

**INDUSTRIAL PERSPECTIVES ON THE IMPLEMENTATION OF THE AIR QUALITY ACT
(AQA) (ACT NO. 39 OF 2004).**

By

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PREFACE

The research described in this dissertation was carried out in the Kwazulu-Natal, North West and Gauteng Provinces from January 2008 to December 2009, under the supervision of Professor Roseanne Diab.

This study represents original work by the author and has not otherwise been submitted in any form for any degree to diploma to any University. Where use has been made of the work of others, it is duly acknowledged in the text.

As the candidate's supervisor I, Professor Roseanne Diab, approve the dissertation for submission for examination.

Signed:

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Professor Roseanne Diab

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Abstract

The Air Quality Act (AQA) Act No.39 of 2004 promulgated in 2004 follows the outdated Atmospheric Pollution Prevention Act (APPA) (Act No.45 of 1965). The legislative approach shifted from a source- based, end of pipe, command and control, guideline principle to ambient air quality management and improvement of compliance to standards through a consultative process.

The AQA's management framework incorporates a co-operative and integrated approach with government, communities and polluters to look at the holistic management of ambient air quality and the identified roles and responsibilities for all stakeholders. The AQA branched from the National Environmental Management Act (NEMA) 107 of 1998, which is the first piece of legislation formalizing the principles of the Integrated Pollution Waste Management (IPWM) Policy published in 2000 and the Bill of Rights.

Government and Industry have a role to play in the implementation of the AQA. Government's role covers the management and enforcement aspects, whilst industries' role includes the management of air emissions and compliance reporting to improve the overall ambient air quality.

The AQA's industrial requirements range from compliance and reporting by ensuring emission licenses are in place, compliance with standards set by different spheres of government and the management of these emissions. The management of these requirements includes understanding the legislation, its implications and the provision of other financial, human and technological resources. Industry needs to consider the impacts of these legislative changes and how it may impact business as a whole.

The aim of this study is to analyze the industrial perspectives of the AQA and its implementation through the use of a questionnaire. Open-ended questionnaires were administered to a total of forty industrial companies in the chemical, petrochemical, energy and mining sectors in the Gauteng, North West and Durban industrial areas. Industries were identified as those which have scheduled process certificates or companies that will be impacted by the impending changes as a result of the AQA.

The overall outcome of the industrial responses revealed poor general knowledge of the principles, purpose and the reasons for the transition from APPA to AQA. Few industries had insight into the type of challenges they may face from the AQA's listed control measures and the control measures that would apply to their particular industry. There is a general concern surrounding the government's lack of support and the essential enforcement that is required to ensure ambient air quality compliance. These challenges and recommendations are discussed in the thesis.

CHAPTER 1

INTRODUCTION

1.1 Background

“Atmospheric pollution is a major problem facing all nations of the world. Rapid urban and industrial growth has resulted in vast quantities of potentially harmful waste products being released into the atmosphere. Societies have been reluctant to accept, or have simply failed to recognize the limitations of the cleansing properties of the atmosphere. The consequence has been that air pollution has affected the health and well-being of people, has caused widespread damage to vegetation, crops, wildlife, materials, building and climate, and has resulted in depletion of the scarce natural resources needed for long-term economic development” (Elsom, 1987: viii).

Elsom’s (1987) view, written some twenty years ago, is still relevant today, particularly in South Africa, where slow progress has been made in the achievement of cleaner air. Atmospheric pollution has for many years been the cause of ill health and vegetation damage. Examples include the killer fog of London in 1952, which resulted in significant numbers of human fatalities, but which subsequently led to the introduction of major air pollution control measures; the brown haze or photochemical smog in Los Angeles; and the effects of acid rain in dense forest or vegetated areas in Europe (Krupa in Austin, *et al.*, 2002).

Health effects of air pollution include respiratory diseases such as asthma, upper respiratory tract infections, emphysema and chronic bronchitis, as well as the exacerbation of more serious illnesses such as lung cancer. Property damage is usually associated with metals and coatings damage is caused by gaseous emissions. Airborne acid is responsible for corroding steel buildings, bridges and masonry works of art. Damage to crops and other sensitive vegetation can also impact agricultural yield and food sources (Tomany, 1975).

Numerous attempts have been made by developed and developing countries to control air pollution for the benefit and sustainability of the city or country. The common approach used as a starting point is management of ambient air quality. Air Quality Management (AQM) involves the management and identification of all aspects that contribute to ambient air

pollution and the mitigation of the pollutant levels to levels that are conducive to the health and wellbeing of the general public and for the sustainability of ecosystems. Stern *et al.* (1977:10) defines AQM as the “*regulation of the amount, location and time of pollutant emissions to achieve some clearly defined set of ambient air quality standards or goal*”. The tools and components for ambient air quality management include health and environmentally based air quality standards, air quality and meteorological monitoring networks, emission inventories, predictive models, regulatory instruments and a selection of cost-effective measures to reduce emissions from sources to ensure compliance with ambient standards (Elsom and Longhurst, 2004).

AQM is the internationally favored approach to manage ambient air quality. Countries such as the United Kingdom, Australia and the United States of America have adopted this approach of AQM to control air pollution. The current South African approach to manage air pollution to acceptable ambient levels is also based on the AQM approach and the National Environmental Management: Air Quality Act (AQA) (Act No. 39 of 2004) has adopted the learning methods and methodology from these first world countries.

The AQM originates from the Integrated Pollution and Waste Management (IPWM) Policy which was published in 2000 (DEAT, 2000). The introduction of the IPWM was to integrate the governance and management of waste and pollution management by addressing legislative gaps and to clarify and allocate responsibilities within the different spheres of government and institutions. The IPWM addressed pollution issues surrounding water, air and land pollution and the shift from reactive measures to proactive management to minimize and prevent pollution. Three principles were adopted to better manage pollution and water. These principles include the assessment of the impacts of transboundary movement of pollution and waste; duty-of-care of pollution from cradle to grave and the accountability of such waste on the generators, and lastly the standardization and streamlining of the regulatory requirements for all polluters.

The first piece of legislation which was developed to meet the needs of the IPWM policy was the framework legislation in the form of the National Environmental Management Act (NEMA) (No. 107 of 1998). There are various pieces of environmental legislation that fall under the umbrella of the NEMA, each focusing on differing environmental elements and aspects. In terms of air quality, the AQA was promulgated in 2004. This national piece of legislation

plays a critical role in AQM and is a point of reference for the management of air quality at all emissions levels and all spheres of government.

The AQM approach used in South Africa allows for the setting of ambient air quality standards, following the implementation and promulgation of the AQA. A number of strategies or measures are included in the Act to control and manage the quality of ambient air. Some of these measures include the licensing of activities, the introduction of emission control and the subsequent monitoring and recording of air pollution information by the polluters.

Industry will be required to play a role in the management of industrial emissions to reach the ambient air quality goals as some industrial emissions have a measurable impact on air quality. Polluters are compelled to comply with the law governing air quality and environmental sustainability. The responsibilities for industries range from administrative measures to practical interventions in the process itself.

The shift in industrial responsibilities from the Atmospheric Pollution Prevention Act (APPA) (No. 45 of 1965) to the AQA will have a significant impact on industrial processes, management of the plants and the interaction and involvement with relevant stakeholders e.g. government, the community and interested parties. Challenges faced by industries are foreseeable and this study aims to analyze the challenges that industry will face and how they aim to overcome these challenges to reach compliance with the AQA and the emission license requirements.

1.2 Aim and objectives

The aim of this study is to analyze the industrial perspectives derived from a range of selected industrial companies on the implementation of the AQA, through the use of a questionnaire and interviews.

The specific objectives of the study include the following:-

1. To examine the requirements of industry as set out by the AQA;

2. To analyse industries' responses to these requirements and the challenges that they face;
3. To assess the level of understanding that industry has about the requirements of the AQA;
4. To make recommendations to streamline the implementation for the AQA.

1.3 Structure of the dissertation

Chapter 1 provides the background to the study, sets the context and outlines the aim and objectives of the dissertation.

Chapter 2 presents a legislative overview, commencing with a historical perspective discussing the APPA and a brief overview of the legislative framework, namely the NEMA and finally, reviewing the scope of the AQA. The chapter concludes with a discussion of the King II report and general corporate accountability in South Africa, in view of the importance of industrial environmental compliance and the benefits that it may have for an organization.

Chapter 3 outlines the methodology of the study; presents the template of the questionnaire and the manner in which the questionnaire was issued to industries and the interviews conducted.

Chapter 4 reports on the results on the questionnaire, a discussion of the responses, challenges faced and an overview of positive outcomes. It also includes an analysis of the general understanding that industry has of the AQA and the license requirements.

Chapter 5 summarizes the findings of the dissertation, highlights shortcomings and makes recommendations to streamline the implementation of the AQA.

CHAPTER 2

AIR QUALITY MANAGEMENT – ROLE OF INDUSTRY

2.1 Introduction

Air Quality Management (AQM) together with other pressing environmental issues was highlighted in Agenda 21 of the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992. AQM is fundamentally concerned with the achievements of economic, awareness and regulatory objectives. An effective AQM plan is dependent on reliable information on ambient pollution levels and general air quality (Bower in Hester and Harrison, 1997).

The implementation of AQM includes a systematic approach to the management of air quality input and output data to ensure the use of the data to provide long term sustainable healthy communities. An Air Quality Management System (AQMS) is a fairly complex tool. It is an integration of various air quality data inputs that are used to assess the overall quality of the air that we breathe and the impact it may have on human health and the environment.

The inputs into the AQMS include technical, administrative and legislative data. Technical data includes ambient air monitoring data, as well as meteorological data on weather patterns and atmospheric conditions. Administrative data includes data from industry such as emission inventories, process information and engineering mitigation measures. The identification and epidemiological understanding of the priority pollutants and its associated impacts on receiving environments and communities should also be considered when assessing the pollution potential of the industry. The legislative data will include the standards set locally, provincially and nationally and will be the limits to manage and control air quality (Scorgie, *et al.*, 2003).

2.2 Air Quality Management Systems

AQM involves the setting of local air quality objectives by understanding and evaluating the needs of the receiving environment. The state of the receiving environment will determine the pollution threshold and what pollutant levels might constitute poor or clean air for the general immediate population. The pollution target levels must be satisfactory to ensure that

the environment is sustainable to human health and welfare, the protection of natural resources and the built environment.

