

OPERATION FERRO: TAKING ON THE GIANTS

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SUMMARY

This paper provides an overview of the strategic environmental compliance and enforcement project referred to as “Operation Ferro” which focusses on the iron and steel and ferroalloy industry in South Africa. The reasons for focusing on this industry sector are briefly discussed in the paper followed by an insight into the planning and implementation of the project, including the criteria used for prioritization of inspections. As this project is still in the process of being implemented, the final sections of the paper will detail some of the non-compliance trends that are already evident as well as the achievements and lessons learned to date.

1 INTRODUCTION

In 2006, against the background of the environmental rights contained in the Bill of Rights¹ of the South African Constitution² and the international obligations³ focusing on the development and implementation of effective compliance and enforcement systems, the newly established Environmental Management Inspectorate (more commonly known as the Green Scorpions), embarked on the first joint⁴ compliance and enforcement programmes for the effective implementation of the relevant legislation. These programmes have included proactive approaches to assess compliance in specific industries in a coordinated and integrated manner in order to achieve overarching policy objectives, whilst meeting specific compliance and enforcement responsibilities.

As compliance and enforcement activities can be costly and time-consuming, strategic implementation within the resource and capacity constraints is crucial. It was therefore necessary to plan compliance and enforcement actions based on priorities. The factors that are generally considered in setting priorities includes the significance of violators; severity of impacts;⁵ involvement of priority pollutants; relative contributions to environmental harm; complexity of processes; availability of resources; levels of government; sensitivity of the receiving environment, and types of industry/sector.

While understanding that the above factors form the basis for prioritisation, it also needs to be understood that environmental compliance and enforcement, particularly in an industrial context, are relatively new within the South African context. Accordingly, there are major gaps in compliance and enforcement information required to target and plan specific actions with ideal accuracy. In the absence of detailed information required to profile violators and accurately determine relative contributions to environmental harm, the decision to prioritise the iron and steel and ferroalloy industry was based on a number of factors, including the cumulative impact of this industry on the environment.

2 SELECTION OF THE PROJECT

At the outset, it is important to understand that, until Operation Ferro, there had been no co-ordinated, proactive, strategic compliance projects in any industrial sectors in South Africa. Historically, inspectors – focused only on either air, waste or water – would do fairly random and superficial compliance inspections, without enforcement action of any significance being taken where violations were detected. These inspectors were the same officials who issued permits to the facilities in question. Never were any comprehensive, integrated compliance inspections conducted to assess compliance with all environmental legislation.

In 2006 (one year after the statutory establishment of the Environmental Management Inspectorate), Operation Ferro was selected as the first project focused on the monitoring and enforcement components of the traditional regulatory cycle within a specific industry sector. Sufficient information existed to understand that this industry - comprising iron and steel, ferrochrome, ferromanganese and ferrosilicon - is unquestionably one of the largest polluting industries. Such a conclusion was drawn from, *inter alia*, the following information:

- Most ferroalloy production occurs in submerged electric arc furnaces which convert electrical energy to heat. Pollutants are emitted by these facilities in significant volumes from both point and diffuse sources, include (SO₂), nitrous oxides (NO_x) (which is a precursor for ozone formation), carbon monoxide (CO) and particulate matter (PM_{2.5} and PM₁₀). Metallic hazardous air pollutants, such as chromium, nickel, manganese, lead, phosphorus, antimony, cadmium, arsenic, and selenium, are also emitted depending on the production process involved. Partly for these reasons, both the iron and steel and ferroalloy industries had already been prioritised for review of their air emission permits in a related project.⁶
- Facilities that fall within this sector treat and/or dispose of various hazardous wastes (hazardous primarily because of the heavy metal content) to waste disposal sites on the facility's premises. The waste disposal sites associated with most of the facilities, historically unlined, have resulted in and continue to result in significant soil and water pollution.

In addition to the above, it was felt that the cumulative environmental impacts of this sector justified tackling the industry as a whole and ensuring an integrated compliance and enforcement approach which had been lacking in the past. It was recognised that many of the sites in question were a number of decades old, with associated legacy pollution issues. Many sites had also embarked on expansions which had resulted in increased production, but had also compounded detrimental impacts on the receiving environment. A review of the different information management systems available, drawing on the knowledge and experience of officials within the different government departments, revealed that it was likely that many of the expansions as well as other activities on the different sites were not authorised in terms of environmental legislation.

It should be noted that, while contributing significantly to the degradation of the environment in the vicinity of the different sites, the sector also makes a large contribution to South Africa's gross domestic product as well as providing employment, both directly and indirectly, for a vast number of local people. This is particularly attributable to significant infrastructure investment by both the public and private sector. As a result, enormous profits⁷ are generated by the sector, with only a small percentage of these profits being applied to environmental improvements in relation to the South African operations.⁸

Despite the substantial environmental impact of the industry, the entire sector consisted of no more than 40 sites of meaningful size, based in six of South Africa's nine provinces, and controlled by approximately 17 companies.⁹ Many of these companies are listed on the Johannesburg Securities Exchange (JSE) and most even on the JSE's Social Responsibility Index (which includes environmental responsibility). At least 4 of the 6 biggest players have ISO14001 accreditation. The Inspectorate therefore resolved that all the industry was relatively manageable in terms of regulation and compliance monitoring.

3 PROJECT OBJECTIVES AND PHASES

3.1 Objectives

The agreed primary objectives of Operation Ferro are to:

- assess and evaluate the current compliance of key players in the iron and steel and ferro-alloy industry with environmental legislation (including permits and authorisations issued in terms of such legislation); and
- take appropriate corrective action in cases of non-compliance, including enforcement action.

3.2 Phases of the project

In this, the first compliance and enforcement project of its kind, Environmental Management Inspectorate took a particularly methodical approach, which would

for proper preparation before engaging with the industry sector itself. The project was therefore split into four separate components:

1. planning and information-gathering;
2. prioritisation;
3. a pilot compliance inspection; and
4. comprehensive compliance inspections.

These components are briefly described below.

3.2.1 Planning and Information-gathering

The planning and information-gathering phase was particularly important in view of the lack of adequate information about the industry, and Environmental Management Inspectorate's relative inexperience in both the industry sector and compliance inspections in general. Environmental Management Inspectorates therefore conducted at least five project meetings, held in different parts of the country, to consider and assess the various facilities in each province. Information-gathering and learning encompassed:

- identifying all authorisations issued to facilities by all spheres of government, including air pollution permits, waste disposal site permits, general environmental impact assessment authorisations and local government authorisations;¹⁰
- general compliance monitoring data available from all environment institutions;
- air quality monitoring data gathered by various bodies collated and analysed at the hand of meteorological data and basic dispersion models;
- geochemical maps being produced by the national Council for Geosciences indicating levels of soil pollution by heavy metals as a result of particulate air emissions over time;
- satellite imagery available for at least 10 years which may be applied to
 - o link significant particulate emissions to particular large ferroalloy producers' facilities; and
 - o investigate waste handling, storage, treatment and disposal practices; and
- general comparative information provided by inspectors from the Environment Agency of England and Wales regarding regulation and compliance monitoring of similar facilities in the UK.

Other crucial work done during this phase was the finalisation of an inspection methodology and a general enforcement strategy for Operation Ferro.

3.2.2 Prioritisation phase

Once necessary information was gathered, it was necessary to identify both a suitable pilot site as well as determine the order in which all sites would be inspected. The site selected for the pilot compliance inspection was identified on the basis of specific objectives as set out in 4.2.3 below, while different criteria were used for the determination of the pilot site in comparison to deciding on the schedule of site inspections of the other facilities.