Air management objectives are essential and must be clear, concise, well defined and uniformly understood in order to ensure that the AQMS follows the correct roadmap. Objectives must be realistic, cost effective and achievable; if not, the air quality management plan is set for failure. The availability of all resources such as human, technical and funding must be considered through the lifespan of the AQM plan to ensure its sustainability. It is possible that an organization is likely to have its own specific objectives for air quality, as well as regulated objectives set either locally or nationally by the authorities.

Monitoring of air pollutants is key in the managing of air quality and includes both monitoring of emissions and ambient air concentrations. The reasons for monitoring ambient air may include but are not limited to: statutory requirements for legal compliance; policy and strategy development for long term business and municipality sustainability; local and national planning; measurement against standards to assess ambient air quality; identification and quantification of risk to assess health risk of communities and public awareness. Typical monitoring functions could be: to identify threats to natural ecosystems or population health; informing the public about air quality and to raise general awareness; to determine compliance with national and international standards/guidelines such as the World Health Organization. Other typical monitoring functions include providing objective inputs to AQM; traffic and land-use planning in terms of Environmental Impact Assessments; policy development and prioritization of management actions. The measuring tools such as pollution modeling or geographical information systems can assess point or area source impacts, potential problematic geographical areas and measure change of conformance to control targets (Bower, in Hester and Harrison, 1997).

A large portion of the AQMS is dependent on the technical data. It is of the utmost importance that the technical resources are based on sound technical expertise and internationally recognized methodology and technology. Capacity building in this particular sphere is important to understand the intricacies and interpretation of information collected from tools such as emission inventories, dispersion modeling, meteorology, air pollution monitoring networks and impact assessment methodologies.

Mitigation tools include the use of incentives to minimize and reduce the emission levels as a mitigation measure and to manage air emission to lower its impact on the receiving environment. These tools include a source based command and control measure which is a historical approach but can still be effective in the short term. Other tools include market incentives, tax refunds, voluntary initiatives and self regulation, particularly for polluters who are environmentally conscious and who practice self regulation purely from a corporately responsible point of view or from the view where they are influenced by public opinion and societal pressure. Other tools include education and awareness programmes for staff and the public. In terms of AQM plans for a city or a large geographical area it may be best to implement a range of mitigation tools and mitigation measures to reduce emission levels due to various sources and pollutants. The emission reduction measures must take into account the benefits and impacts for all aspects (air, water, soil and human) of the receiving environment; the technical feasibility; economical viability and whether the method is socially and politically accepted (Scorgie, *et al.*, 2003).

Integrated Environmental Management is a helpful approach to implement an air quality management plan. The integrated environment approach would include sectors affecting air quality such as The Roads and Transport Departments, Mineral and Energy Department; Housing and Land Development Departments and City Planners. Integration and strategic planning for housing developments can minimize future exposure to communities from poor air quality. For example a proposed housing development situated close to a landfill. In instances such as these, authorities need to take into account the causes, impacts and mitigation for air, odour, noise, traffic congestion, damage to roads, etc., hence the valuable input and integrated co-ordination from other municipal departments and surrounding affected communities (Scorgie, *et al.*, 2003).

Communities need to be empowered to understand air quality and the impacts poor air quality has on their environments. This will raise awareness and increase the pressure on to non-compliant organisations. Environmentally active communities play a significant role in the management of air quality and emission levels for pollutants. These communities act as watch dogs. Public consultation through the interested and affected party process cover two aspects; to inform the public of changes in the surrounding environment and the potential impacts thereof and to provide the opportunity for their voices and opinions to be heard and

considered. AQA place great emphasis on public consultation, particularly through the permitting process and environmental impact assessments (Scorgie, *et al.*, 2003).

2.3 Legislative Context in South Africa

2.3.1 Atmospheric Pollution Prevention Act (APPA) Act No. 45 of 1965)

The Atmospheric Pollution Prevention Act (APPA) (Act No. 45 of 1965) was the driving piece of air quality legislation from the mid 1960s. The act excluded targets, standards and was based on emission guidelines. APPA controlled noxious and offensive gases, smoke, dust and vehicular emissions. Noxious and offensive gases, were defined in the Act to include a large number of compounds caused by industrial pollution, and were controlled by the Schedule Process Permit which was obtained from the Chief Air Pollution Control Officer (CAPCO). Since 1968, South Africa as a whole was declared a controlled area. By 1996, the South African Constitution (Act No. 108 of 1996) was promulgated and contained within it the Bill of Rights (Lazarus, *et al.*, 1997).

The Bill of Rights enshrined the right of the South African people and affirms their democratic values of human dignity, equality and freedom. Section 24 of the Constitution states that everyone has the right:

- a) To an environment that is not harmful to their health or well-being and
- b) To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that:-
 - a. Prevent pollution and ecological degradation
 - b. Promote conservation and
 - c. Secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

In order to give effect to this piece of legislation in the context of air quality, it is essential that air pollution levels are conducive to sustainable communities to promote a sustainable and healthy environment. The setting of ambient air quality standards are necessary and the measures to ensure that air quality standards are monitored, controlled and sustained (DEAT, 2007).

2.3.2 National Environmental Management Act (NEMA) (Act No. 107 of 1998)

NEMA provides the legislative framework for environmental management in South Africa. Its primary purpose is to provide for co-operative environmental governance and the guidance for decision making on matters affecting the environment and its people. NEMA highlights principles for the sustainable management and integration of environmental aspects within South Africa and its impacts on the people and receiving environment. NEMA makes for further provision for the establishment of the National Environmental Advisory Forum (NEAF) as a body to encourage stakeholder participation and develop management methods. Co-operative governance, conflict resolution, the integrated environmental management, international agreements and compliance and enforcement form chapters in NEMA (DEAT, 2007).

NEMA principles are fundamental to understand the background to AQM, its national framework and the link to report permit and regulatory deviations. The principles are discussed below in light of industry's role.

NEMA has within it set principles that significantly affect the environment which will provide the various organs of state's responsibility to respect, protect, promote and fulfill the social and economic rights and basic needs of South African people. These principles will serve as a general framework within which environmental management and its implementation plans are formulated. NEMA will also serve as a guideline for intergovernmental co-operation and the roles that the varying organs of state exercise in order to preserve and protect the environment. The principles include the focus to ensure that people and their needs are at the forefront of any decision making process and to serve their physical, psychological, development, cultural and social interests equitably. A key principle within NEMA is to ensure that development must be socially, environmentally and economically sustainable (DEAT, 2007).

Sustainable development within NEMA makes provision for the negative impacts to the environment and the consideration of alternatives such as avoidance, minimization, remediation and recycling and reuse in terms of waste. These negative impacts include the disturbances to ecosystems, loss of biological diversity, pollution, degradation of the environment, disturbance of landscapes and cultural/ heritage sites, exploitation of non-

renewable and renewable natural resources and its ecosystems. The risk averse and cautious approach is considered as part of sustainable development where the lack of knowledge is taken into account in view of the potential consequences and the minimization of the negative impacts.

Environmental management within NEMA must be integrated to acknowledge the interrelation of the environmental elements and the consequences those decisions can have on the environment and its people. Decision makers and polluters are encouraged to pursue a range of best practicable environmental options.

Environmental justice must be the cornerstone so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any vulnerable or disadvantaged person. Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being for all categories of people must be encouraged.

The promotion of interested and affected parties' participation in environmental governance ensures that all aspects of environmental elements and its impacts to the environment and the people are considered and recognized. In order for beneficial input from interested and affected parties, all people must have the opportunity to develop the understanding, skills and capacity to achieve equitable and effective participation by vulnerable and disadvantage groups. NEMA allows for the empowerment of communities to improve their well-being by improving access to environmental education and raising environmental awareness to sharing knowledge and experience. Consultative methods with interested and affected parties' where decisions are made in an open and transparent manner and access to information must be conducted in measures that abide by law.

The polluter pays principle is a common principle understood by many polluters. Polluters are responsible for the cost of remedying pollution, environmental degradation and consequent adverse health effect and to prevent, control or minimize further pollution, environmental damage or adverse health effects. Stressed ecosystems or environments such as the atmosphere may require specific attention in the management and planning procedures.

Section 28 of NEMA is the duty of care and remediation of environmental damage, whereby “Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorized by law or cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment”. The duty of care allows for the reporting and recording of pollution incidence and the duty that polluters have to report and to ensure the necessary remediation is taking place.

Industries and polluters are compelled to comply with the Constitution – Bill of Rights that is to not impinge on everyone’s right to a clean environment that will not cause harm to health and well-being. Furthermore, industries are also compelled to comply to Section 28 of NEMA – duty of care.

2.3.3 National Environmental Management: Air Quality Act (AQA) (No. 39 Of 2004)

The promulgation of the AQA in 2004 saw a significant change in the management of air quality in South Africa. The main change was a shift from source-based management to ambient air quality management. The AQA scope encompassed a larger and more detailed array of air quality aspects as opposed to mere pollution prevention as per the scope of the APPA. The scope of the AQA, 2004 is as follows: *“To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulation air quality monitoring, management and control by all spheres of government; for specific air quality measures and for matters incidental thereto”*. The objectives within the scope cover the protection of the environment but also generally to give effect to the Section 24(b) of the Constitution by securing an environment that is not harmful to the health and well-being of people.

Aspects of the AQA that cover the method of how air quality is managed in industry have increased in comparison to APPA. The responsibility of gathering data, pollution minimization, air quality reporting and the accountability of non-compliance has resulted in increased awareness for industries. The AQA represents a shift to an air pollution control

strategy that is based on the receiving environment's air quality status. The AQA focuses on the adverse impacts of air pollution on the ambient environment. It also sets ambient air standards to measure air quality management performance and simultaneously sets emission standards to measure and monitor the concentration of pollution that enters the atmosphere at source (DEAT, 2007).

Chapter Two of the AQA identifies the need for a national framework and the development which includes the setting of national monitoring and information management standards, the setting of national, provincial and local standards and the ambient air quality and emission measurements. The national framework was released in September 2007 by the Department of Environmental Affairs and Tourism and titled "The 2007 National Framework for Air Quality Management in the Republic of South Africa". Chapter two emphasizes that enforceable national standards must be developed by the Department of Environmental Affairs and Tourism (DEAT) for ambient concentrations. Provincial and local government may also set air quality ambient standards. The ambient standards may be the same for all spheres of government; however, no standard can be lower than the national standard. In priority areas the standard can be higher than the set national, provincial or local standard. The setting of standards has an impact on industry as the standards are now enforceable and encourage the industries to monitor emissions and ensure accuracy when drawing up emission inventories (DEAT, 2004)

Chapter Three covers the institutional and planning matters outlining the responsibility of the governmental authorities and institutions and does not apply to this dissertation.

Chapter Four focuses on the priority areas, listing of activities resulting in atmospheric emissions, controlled emitters, controlled fuels and other measures such as pollution prevention plans, atmospheric impact reports and recognition programmes, the control of dust, noise, offensive odours and the rehabilitation of closed mines. The Minister or MEC may list activities that result in atmospheric emissions and may have a detrimental effect on the environment, including health, social, economic, ecological conditions or cultural heritage. The list of activities addresses the permissible amount, volume, emission rate or concentration of the substance or the mixture of substances that may be emitted per listed activity. Industries whose processes appear on the listed activities will have to pay much attention to the allowed emission concentrations as the actual emission will be determined by

the processes of the operation and may impact negatively on the organization if the emission concentration set by the authorities is not favourable (DEAT, 2004).

The introduction of listed activities in the AQA marks a dramatic shift for industries. The process related measures should be implemented using reasonable practicable steps and the BATNEEC (Best Available Technology Not Entailing Excessive Cost) principle. Industries must take reasonable measures to manage the release of offensive odours emanating from their facility or premises. Compliance with the relevant national, provincial and local standards from point, non-point and mobile sources in terms of substances and mixtures of substances emitted; for controlled emitters and the use of controlled fuels may lead to process design challenges and may lead to costly retrospective process design changes. In cases where the industry is a listed activity, the industry must comply with any minimum emission standards in respect of a substance or mixture of substances identified as resulting from that listed activity (DEAT, 2004).

The minister or MEC may declare any substance contributing to air pollution as a priority air pollutant and require those polluters falling within the specified category to develop pollution prevention plans. Atmospheric impact reports to be developed by the polluter in the event that an air quality officer may wish to view the report if he/she suspects contravention. A public recognition programme can be developed by the air quality officer to recognize significant achievements in an area for pollution prevention. Industries' role in the development of pollution prevention plans increase the accountability of accurate and valid data, increased responsibility in terms of non-compliance, improved reporting to authoritative bodies and the public. It also ensures that where non-compliance exists an atmospheric impact report is drafted and submitted to the necessary authoritative body or where the air quality officer finds it necessary for an organization to submit an atmospheric impact report in the event of uncertainty or a change in the license or process (DEAT, 2004)

Chapter Five is of great interest to Industries for those who fall within the categories of controlled emitters and listed activities as this chapter deals with the licensing of these organizations. The local government and district municipalities are charged with implementing the atmospheric emission licensing system. Holders of the atmospheric emission license may be requested by the air quality officer to designate an emission control officer within the organization. This particular section of the Act governs the need for

industry to employ qualified emission control officers within the organization to ensure that annual reports are accurate and technically valid. The emission control officer must be competent in air quality management. The licensing process includes a consultative process whereby community and public participation is necessary when drafting and implementing licenses which may be an added concern for industries (DEAT, 2004).

The above administrative measures include: the compliance reporting to the standards for identified emissions from point, non-point or mobile source to the correct organ of state and the compliance with pollution prevention plans for the facility that emits priority air pollutants. Other administrative measures include; compliance to the air quality officer's legal request to submit an atmospheric impact report in a prescribed form; and in the case of listed activities to make an application for an Atmospheric Emission License and to comply with its provisions, and lastly for the industry to designate an Emission Control Officer who will manage the compliance with the AQA and emission license requirements.

The Atmospheric Emission Licenses are detailed within Section 37 and 38 of the AQA. The licenses make provision for the minimum standards set for ambient air and point source monitoring and will highlight the activity of the business, premises, the period of validity, maximum allowed concentrations of pollutants, emission rates during normal and abnormal operations, reporting requirements and penalties for non-compliance to name a few. The licenses may include further conditions surrounding odour, noise and review of permits. Atmospheric impact reports are dependent on the Atmospheric Emission Licences. An Air Quality Officer may require an assessment in the form of an atmospheric impact report if there is suspicion in terms of non-compliance of the permit conditions listed or that may have a detrimental effect on the surrounding environment. It may not be possible to submit an atmospheric impact report if an organization or industry does not have an Atmospheric Emission License (DEAT, 2004)

The National Framework for Air Quality Management in the Republic of South Africa released on the 11 September 2007 highlights and details the implementation of the AQA by serving NEMA section 12 which is to develop environmental implementation and management plans. The purpose of the national framework is to achieve the objectives of the AQA and to provide the medium- to-long term plan of the practical implementation of the AQA. The framework will provide the mechanisms, systems and procedures to promote

holistic and integrated air quality management through pollution prevention and minimization at source and through impact management with respect to the receiving environment from a local scale to international issues by setting norms and standards for all technical aspects of AQM. AQA section 7(1) stipulates the requirements of the national framework which include the systems, procedures and mechanisms to attain compliance with the ambient air quality standards and to incorporate South African's obligations in terms of international agreements. The national norms and standards are set for the control of point and non-point source emissions, the monitoring of air quality, air quality management planning, air quality information management. The National Framework includes the methodology aimed to ensure that the norms and standards address public participation and the role it has in the protection and enhancement of air quality; public access to air quality information; the prevention of air pollution and the degradation of air quality; the reduction of alternative discharges that might impact air quality and the reduction of emissions at source. The promotion of efficient and effective air quality management and monitoring together with regular compliance reporting to South African standards and international agreements are included as part of Section 7(2) (DEAT, 2004).

The cooperative governance between all spheres and organs of state together with each organ's responsibilities is stated within Section 7(3). Section 8 of AQA covers the national monitoring and information standards- the national framework establishes national standards for municipalities and provinces to monitor ambient air quality, point, non-point and mobile sources and the methodology to measure the performance of each province. The collection and management of data are necessary to assess the compliance with the AQA and are measured for compliance against the ambient air quality and emission standards; performance of compliance with municipalities' air quality management plans within priority areas. (DEAT, 2007).

According to Lazarus, *et al.* (1997), the response of many South African industries to environmental law was more reactive than proactive because the South African environmental law was not designed to encourage long-term environmental planning by industry due to the fragmentation and poor law enforcement by government. Although this statement by Lazarus, *et al.* (1997) was written twelve years ago, the national framework for the implementation of the AQA aims to achieve its medium to long term objectives.

2.3.4 King II Report and Corporate Accountability Reporting

Corporate reporting is a responsibility of industry and plays a role in AQM. The King report on corporate Governance (King I) published in 1994 incorporated the Code of Corporate Practices and Conduct and was aimed at promoting the highest standards of corporate governance in South Africa. Growing economic businesses globally and many legislative developments resulted in the development of the 2002 King II Report on Corporate Governance. The King II report acknowledged that there was a move from the single bottom line being the profit share for shareholders to the triple bottom line which embraced the economic, environmental and social aspects of the company. The King committee describes the King II as..." *successful governance in the world in the 21st century requires companies to adopt an inclusive and not exclusive approach. The company must be open to institutional activism and there must be greater emphasis on the sustainable or non-financial aspects of its performance. Boards must apply the test of fairness, accountability, responsibility and transparency to all acts or omissions and be accountable to the company but also responsive and responsible towards the company's identified stakeholders. The correct balance between conformance with governance principles and performance in an entrepreneurial market economy must be found, but this will be specific to each company.*" (Dekker, 2002)

Although corporate reporting and the King report are not legislative requirements, these reporting tools are effective in the private sector and amongst the shareholders and stakeholders. The concept of sustainability has been recently recognized and adopted into the business context whereby the integrated sustainability reports show a balanced and integrated economic, environmental and social performance i.e. the triple bottom line. King II aims to provide indicative, aspirational guidelines to South African companies who are willing and able to disclose practices and who recognize the importance of relationships between the company and the community in which it exists. The integrated sustainability reports are achieved whereby every company, particularly those on the Johannesburg Stock Exchange (JSE), report at least annually on the progress and status of their social, transformation, ethical, safety, health and environmental management practices and policies. The principles of the integrated sustainability reports rely on the reliability, relevance, clarity, comparability, timeliness and verifiability of information (Dekker, 2002). In the competitive environment that private organizations operate in, benchmarking and the good corporate citizen image and the

appearance of solid sustainability becomes a brand for marketing for the particular organization.

Corporate reporting is also used to demonstrate company wide integrated environmental management systems, corporate responsibility and the implementation of voluntary initiatives and codes of conduct. The corporate environmental reporting also identifies the company's performance and the company's progress with their internal strengths and weaknesses. Conformance to company procedures, policies and best practice as well as compliance with necessary national and international legislation and protocols forms part of corporate reporting. Environmental reporting allows the general public and stakeholders to participate in corporate goal setting, as well as providing third party opinions on the management of environmental issues within an organisation or company. Combining corporate environmental reporting together with economic and social reporting provides information about the company's performance against the triple bottom line of sustainability.¹

The focus points of improvement in the generation of corporate environmental reporting include multi-way active dialogue by involving stakeholders and interested and affected parties. The verification of the information was standardized therefore it allowed all or most corporate environmental reports to improve their credibility. The focus shifts from quantitative inputs and outputs to benchmarking and qualitative business, strategy, qualitative impacts and outcomes. The reporting boundaries are set through stakeholder dialogue and by the needs of stakeholders. The triple bottom line including environmental, social and economic reporting is paramount whereas established focus points reported on environmental performance only¹.

A large hindrance to environmental management in South Africa is a shortage of accessible information. In some cases, information is restricted, difficult to locate and the format is difficult to use or non-existent. Any management system and the complexity of an integrated pollution control system must be based on one that is a reliable, consistent, easily retrievable and useable. Pollution cannot be effectively controlled unless sources, its make-up and the way in which it is transferred are well understood. Without this information it is difficult to set long-term planning and resource allocation. Availability of information was also problematic

¹ <http://www.uneptie.org/pc/pc/tools/reporting.htm> accessed 26 March 2006

in the past whereby the governmental authorities did not publicly make this information accessible. Under the APPA – section 41 there was a blanket secrecy provision which that no information can be disclosed without the consent of the person carrying out the undertaking unless it is for the purposes of legal proceedings arising out of the Act. The secrecy culture developed within industries, in which they were reluctant to release any environmental information, especially information that may put the industry in bad light (Goldblatt, 1997). This secrecy culture was evident during the interview process of gathering information for this dissertation.