The graphs below provide an indication of the criteria used for both pilot selection (Figure 2) as well as general prioritisation for determining the order in which all sites would be inspected (Figures 1a and 1b). These criteria include many internationally recognised prioritisation criteria, such as relative pollutant contributions from various facilities and companies; provincial and national priorities;¹¹ complexity of the processes involved; sensitivity of the receiving environment having regard to high impact receptor density (e.g. highly polluted residential areas where industries are concentrated); citizen complaints; significant violators in the industry and government circles and financial, technical and human resources required. Due to the size of these graphs only the ten facilities that scored the highest are reflected in this paper and the writers may be contacted to view the results in relation to all the facilities.

Figure 1a: Prioritisation Criteria: Determination of Order of Site Inspections

	Province	Mpum	Mpum	Gau	Mpum	Mpum	Gau	Mpum	Mpum	Mpum	NW	KZN
Impact on receiving environment	10	5	5	5	5	5	4	5	5	3	3	3
Nature / size of facility	10	1	1	1	3	4	4	4	4	2	3	2
Public profile	10	5	5	5	3	3	4	3	3	3	4	4
Business profile	5	5	5	5	5	3	5	3	5	5	1	5
Proximity to sensitive environments	15	3	3	4	5	5	4	3	5	5	5	2
Meeting requirements of APPA review	10	5	5	5	2	5	5	5	2	5	5	5
Age of site / historical impacts	5	5	5	5	5	5	4	2	5	5	3	4
Management systems	5	5	5	4	3	3	3	3	2	5	5	4
Grid load on receiving environment	5	5	5	5	5	5	3	3	5	5	5	2
Declaration as priority area	15	5	5	5	5	5	5	5	5	5	1	2
Poor environmental performance	5	5	5	3	5	3	3	3	2	4	4	3
Information available / Institutional memory	5	5	5	4	3	3	2	5	3	3	3	4
TOTAL	100	260	260	243	223	219	206	198	192	188	188	188

Figure 1b: Prioritisation Criteria: Determination of Order of Site Inspections

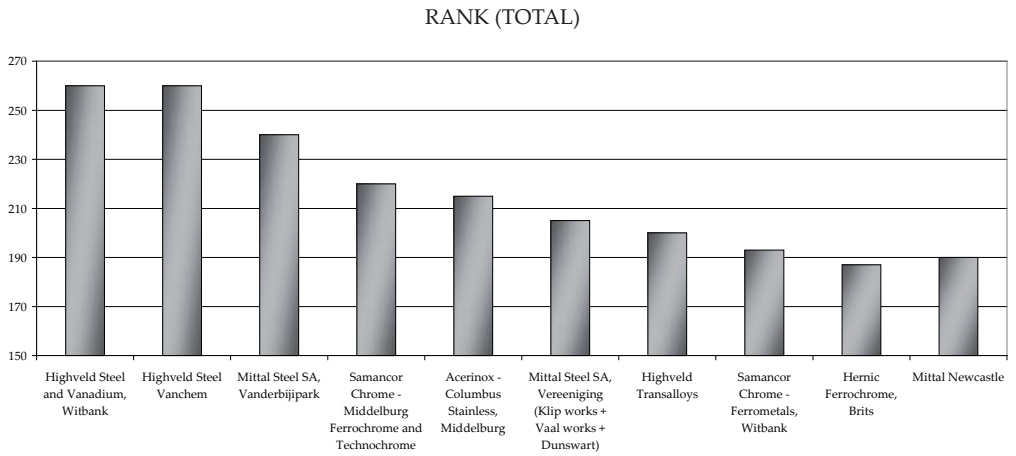


Figure 2: Prioritisation Criteria: Pilot Site Inspection

	Ease of Inspection (complexity)	Accessibility	Available information	Public profile (complaints)	Co-operation of management	Institutional / in-house knowledge	Good current performance	Situated in priority area	TOTAL
SITE NAME	15	5	15	15	10	15	5	20	100
Mittal Steel SA, Vereeniging (Klip works + Vaal works + Dunsward)	3	4	3	5	3	2	1	5	350
Manganese Metal Company, Nelspruit	3	3	4	2	4	3	2	5	345
Highveld Steel and Vanadium, Witbank	1	4	4	5	3	2	1	5	335
Mittal Steel SA, Vanderbijipark	1	4	4	5	3	2	1	5	335
Mittal Saldanha Steel	4	4	4	4	4	4	3	1	335
Cape Gate Pty Ltd (Vanderbijipark + Cullinan)	5	4	3	1	5	1	3	5	335
Samancor Manganese - Metalloys Meyerton incl. DMS Powders	2	4	2	5	3	2	1	5	320
Cisco	5	5	4	1	4	4	4	1	315
Richards Bay Minerals, Richards Bay	4	4	4	2	4	4	4	1	310
SCAW South Africa	5	5	3	2	5	3	3	1	305