Air Quality reporting and publication e.g. State of Air Reporting are conducted by environmental authorities as per the AQA and the National Framework. In terms of industrial reporting, industry may need to submit pollution prevention plans as per Section 29 of AQA and the emission control officer is tasked with submitting non-compliance reports to the authorities Section 48(c). The non-compliance reports should be in the form of the atmospheric impact reports as stated in Section 30. (DEAT, 2007)

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter describes the methodology used to analyze the industrial perspectives and responses of selected industrial companies on the implementation of the AQA, through the use of a questionnaire. The methodology for each specific objective is detailed below.

3.2 Examination of the requirements of industry as set out by the AQA

The AQA and relevant supporting literature was read and analyzed to determine the requirements of the AQA as a whole and more specifically the requirements for industries. An appraisal of environmental management legislation and the legislative process that lead up to the development of the AQA is essential to evaluate the shift from APPA to AQA and to understand the impact the shift would have on industries. The evaluation of the legislative change supported the design of the questionnaire to test industries' knowledge of the AQA and management of air quality. Questions were included to determine whether industry understood their requirement and legal obligations in terms of the AQA.

3.3 Questionnaire design

Two questionnaires were designed for reasons which are elaborated on below. The original questionnaire was aimed at highlighting industries' general knowledge of the AQA and the specific AQA requirements for their operations. The general questions were aimed at examining the overall industrial perspectives and understanding of the AQA and the transition from APPA to the AQA and how the shift affected the operations and environmental management in the industry. Through open-ended questions, the questionnaire allowed the respondents to elaborate on the challenges faced by their industry in terms of administrative, communication and technical implementation of the AQA requirements.

The questionnaire contained specific questions on air quality management in the actual company or industry. These included emissions of priority pollutants; location of the industry and whether its location was in a declared priority area; and the use of controlled emitters and controlled fuels.

Questionnaires were distributed; however, the initial response was poor. This was mainly due to the level of detail required in the questionnaire about the industries' air emissions. Some industries were reluctant to respond, citing reasons such as the level of detail required exposed their company too much in terms of their emissions, and that they did not understand the AQA requirements itself.

Following the poor response and based on the reasons given by the respondents for not wishing to respond to the first questionnaire, a second questionnaire was distributed. The second questionnaire entailed less detail about the companies' air emissions and more detail surrounding the knowledge and understanding of the AQA by those who manage air pollution of the facility. The questionnaire is included in Appendix 1. All questionnaire responses were recorded as anonymous in this dissertation, Appendix 2 shows a table comparison of the industries that were targeted versus the response and Appendix 3 shows the percentage breakdown of the industries targeted.

The questionnaire included questions relating to the respondents' knowledge, understanding and practice of the implementation of the AQA. An analysis of the responses focused on their level of understanding of the AQA, the challenges faced and the level of implementation of the requirements of the AQA and license requirements. The responses were then categorized into common themes and trends amongst the varying industries. The themes were then analyzed and discussed to understand what will work well and what would be the future challenges in the implementation of the AQA. Once the themes were identified and analyzed, areas of improvement were identified and recommendations made to improve the implementation of the AQA going forward.

3.4 Questionnaire distribution

The questionnaire was distributed to selected industries. An explanatory note accompanied the questionnaire to explain its purpose, terms used and instructions on how to complete the

questionnaire correctly. The questionnaire was distributed by email to the environmental manager or the individual who has an environmental role at each industry.

The primary target for the questionnaire, were industries that were declared as scheduled process activities according to the APPA and secondly, those industries that fit the requirements of the AQA, i.e. industries that are located in priority areas and operate controlled activities. The industries targeted were located in the Gauteng, North West and KwaZulu-Natal provinces of South Africa, two of which are recognized as the most heavily industrialized provinces of the country.

In KwaZulu-Natal, a list of industries was provided by the Ethekewini Municipality. The industries selected from this list included those that were listed as air pollution sources as part of the Multi-point Plan and included the big 5 industries (two paper and pulp, two refineries and sugar industry) and other medium size industries that have schedule atmospheric process permits. In Gauteng and North West, industries were identified by the use of a network of environmental professionals and environmental directories and publications. The total number of targeted companies in both regions was 52.

Some industries were approached more than once (e.g. pulp and paper sector). In such a case, a questionnaire was sent to a particular operations plant to gain insights from an operational perspective, as well as to their corporate/head office to gain insights at a strategic level and to understand the challenges faced with compliance to the AQA at a group level. Other companies with various branches but within the same industry were also approached more than once (e.g. Sasol which has a number of smaller subsidiary companies such as Sasol Oil, Sasol Polymers and Sasol Infrachem). The reason for this was that each of these subsidiary companies is based at a different location and has different chemical processes that may be affected by the AQA. Further, it was desired to get as rich a data set of responses as possible, particularly as implementation is at the local level. Appendix 2 is a pie chart showing the industries targeted and where the questionnaires were sent to.

The majority of industries opted for anonymity when responding to the questionnaires; therefore, all company responses will remain anonymous. Six companies did not respond to the questionnaire but gave reasons for not responding. These reasons included not being aware of the AQA or that the AQA was not applicable to their operations, even though based

on their locality and process, they are deemed to fall under the AQA. Some industries responded that their Air Quality Management Plans (AQMPs) were sensitive and that they preferred not to respond, even though the option of anonymity was offered.

Industries targeted included chemical manufacturers, mining, paper and pulp, waste disposal, sugar manufacture, petrochemical and cement industries based in the Gauteng, KwaZulu-Natal and North-West provinces. Although over 50 companies were approached, the response rate was generally poor (31%). Despite this, the level of detail provided in the submitted questionnaires and the fact that approximately 50% of the respondents had been involved in the drafting process of the legislation, provided considerable insights into the implementation and long term effect of the AQA.

The questionnaire was distributed by e-mail to the environmental manager or individual with environmental responsibility at the selected industries, with an accompanying note explaining the purpose of the questionnaire, terms used and instructions on how to complete the questionnaire correctly.

3.5 Assumptions and limitations

An underlying assumption of the study was that respondents should have some basic understanding of the AQA, the shift from APPA to the AQA and the impact that the AQA will have on the industry. The questionnaire was designed in a language and style that assumed that respondents would understand AQA terminology and technical processes.

A limitation of this study, although explicitly part of its design, is that it focused only on industrial perspectives and not on the perspectives from government, private consultants or communities. Owing to this, the perspectives of a large number of air quality specialists and people who are significantly involved with the implementation of the AQA, for example government officials and private consultants have been omitted from the study. Inevitably, responses from these target groups may provide quite a different perspective on the AQA and its implementation.

Although the sample was small, the responses given by the sample group reflect some consistency to the results giving the feedback validity and some credibility to the challenges and the perspectives of industry.

A further limitation is that the questionnaire survey was conducted predominantly by e-mail. A total of two interviews were conducted telephonically in cases where individuals had opted to talk through the questionnaire as opposed to a written completion of the questionnaire. A total of three face-to-face interviews took place. It is recognized that face-to-face interviews would have been preferable for most questionnaires but the researcher was constrained by part-time studies.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter describes the responses to the questionnaires distributed to the various industries. The results were grouped into five main themes. These themes include industries' overall views of the objectives, principles and intent of the AQA; the capacity, skills and knowledge gaps that exist within industries and the impact thereof; the AQA's listed control measures that industries foresee to be most effective for their operations and for better compliance to the AQA; the communication channels and the government support provided to industries and the effectiveness of these channels and efficiency of this support; and finally, industries' overall perspective of the implementation of the AQA, its long term sustainability and compliance with its principles.

4.2 Industrial views on the objectives, principles and intent of the AQA and the transition from APPA

In summary, respondents from the group of industries (cement, sugar, paper and pulp, mining, petrochemical industries) that participated in the drafting and commenting phases of the AQA understood the objectives, principles and shift from APPA to the AQA fairly well. Respondents from the group of industries (waste disposal, chemical manufacturing and mining industries) that had not been closely involved with the drafting of the AQA, or the comment phase had a limited knowledge of the AQA's objectives and principles and the changes associated with the shift from APPA to the AQA.

4.2.1 Objectives and principles of the AQA

The objectives of the AQA are to give effect to the Bill of Rights within Section 24 of the Constitution:

A) To protect the environment by providing reasonable measures for:-

- i) the protection and enhancement of the quality of air in the Republic;
- ii) the prevention of air pollution and ecological degradation and

- iii) securing ecologically sustainable development while promoting justifiable economic and social development.

B) To give effect to Section 24 (b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

None of the industries responded perfectly on the objectives of the AQA but some industries (paper and pulp, cement, mining, sugar and petrochemical) understood that there is a link between the AQA and the National Environmental Management Act (NEMA) and the AQA and the Bill of Rights - Section 24 of the Constitution. These industries also identified that the objective of the AQA is to enhance air quality of the receiving environment and to contribute to a sustainable environment and society. The AQA is focused on emissions and ensuring that emissions have minimal impact on the environment and communities. The Polluter Pays Principle was identified and linked to NEMA which raises the compliance standard and penalties executed.

The remaining industries (chemical manufacture and waste disposal) were not clear in their responses and appeared unsure as to the purpose of the AQA. Vague responses such as “to implement guidelines”, “wait and see” approach, “very little understanding” and that “APPA was outdated” were some of the reasons given for the drafting of the AQA. It is apparent that their understanding of the underlying objectives of the AQA is superficial and may be inadequate and possibly incorrect.

4.2.2 Understanding the shift from APPA to AQA

The detailed knowledge of the shift from APPA to the AQA was clear and well understood in some of the industries (paper and pulp, cement, mining and sugar manufacturing). This knowledge included an understanding of the emission limits set by national government and how these will cascade to local government for implementation, compliance and regulatory monitoring. They understood that the shift from APPA to the AQA would link the emission limits to the emission license structure and they were able to highlight the process for the license implementation for the individual, tailored license requirements. They noted further that the AQA identifies the need for enforceable standards, the development of the Air

Quality Management Plans (AQMPs) within the local councils and that there was a systematic approach to the implementation of Air Quality Management Systems (AQMSs).

The AQA identifies a number of control measures to measure compliance and reporting structures within the various spheres of government. Industries identified that the AQA allows for legislated, improved communication between industries and communities. It was also recognized that some of these community forums and structures existed prior to the introduction of the AQA. It was noted that the forums improved communication with the business and contributed towards business transparency. Industries also identified the effective licensing system which is significantly different from the APPA and the inclusion of ambient emission standards into the permit requirements of a particular industry. The main shift highlighted by this group (petrochemical, cement, mining, paper and pulp and sugar manufacturing) was the change to a focus on monitoring and compliance with ambient air quality standards, whereas APPA focused on stack emissions and not the cumulative impact of stack emissions. It was also noted that the AQA focuses on continual improvement and is meant to incorporate a collaborative and integrated approach by government, industry and the communities. For the first time, the legislation aims to develop sustainable communities and to improve human health as opposed to meeting standards by modifying industrial processes and factory equipment. The APPA was also outdated and in much need of revision in order to benchmark South African air quality management legislation to international legislation.

The language and words used in APPA, for example “guidelines” and “may” allowed industries to find loop holes in the legislation and in the enforcement approach and to justify non-compliance. The AQA, on the other hand, is very specific and enforceable and the language and choice of words e.g “standards” and “shall” create a mandatory tone.

Some industries (chemical, mining, waste management) were not clear on the changes that may emanate from the shift from APPA to the AQA. Their responses indicated that the legislative shift may not affect their operations and they do not foresee the applicability of the AQA to their operations. Notably, a number of these industries met the requirements of the AQA emission license criteria for example, a mining industry was not convinced that the AQA would have any impact on its operations, and would only react once there was physical intervention from the authorities.

Other changes identified were that the AQA included a number of air pollution sources and fuel types, whereas APPA only focused on the noxious gases, dust, noise and vehicle fumes.

4.3 Impact on industries in terms of human resource capacity, business impact and knowledge gaps

Industrial impacts and challenges as a result of the shift from APPA to the AQA, vary from the appointment of competent emission control officers, the need for an understanding of the emission licenses and a comprehensive knowledge of the local air quality management system relevant to the location of the industry.

Industries whose activities fall within the following categories are required to comply with the requirements of the AQA. These categories include the use of controlled fuels (Section 26), controlled emitters (Section 23), location within a priority area (Section 18) or processes that are defined within the scope of declared listed activities (Section 21). The implementation of the atmospheric emission licenses (Section 37) and emission standards (Section 9-11) will impact businesses and industrial processes in order to comply with the stricter emission standards and regular permit reporting and non-compliance reporting requirements (Section 30) as stated by the AQA.

The business impact is related to financial, reputation and social/corporate responsibility changes that may occur as a result of the implementation of the AQA. The knowledge gaps highlight the gaps and implementation concerns from the industries' standpoint.

4.3.1 Industrial human resource capacity

Section 48 of the AQA refers that industries make provision for emission control officers who 'must have requisite air quality management competence in respect of the listed activity in question, and must –

- a) work towards the development and introduction of cleaner production technologies and practices;
- b) take all reasonable steps to ensure compliance by the holder of the license with the license conditions and requirements; and

- c) promptly report any non-compliance with any license conditions or requirements to the licensing authority through the most effective means reasonably available.'

Eleven of the industries from the cement, paper and pulp, sugar, mining and chemical manufacturing industries indicated that there is adequate knowledge amongst their current staff to fulfill the requirements of the AQA. For technical knowledge gaps external consultants are appointed to assist. A fewer number (four - paper and pulp and cement) of the industries also indicated that they rely on the technical knowledge at the company's head office where their experts provide legal and technical advice. As mentioned previously, six of the respondents had been part of the drafting process of the AQA and have a good knowledge and foundation on air quality management systems. Three industries (sugar, mining, paper and pulp) responded that chemical engineers and air quality specialists have been appointed as permanent staff members whose objectives are primarily to ensure compliance with the AQA. Fewer industries i.e. seven respondents (chemical, waste and petrochemical) mentioned that there is an internal lack of AQA knowledge and that they fully rely on air quality consultants to ensure compliance with standards and compliance with the AQA. These industries indicated that they had no plans to appoint a full-time emission control officer, as defined by the AQA.

The paper and pulp and cement industries, in particular, mentioned that at their company corporate level, the technical and legal knowledge was well embedded. There was concern that at some sites knowledge needed to be improved at the operational level.

All industries commented on the dynamic human resource environment, including the rapid staff turnover changes and poor capacity challenges within the government sphere. This will be further discussed within the government support theme.

4.3.2 Business impact

Financial outlay is the greatest impact on businesses associated with the level of compliance with the AQA and the permit requirements. The high cost of complying with the AQA has the potential to close businesses. According to a sugar manufacturer, a capital investment of R 50 million over a period of five years is the financial outlay needed to ensure that the sugar manufacturing process is efficient and optimized and assures compliance with the emissions

standards and in order to reduce community complaints. The paper and pulp sector noted similar monetary values to ensure compliance with the AQA. The view of these industries was that compliance to the AQA was paramount and that non-compliance would lead to the closure of manufacturing plants. In their view it was in the companies' and communities' best interests to ensure that compliance with the AQA was entrenched in order to secure jobs for the surrounding communities. The pulp and paper industry was of the opinion that compliance with the AQA was a legal requirement that was justified. It motivated companies to invest further into the operations thereby securing jobs and contributing to sustainable communities.

The major concern of the above two industries was the promulgation of stringent enforceable standards that would be impossible to meet. The draft emission standards were released in Government Gazette No. 32434 – 24 July 2009. Industries from the mining sector, paper and pulp, sugar manufacturing, petrochemical and cement sectors surveyed have indicated that the time lines are too short and that it will be impractical to ensure compliance with these emission standards as proposed in the period envisaged. Comments and recommendations have been forwarded to the national government (Department of Environmental Affairs) regarding the process relating to the release of these strict emission standards. Industries have recommended a phased approach, over a number of years, to embed the strict emissions standards. This approach will allow industries the time to upgrade their plants and processes and make the necessary internal organizational changes and ensure compliance with the AQA. It was noted that petrochemical industries have negotiated a time span of eight years to meet these standards.

Respondents from the mining industry generally commented that there would be minor business impacts on their industry as the management of dust emissions had not changed substantially and therefore significant changes were not necessary. The mines located in the North-West province had done much of the air quality management and monitoring of dust emissions some years ago, due to the proactive thinking of the former Chief Air Pollution Control Officer (CAPCO) in the province. The historical work that took place in these mining industries placed them in a good position to comply with the AQA.

A few industries, for example chemical manufacturing, were unable to foresee the potential impact of the AQA on their business and relied on the “wait and see” and “hire air quality management consultants” approach to manage the impending compliance with the AQA.

In general, industries identified that the overall impact of the implementation of the AQA would have a positive spin-off on surrounding communities. Communities would have cleaner air, industries would be more transparent, and communities would begin to trust industries. Most industries have pre-existing community forums that prove to be effective and will continue to be part of the environmental management programmes for the industry.

All the industries surveyed, spanning the cement, sugar, mining, petrochemical, chemical and paper and pulp sectors, highlighted a number of positive impacts arising from the implementation of the AQA. The AQA will require all industries that may have a potential negative impact on the receiving environment to invest in skills; equipment and technology which will enable balanced industrial efforts across the various industries to equally contribute to the improved ambient air quality and avoid larger companies being targeted due to their size and visibility (cement manufacturing). Industries are viewed as equal entities and treated equally in terms of compliance. The general understanding is that the AQA is a good piece of legislation with stringent limits that will apply to a larger range of industries and operations. The AQA has also had a positive impact on the surrounding communities and the fulfillment of the Bill of Rights and 24(b) of the Constitution (sugar manufacturing). Compliance with the AQA has acted as a catalyst and forced industries to re-think their processes. It has also forced industry to change their mind-sets and behaviours with regard to making decisions within the business and allocation of costs to plant upgrade (sugar manufacturing). Industry is forced to use their initiative to introduce ways of reducing energy consumption, reducing the carbon footprint and enabling the processes to become more efficient. In the case of the paper and pulp industry the implementation of the AQA has had great positive impacts whereby emissions were reduced by replacing coal and gas energy with tree bark which was previously a waste material; the introduction of tree bark has reduced the sulphur dioxide emissions.

4.3.3 Knowledge gaps within industry

All industries responded that in their opinion the various spheres of government, themselves, have not fully grasped the implementation of the emission standards and the atmospheric emission licenses. There is a lack of knowledge within industry on how government intends to proceed with the implementation of these emission licenses. The industries that have not had much involvement in the drafting or commenting phases of the AQA have the greatest lack of knowledge and understanding in this respect.

Although the group of industries that did play a role in the drafting and commenting phases of the AQA has a better knowledge of the AQA, some areas where further information is required relate to the understanding of the testing requirements and the listing of accredited laboratories that are equipped to measure and analyze air quality samples and the laboratories' fitness and accreditation for the interpretation of air monitoring data. The mining industries expressed a full understanding of dust emission management requirements and are comfortable with their understanding of dust monitoring provisions within the AQA.

4.4 Industrial views on the AQA control measures

The AQA lists a number of control measures, methods and tools to minimize the impact of source-based emissions in the ambient air. The range of control measures includes the setting of national, provincial and local ambient air quality standards; the identification of priority areas and the management thereof; and the listing of activities, controlled emitters and controlled fuels. The AQA also identifies other measures such as pollution prevention plans, atmospheric impact reports and recognition programmes.

The national, provincial and local ambient air quality standards are set by the different spheres of government and no standards can be set lower than the national standard although the standards can be stricter. The National Framework explains in detail the method and approach for government to set these standards with the input from necessary stakeholders. The National Framework also refers to the declaration of certain areas where the ambient air quality standards are being, or may be, exceeded or any other situation exists which is causing, or may cause a significant negative impact on air quality in the areas. Industries in these priority areas are required to comply with the ambient air quality standards. Industries whose processes fall within the listed activities (Section 21) or where their operations have controlled emitters (an appliance or activity that release air emissions

that impact ambient air quality – Section 23) or controlled fuels (fuels used in the combustion process that negatively impact the ambient air concentrations – Section 26) are required to meet the relevant ambient air quality standards. Industries that are classed as a listed activity and that involve the emission of a substance declared as a priority air pollutant are required to draw up and submit a pollution prevention plan to the Minister or the MEC for approval and implementation (Section 29 (2)). These plans relate to the atmospheric emission license for the industry and the plans to ensure continuous compliance and improvement. In instances where there is non-compliance with the emission standards and the atmospheric emission license permit conditions, or if the air quality officer suspects non-compliance with the permit emission conditions, atmospheric impact reports are required of industry to report these non-compliances to the authorities (Section 30). The relevant section reads “An air quality officer may require any person to submit to the air quality officer an atmospheric impact report in a prescribed form if:-

- a) the air quality officer reasonably suspects that the person has on one or more occasions contravened or failed to comply with the AQA or any conditions of the license and that such contravention of failure has had, or may have a detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage, or has contributed to the degradation of ambient air quality” (DEAT, 2004).