The following important points should be noted in relation to the prioritization conducted:

- as all sites were going to be visited as part of the project, a risk-based approach to prioritization could be supplemented by other criteria;
- site inspections needed to be prioritised in a way that ensured adequate capacity was built up during the process of inspections;
- the most complex sites needed to be visited later in the project, in order to ensure that the team was adequately trained and skilled;
- the order of inspections needed to be sensitive to the benefits associated with awareness of the project and the media messages which formed part of the communications strategy; and
- criteria for determining the order of inspections were developed and weighted in such a way that the higher the score, the sooner the site inspection should take place.

3.2.3 Pilot phase

The pilot site inspection – selected on the basis of specific criteria listed above – provided both industry and Environmental Management Inspectorates with invaluable experience regarding appropriate compliance inspection methodology in this particular industry sector, within the existing capacity and experience deficit amongst authorities. Expertise of consultants were also utilised during this inspection in order ensure building of capacity.

3.2.4 A comprehensive compliance inspection phase

The comprehensive compliance inspection phase entails a series of compliance inspections, conducted in an order determined by the prioritisation described above, and taking into account all lessons learned from the Pilot Phase.

4 ANALYSIS AT THIS STAGE OF IMPLEMENTATION

4.1 Achievements

Although Operation Ferro has been focused on a single industry sector, its implementation has undoubtedly and permanently changed the perception that there is no compliance monitoring and enforcement of pollution, waste and environmental impact assessment legislation in South Africa. Despite not having a particularly sophisticated media strategy for Operation Ferro, the South African media (particularly the business print media and radio) has given extensive coverage to the concept and findings of Operation Ferro. In this way, Operation

Ferro has also strengthened and established the roll-out of the Environmental Management Inspectorate.

Findings of non-compliance have been followed by administrative enforcement action against two facilities thus far, with more to follow. Even at this early stage, it appears from the major environmental improvement projects proposed by only two of the facilities in response to enforcement action that the project is likely to have a major positive impact on environmental quality in one of the most polluting industries in the country.

Great care was taken to ensure that all facilities and companies are treated in an equal manner, with the ultimate purpose of levelling the economic playing field whilst avoiding allegations of targeting, at least within this particular industry.

A major achievement of the project has been to establish a reliable, consistent protocol for industrial compliance inspections in South Africa. This protocol has already undergone a number of key improvements borne out of experience in the first six inspections, and the input from the Environment Agency. Along with the protocol, a significant amount of capacity-building has taken place for all officials who have participated in the inspections as part of the project.

However, the most notable achievement of Operation Ferro was probably the networking and relationship-building between national, provincial and municipal officials that has taken place during the planning for and conducting of the compliance inspections, as well as the inspiration and energy that have grown from the project. On a number of occasions, officials participating in the inspections have voluntarily worked far beyond office hours, and particularly municipal officials have repeatedly expressed excitement for the project.

4.2 Trends in noncompliance

From the findings of the compliance inspections to date, noticeable non-compliance trends in the industry sector include the following:

- a consistent failure to lodge audit reports required in terms of permits applicable to the sites;
- a lack of consistent monitoring, particularly of emissions to air, with the resulting in very few facilities demonstrating compliance or non-compliance with permit conditions;
- where monitoring data is available for emissions to air, that data shows regular exceedances of permits;
- no lined or permitted disposal sites originating from before 1990;

- the ongoing disposal of hazardous and general waste on these unlined, unpermitted disposal sites; and
- fairly significant groundwater contamination at almost every site, with limited measures to address the contamination.