The AQA clearly defines the types of industries, the location of the industries, types of fuels used and the use of controlled emitters that are applicable under the Act and there is no ambiguity as to whether a particular industry falls within the scope of the Act or not. It was also noted that the AQA identifies other recognition programmes for motivating industries to comply e.g. tax refunds. Although the tax refund initiative has not been finalized, it is regarded as a positive approach to encourage industries to comply and ensure continuous and sustainable improvement.

Government Gazette No. 31107 released on 6 June 2008 titled “Proposed regulations regarding the form of the atmospheric impact report, as contemplated in Section 30 of the AQA” outlines the details that will be required in the atmospheric impact report. These include the industry details e.g. locality, nature of process and authorization details; process details and mass balances; atmospheric emissions – air pollutants, point source and fugitive

emissions; emissions during upset conditions; impact assessments of the local air quality, illness and complaints; and compliance management.

Recognition programmes are another motivational tool for public recognition of significant achievements in the area of pollution prevention. This tool has not been adequately explored at this stage and none of the industries made reference to this tool outlined in Section 31.

In general, the cement, paper and pulp, mining, petrochemical, chemical, and sugar industries have clearly outlined the AQA control measures and understood them well (i.e. the same group that had some involvement with the drafting of the AQA). Although one hundred percent of the respondents may not have fully understood the AQA control measures; all respondents expressed concern related to the implementation of the control measures. The concern extended to the authorities' empowerment to enforce these control measures and whether the officials were sufficiently well versed in the control measures, its process of implementation and the associated impact they would have on industrial processes and businesses.

They identified the declaration of priority areas; the implementation of air quality management plans by the local authorities; the listing of activities that may have a detrimental impact on the ambient air quality; the permit application process; and the establishment of ambient air quality standards by different spheres of government. Industries also identified pollution prevention plans that contain plans for continuous compliance and improvement, and the identification of controlled emitters and controlled fuels as relevant.

The control measure that industry unanimously feels is most appropriate is effective source emission monitoring and ensuring that the stack emissions comply with the standard as in their view this will automatically ensure compliance with ambient air quality standards. The use of available monitoring data will also ensure that the AQMP is current and will ensure that the air quality emissions are appropriate for the receiving environment in that area. Respondents also referred to industrial procedures that are available to ensure that the maintenance of equipment is high quality and regular so that equipment works effectively and efficiently, to minimize the risk of emissions exceedances. Industries' have raised concern about the setting of emission standards and whether the standards take into

consideration a number of other variable factors. These variable factors include uneven topography, the potential negative influence weather and climate may have on ambient air pollution levels and its compliance to ambient emission standards. Industries in the Kwazulu-Natal region are particularly concerned that the emission standards have not taken into consideration the topography and the ambient concentration levels monitored in the area and whether it may have detrimental impacts on the receiving environment. Current continuous monitoring in industries is by source and stack monitoring methods. These industries find end-of-pipe monitoring easier to manage and to respond to in the event of emissions exceedances. The shift to ambient air monitoring is difficult to monitor and there is a greater lag time to respond to the operation processes when ambient emission standards are exceeded. Other points of concern are how vehicle emissions will be monitored and managed as this may have an impact for some industries located close to busy roads and intersections. Townships surrounding industries are another source of concern to some industries, noting that where coal burning is the main source of energy or where biomass burning is taking place, there are other significant sources of air pollution.

In terms of the current permit conditions within the Ethekewini council in KwaZulu-Natal, industries in the Durban area are unsure how the ambient air quality standards will be embedded into the current schedule trade permits.

Each industry type had their own particular recommendation for optimum control measures that would apply to their particular industries. For example, the cement manufacturing sector preferred the management of the point sources and controlled emitters to ensure compliance with the ambient air quality standards. The sugar and paper and pulp manufacturing and chemical manufacturing sectors preferred control of their fuel source, thereby reducing the use of dirty fuels. The types of alternative fuels introduced ranged from low sulphur coal, methane rich gas through to tree barks; the petrochemical industry preferred a holistic and rational approach to manage controlled emitters and engineering processes to minimize emissions into the atmosphere.

4.5 Industrial views on the support and communication to government and communities

The National Framework outlines the establishment of committees and forums where support is given and where uncertainties can be discussed. The release of portions of the AQA as draft documents prior to promulgation with provision for comments to be submitted to the government departments within set time lines is also an attempt by government to ensure consultation. The AQA outlines the roles and responsibilities of each sphere of government and this gives an idea of who industry can contact for further details and support. A series of workshops has been arranged by the national Department of Environmental Affairs to engage stakeholders on the proposed implementation of the AQA and to enable discussion on content, technical details and emission limits. Atmospheric emission licenses will also undergo public participation as part of the requirements of the AQA. The theoretical structures are in place for adequate support, and communication channels and procedures are clearly laid out in the National Framework. However, based on the questionnaire responses, the reality is that industries are not experiencing the support and have responded that the government is not sure how to implement these structures.

4.5.1 Government support

There is a strong and unanimous view from all industries that governmental support is inadequate. The feeling is that numerous meetings and working groups between industry and national and local government take place but that there still remains a sense of uncertainty on the way forward with respect to the implementation of the emission standards and permit requirements. Further, there is a lack of clarity on how government plans to support industry in the short to long term to ensure sustainability of ambient air quality management. In some industries, those that have not had the opportunity to participate in the meetings or workshops, they have had little or no communication with the different spheres of government.

It was noted that in one province e.g. North-West province, the CAPCO position had remained vacant for a number of years and that the management of air quality had come to a halt. Now, after a number of years in which there has been no air quality management, the local municipality has set strict levels for industries to comply with.

Other comments made by some mining companies were that the Department of Minerals and Energy had planned to visit a number of mining sites, but that these visits had never

materialized. In respect of the cement industry, it was stated that although the industry is compliant with national standards, the company is still waiting for its APPA registration certificates. The cement industry representatives (from KwaZulu-Natal and Gauteng provinces) foresee that the industry will support government rather than government supporting industry, as in their view government generally does not understand the AQA. The petrochemical industries responded that “sometimes governments listen to reason, sometimes not”, showing the frustration that some industries are experiencing in terms of the uncertainty that surrounds the implementation of aspects of the AQA. It is their view that within the government departments it is not clear how they plan to manage the emission standards and the permit conditions. The paper and pulp industry (group level) have clearly stated that it is difficult to work with the various spheres of government because “they don’t always understand the implications when issuing permits with unreasonable limits within unreasonable timeframes” noting that “government is too ambitious”.

Industry’s overall opinion of government’s capacity in terms of human resources is a poor one and they remain unconvinced that government is knowledgeable, well-equipped and has adequate human resources to ensure that the AQA is implemented to create a sustainable atmospheric environment for all people. The paper and pulp and sugar industries have made mention of the rapid turnover of staff within government departments. This has led to challenges within industry, as with every staff change a new relationship needs to be established and developed, and there is a continual revision of past activities. Industries are also frustrated about the high staff turnover as agreements made with one officer are not necessarily acceptable to the new officer. From the government perspective, retaining motivated and skilled air quality officers is an ongoing challenge. The state has included capacity development in their implementation of the AQA programme which looks at improving the skills base and increasing the human resource base ².

4.5.2 Communication and reporting to government and communities

The atmospheric emission licenses have not been released and finalized and therefore not implemented within the organizations. Hence, communication in terms of regular and non-compliance reporting has not taken effect and therefore communication changes have not taken place. Normal reporting according to the existing APPA permit requirements is still

² <http://www.pmg.org.za/files/docs/080220aqapres.pdf>. Accessed 17 August 2009

taking place within the relevant industries but other than that, there has been no change in the reporting to government.

The community communication channels have also not changed. Since the atmospheric emission licenses have not yet been implemented, the stage of community involvement has not yet been reached. All industries already have community communication channels within their respective organizations where community concerns are logged and raised. Industries do realize that with the implementation of the atmospheric emission licenses both government reporting and community communication will change. However, at this juncture, nothing has changed.

4.6 Overall Industrial perspectives of the AQA

The industrial perspectives are not only a reflection on the AQA itself, but also a measure of how well the Department of Environmental Affairs and provincial and local spheres of government are meeting the objectives of the AQA, and of how effectively they are implementing their general duty towards the implementation of the AQA. In general, industries have drawn attention to the positive influences of the AQA, although there are some challenges that the AQA poses to the industrial sector.

The AQA is a “well intended piece of legislation with desirable actions to benefit environmental and public health” (cement manufacturing). “AQA is a progressive, ambitious piece of legislation and a move in the right direction by regulating first world air emissions for a sustainable and healthy impact on the ambient air quality and the surrounding communities”. However, there are a number of concerns surrounding the skills competency, administrative processes within government and the costly implementation process within unreasonable time frames. A phased approach over a number of years is what the cement manufacturing sector sees as more sustainable and workable.

The paper and pulp manufacturers are pleased that the AQA standardizes the approach for all businesses and processes that may have a detrimental impact on the ambient air quality and that larger industries are not singled out and targeted by the various spheres of government. In comparison to the APPA, the AQA is more defined, provides more information and is “more sensible”. The concern expressed by this sector is that those

smaller industries which are unable to comply with or unable to spend the capital to ensure compliance will be penalized significantly, which may result in closure of their businesses. The AQA focuses on ambient air quality monitoring which has challenges of its own due to the many variables affecting ambient air quality. In their view, the point source management approach to monitor and measure emissions is a more defined (technical and simple) approach; there are fewer variables to consider in comparison to ambient air quality monitoring and air quality management for the surrounding receiving environment. They note that government did not fully think through the implementation of atmospheric emission licenses. They fear that the AQA is too ambitious and too theoretical and may lead to a piece of legislation that is unusable. However, their general opinion is that the positive influences outweigh the challenges posed by the AQA.

“No-industry is exempted” and “the AQA makes industry responsible and accountable for its processes and emissions” is how the chemical manufacturers have described the AQA and they are in full support of the AQA. Although, some of the chemical manufactures did not fully understand the detailed requirements of the AQA, there is consensus that the AQA is a positive influence on the ambient air quality. Their concerns related to the lack of knowledge, involvement and poor enforcement from government sectors. This sector feels that they rarely see initiatives nor are they influenced by government authorities from national to local sectors.

“It’s what industry needs” and “it’s a good concept” are some of the comments from the sugar manufacturers. They believe that public health will benefit greatly from the implementation of the AQA and that it will force industry to change their business behaviours and strategic thinking. The concerns expressed relate to the sustainability of the AQA as it depends on the capacity of government authorities and the enforcement posed by air quality officers. The financial impact on business is another concern raised, noting that in order to ensure compliance with the emission standards, the stance is to comply or shut down. In their view, this leads to the consideration of whether the requirements of the AQA are too ambitious and impractical for the economy of South Africa, a third world country. They raised the issue of a “growing economy versus a clean environment”.

The mining perspective is that the AQA is in the right direction and is workable within the mining sector except for the timeframes set by the state. The reason for this is that the

monitoring and measurement of dust emissions has not changed significantly from APPA to AQA. Within the past few years, the mining sector has been closely monitored by the CAPCOs in the respective provinces and this has laid a good foundation for the future compliance with the AQA.

CHAPTER 5

SUMMARY AND RECOMMENDATIONS

5.1 Introduction

The promulgation and implementation of the AQA has had a number of positive influences on the management of air quality and the public health of the communities who reside in the areas where they are affected by poor air quality. From an industrial point of view, the implementation of the AQA has had a number of positive impacts, as well as presenting challenges for the business operations.

This chapter summarizes the findings of the industrial perspectives of the implementation of the AQA and the challenges faced by industry. The summary and perspectives highlighted are purely the industrial perspective and exclude the views of communities, government representatives or environmental consultants.

5.2 Summary

The first objective of the dissertation was to examine the requirements for industry set out by the AQA. This was met by summarizing the relevant aspects of the APPA and the AQA with particular attention to the industrial references and understanding the shift from APPA to AQA. The legislative context was crucial in assessing the legislative requirements from an industrial perspective and in developing a questionnaire that addressed the relevant industrial impacts.

The general feedback from industries was poor, although a representative range of responses was received from industries that had limited or no interaction with the AQA to industries that had played a role in the drafting of the legislation itself. The industrial scope included responses from operational plants as well as from corporate offices involved in the environmental management and air quality management. The range of the industries included chemical manufacturers, cement manufacturers, mining, paper and pulp, sugar manufacturers and waste disposal companies. The majority of industries opted for anonymity and hence all industries were reported as anonymous.

The second objective of the dissertation was to analyze the industrial responses to the requirements and the foreseeable challenges they may face by implementing the AQA. By means of questionnaires, interviews and telephone calls the responses of industries were gathered and assessed. The responses were grouped into themes and the challenges identified..

The themes highlighted were: industrial views on the objectives, principles and intent of the AQA and the transition from APPA (pg 24); impact on industries in terms of human resource capacity, business impact and knowledge gaps (pg 27); industrial views on the AQA control measures (pg 31); industrial views on the support and communication to government and communities (pg 34); and finally, overall Industrial perspectives of the AQA (pg 37).

A number of industries understood the general principles, objectives and the shift of the AQA from the APPA. Many industries were able to link the purpose of the AQA to the NEMA and the Bill of Rights. Industries within the chemical manufacturing and waste industry sectors did not clearly understand the general principles of the AQA. Their response was that the main reason for the implementation of the AQA was due to APPA being out of date and their view was of a “wait and see” approach to assess how the AQA would impact their operations. It was found that there are some industries that still require further understanding of the AQA and that have failed to appreciate the potential impacts of the AQA on their operations.

The third objective of the dissertation was to assess the level of understanding that industry has about the requirements of the AQA. The industries that played a role in the drafting of the AQA were able to foresee the challenges that they would face and were therefore able to plan and prepare the business accordingly. The industries that did not play a role in the drafting of the AQA had little understanding of the impending change and the impact that it would have on the industry. The changes and challenges that were identified included large financial capital outlay in improving and optimizing the current plant and upgrading older plant equipment. Other challenges included competence and skills of the staff that would provide the assurance that the air quality management plans set out by industry were in fact being followed and adhered to in terms of the license conditions.

The challenges identified include skepticism of the implementation of the emission licenses and the manner in which they will be implemented. Industries were also concerned about the relationship that emission licenses would have with current permits and the current permitting structure within the local authorities and how this would influence the management of air quality and plant optimization within strict time frames.

The main challenge was the strict and tight timeline for industry to comply with the set standards and the financial impact that compliance within the short time frame would have on the business. Businesses are aware that if there is non-compliance, business would need to change business strategy or even worse, close down.

A common finding amongst all industries was the view of lack of competence within the government departments and their lack of capacity to fully implement the AQA to its desired purpose. Industry also commented that the level of support from the government departments in assisting with the understanding and the implementation of the AQA has been limited. The lack of confidence that industry has in the government's future support and capacity is of great concern for the long term sustainability of the AQA.

There was also a common concern that the AQA is ambitious and 'first world' in nature and may not be fully aligned or apply to the South African scenario and its affordability in a developing country context. Other concerns were the strict timelines for the implementation and compliance with the set emission standards. This raises a concern again, on the sustainability of the AQA in the long term and a fear that the AQA may become unusable and an act that has no regulatory impact and is not enforceable, leading to the objectives and purpose of the AQA being compromised.

Although a number of challenges are faced by industries, there is a consensus that the shift from APPA to the AQA is a progressive and positive move for the well being of communities and the sustainability of the environment and business. The AQA will encourage innovative thinking within industries to optimize manufacturing plants and facility processes to reduce the environmental impact. All industries commented that the AQA was long overdue and that they are keen to comply with it within the parameters that are suitable and reasonable to all stakeholders.

5.3 Recommendations

The final objective of the dissertation was to make recommendations to streamline the implementation of the AQA. These are elaborated on below.

Industries that are not fully aware of the AQA need to understand the implications that the act will have on the businesses that they support and in order that they can make the necessary provisions to prepare the industry for such changes. These industries should partake in forums that will assist in gaining knowledge and understanding of the AQA.

There appears to be a requirement to increase human resource and knowledge capacity within the government departments to support the industries in the application of the AQA and its requirements. There are currently programmes in place within the Department of Environmental Affairs to increase capacity and knowledge and to retain staff with the department who will administer the AQA. This aspect is clearly of critical importance if industry is to have any confidence in government's ability to roll out all aspects of the AQA.

From an industrial perspective, industry needs to provide further support to government highlighting their views and concerns. It is clear that there was a process of commenting on the legislation when industries' viewpoints could be incorporated, but from the industry's perspective, this process does not appear to have been effective. The reason for this is that industry feels that in general government does not take cognizance of their comments and queries raised.

The need for open communication channels between government and industry is of critical importance in taking the implementation of the AQA forward. It is evident from this limited analysis that industry is very supportive of the principles and purpose of the AQA per se but has grave reservations in terms of its implementation.

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4. Ngubane, N, (2009): personal interview, 28 August 2009
5. Padaychee, N, (2009): personal interview, 28 August 2009

Appendix 1: Questionnaire

Dear Environmental Manager

July 2009

RE: REQUEST FOR COMPLETION OF QUESTIONNAIRE

I am a Masters of Environmental Management part-time student registered at the University of KwaZulu-Natal studying within the Faculty of Science and Agriculture. My student registration number is 205515391 and research supervisor is Professor Roseanne Diab.

The aim of the dissertation is to identify and analyse the perspectives that Industry have on the implementation of the Air Quality Act (Act No. 39 of 2004) and the impact that it may have on your industry and on your company. The study will examine the requirements for industry set out by the AQA and an assessment of the level of understanding industry has on the implementation of the AQA. The research will also include the analysis of the challenges industry face to ensure compliance to the AQA.

Kindly complete the questionnaire to the best of your knowledge and complete as many questions as you can. If you are unable to respond to a question please indicate so on the response lines provided. Where a question is not applicable please indicate as "N/A".

The information that you provide will only be used for academic purposes and for the writing up of this dissertation and there will be no mention of company names or personal names.

Your participation in the questionnaire will be greatly appreciated. Should you require feedback from the outcome of this analysis, please do not hesitate to contact me on the below contact details. Kindly respond by **31 August 2009.**

You may contact me for any other comments or queries.

Kind regards

Liesl Barnwell

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083 584 7734

Fax to email: 086 572 6296

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lieslbarnwell@yahoo.com

Questionnaire

Nature of Business and Province: _____

Contact person: _____

Contact person designation: _____

Contact details:

OPERATIONAL QUESTIONS

1a. How is air pollution managed at your facility?

1b. What measures are taken to ensure compliance with the air emission limits or air quality standards in terms of permit or license requirements?

GENERAL QUESTIONS

Understanding of the AQA

2. Explain your understanding of the principles of the AQA?

3. Explain the areas of the AQA where you feel more understanding is required.

4. Explain the areas of the AQA where you feel you know and understand well?

5. List the type of control measures that are suggested in the AQA to manage ambient air quality?

6. In your view which of the listed control measures would be most effective to better manage ambient air quality within your type of industry and why?

7. Explain in your opinion the reasons for the change from APPA to AQA?

8. What are the AQA requirements for this particular industry? Explain.

9. What, in your opinion, are the changes that will have a significant impact on industry? Explain

10. Does the facility have adequate capacity, knowledge and resources to ensure compliance with the AQA and license requirements?

Transition from APPA to AQA

11. How has the change from APPA to AQA impacted this industry and this company? Explain in detail positive and negative impacts.

12. What measures (*not already listed previously*) have this company put into place in order to comply with the AQA? Explain.

13. Does the company have adequate support from government in terms of compliance with the AQA and license requirements? What type of support has been provided?

Communication

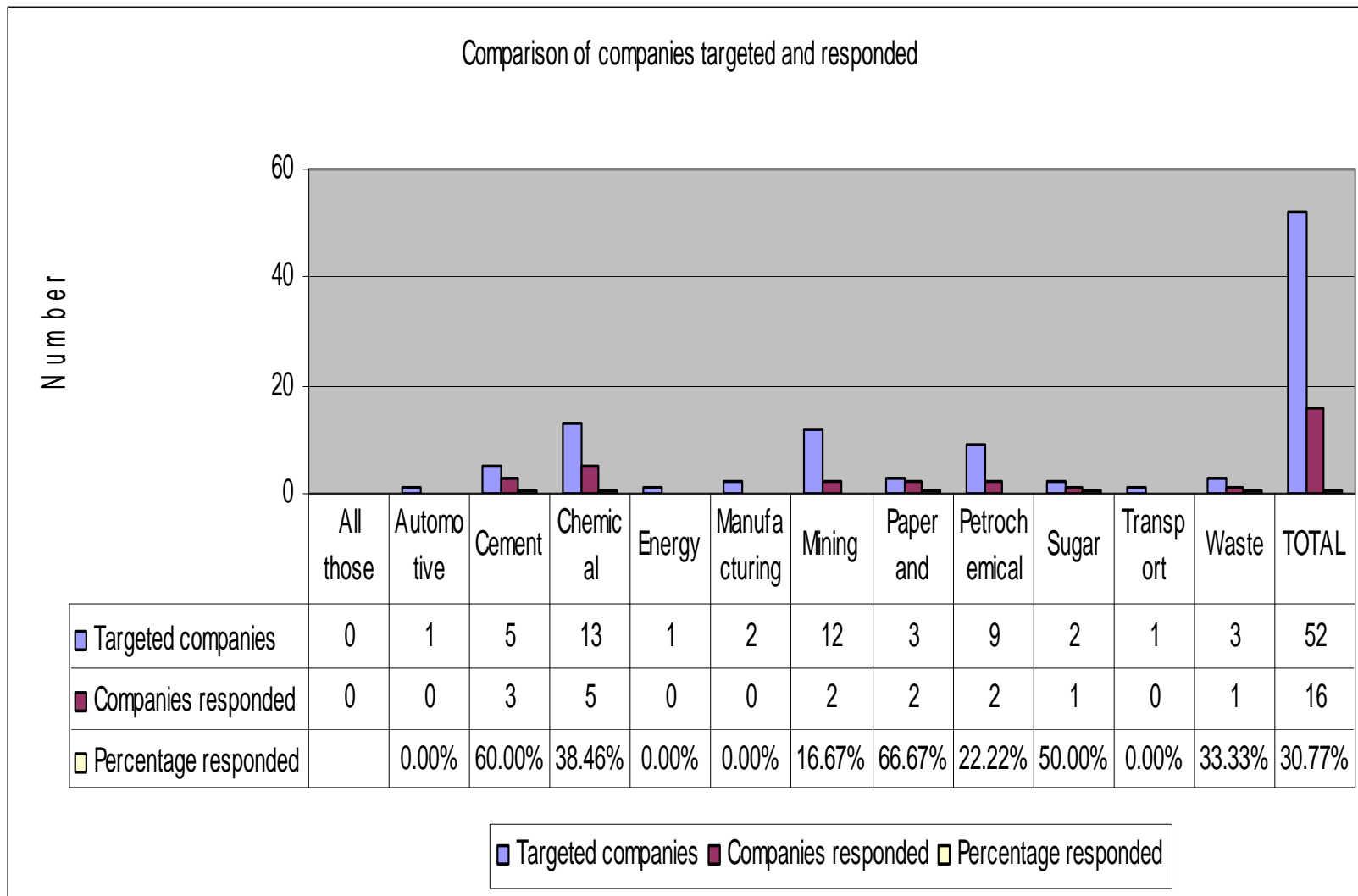
14. How have the reporting requirements to government changed? Explain.

15. How, if any, has communication changed with communities? Explain

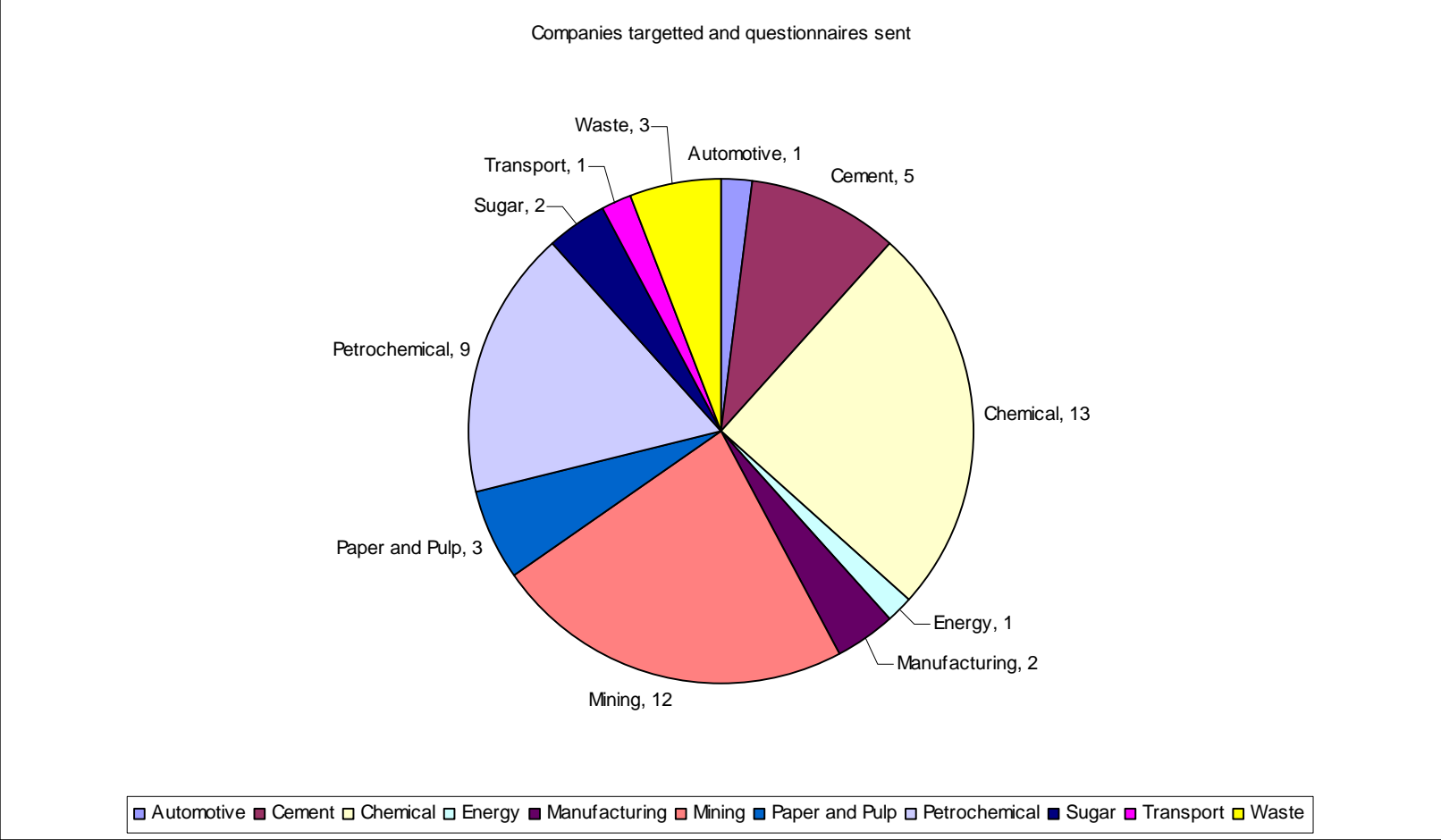
General

16. What is the company's overall perspective of the AQA and its implementation into industry? Explain.

Appendix 2: Table showing comparison of companies targeted and responded



Appendix 3: Pie chart showing breakdown of companies targeted



Appendix 4: Table showing details of individuals who received the questionnaire.

No.	Surname	Name	Company	Sector	No.	Surname	Name	Company	Sector
1	Naidoo	Sarge	Blendcor	chemical	33	Pillay	Riedawaan	BHP Billiton	Mining
2	Oliver	R	Toyota	Automotive	34	Silomntu	Msimolela	Transnet	Transport
3	Brockbank	Elizabeth	Sapref	Petrochemical	35	Toward	Ken	Sappi	Paper & Pulp
4	Redelinghuys	Sandra	Engen	Petrochemical	36	Arnold	Bonnie	Sappi	Paper & Pulp
5	Mbatha	Nelson	Shell	Petrochemical	37	Van Wyk	Brendan	Protea chemicals	chemical
6	Ntlaleng	Christina	BP	Petrochemical	38	Wright	Julie	PG Bison	Manufacturing
7	Mdlalose	Sanelisiwe	Masana	Petrochemical	39	Young	Mikey	FFS	chemical
8	Buthelezi	Malusi	Exxaro	Mining	40	Daniel	Craig	Sappi	Paper & Pulp
9	Moatsh	Abe	Eskom	Energy	41	Padayashee	Natisha	Hulett	Sugar
10	Ramoholi	Claudine	Colgate	chemical	42	Bhoob	B	Sapref	Petrochemical
11	Sewsunker	Nirvana	Valspar	chemical	43	Rafiq	Gafoor	Mondi	Paper & Pulp
12	Nadas	Cathy	Synthomer	chemical	44	Claassens	Marritt	GoldFields	Mining
13	?	Tania	Wasteman	Waste	45	Pholoto	Priscilla	Kumba Iron Ore	Mining
14	Africa	Aldrin	Enviroserv	Waste	46	Rambharos	Mandy	Eskom	Energy
15	Ngubane	Nshika	Plascon	chemical	47	Mban	Meera	De Beers	Mining
16			Phumelela	Waste	48	Naude	Mike	Aerosol association	chemical
17	Humsey	Juganath	Sasol	Petrochemical	49	Ireton	Karen	Anglo American	Mining
18	Nieman	Hienman	Protea	chemical	50	Lesufi	Nikisi	Chamber of Mines	Mining
19	Hlatshawayo	Horace	unilever	chemical	51	Moldon	Anton	South African Petroleum	Petrochemical
20	Koosiale	Avishkar	Sasol	Petrochemical	52	Hall	Mike	Hillside	Mining
21	Human	Charl	Anglogold Ashanti	Mining	53	Cluett	Alan	Holcim cement	Cement
22	Sewpersad	Karishma	Xstrata - Alloys	Mining	54	Tshiqi	fezekile	Nampak	Manufacturing
23	Van Der Heyde	Melanie	Matla - Eskom	Energy	55	Lynsky	Rory	Sugar Association	Sugar
24	Malan	Jacobus	Anglo Platinum	Mining	56	Van der Waal	Gerhard	De Beers	Mining
25	Malebadi	Mumy	Anglo Platinum	Mining	57	Wickens	Patti	De Beers	Mining
26	Manion	carla	Vopak	chemical	58	Ian	Naidoo	NPC	Cement
27	Marias	Estelle	Sasol Infrachem	Petrochemical	59	Mzoboshe	Skhumbuzo	La Farge	Cement
28	Matete	Puseletso	PPC	Cement	60	Dallimore	J	Colas	chemical
29	Moodley	Nivi	Exxaro - KZN	Mining	61	Malan	Johan	IOP	chemical
30	Murray	Derrick	Eskom	Energy	62	Mervin	Poovan	hoosaf fibres	chemical
31	Mushiane	Vhatshilo	Anglo Platinum	Mining	63	Van Der Westhuizen	Sakkie	sappi HQ	Paper & Pulp
32	Otterman	Egmont	PPC Cement	Cement					