Despite the above-mentioned trends, most facilities are and have repeatedly been certified as compliant with the ISO14001 standard. In addition, these facilities generally have extensive environmental improvement programmes; surprisingly, these programmes do not necessarily address compliance with environmental legislation and permits.

5 LESSONS LEARNED

As a developing country that has designed and implemented its first strategic, sector-based compliance and enforcement campaign, the following lessons have been learned:

1. Choose an industry that has known significant detrimental environmental impacts but is not under serious financial pressure (ideally, such a project should be implemented in a growth industry).
2. Spend sufficient time in preparing participating institutions (or participating officials) through information-gathering and collation, and input from industry experts (domestically or internationally).
3. Agree on a single inspection methodology before going on site. Such a methodology, particularly where baseline compliance assessment is being done, should include more inspection teams consisting of fewer inspectors.
4. Send an unambiguous message to facility management regarding the purpose, process and consequences of the compliance inspection.
5. Design and implement a comprehensive media strategy to accompany project roll-out.
6. Ensure that the enforcement strategy implemented is consistent, but also aligned with the approach followed by the permitting sections of the relevant institutions.
7. Make reporting as simple as possible. Most of the assessment being done is baseline assessment and therefore the first inspection reports are necessarily broad and comprehensive, entailing very detailed work after the inspection by the inspection team (consisting of EMIs and other officials based in various institutions). The delay in issuing of inspection reports to facilities threatened to undermine the project.

8. Ensure that the enforcement strategy – and the implementation of that strategy - provides for effective criminal investigation and prosecution. Without this “stick” part of the strategy, industry will not take the project seriously.
9. Give credit to facilities who respond positively and with commitment to address non-compliances.
10. Once this industry sector shows meaningful signs of change, start to divert attention to other industry sectors to prevent a political backlash and accusations of targeting only one industry sector.

6 CONCLUSION

Operation Ferro has provided an opportunity for extensive learning and capacity-building within the newly established Environmental Management Inspectorate in South Africa. At the same time, it has jolted South Africa industry – beyond the iron and steel and ferroalloy industry sector – out of their complacency about the apparent absence of consequences of non-compliance with environmental legislation.

Although Environmental Management Inspectors were very inexperienced at the outset of this project, the mere fact that EMIs were at facilities, engaging with facility management in a coordinated manner, has had a significant impact. Neither inspections nor inspectors have to be perfect to catalyse a change in attitude towards environmental compliance in an industry sector.

7 REFERENCES

- ¹ Constitution of the Republic of South Africa (1996), section 24.
- ² Which, *inter alia*, obliges government to act reasonably in order to protect the environment by preventing pollution, promoting conservation and sustainable development, while building the economy and society.
- ³ Agenda 21 emphasises that institutional strengthening with the development of dedicated compliance and enforcement programmes is important for achieving the goal of sustainable development. This mandate was reinforced at the World Summit of Sustainable Development held in Johannesburg in 2002.
- ⁴ The Environmental Management Inspectorate in South Africa consists of Inspectors based in all three spheres of government (national, provincial and local); joint compliance and enforcement programmes therefore entail unprecedented cooperation between these spheres of government.
- ⁵ As preparation for the full commencement of the new National Environmental Management: Air Quality Act (2004), the Department of Environmental Affairs and Tourism embarked on the review and conversion of all air pollution permits issued in terms of previous air pollution legislation. This review started with certain prioritised industry sectors, which included the iron and steel and ferroalloy industries.

⁶ As preparation for the full commencement of the new National Environmental Management: Air Quality Act (2004), the Department of Environmental Affairs and Tourism embarked on the review and conversion of all air pollution permits issued in terms of previous air pollution legislation. This review started with certain prioritized industry sectors, which included the iron and steel and ferroalloy industries.

⁷ Mittal Steel South Africa's Annual Report for 2006 indicates in the Financial Summary that profit from operations during the year amounted to R5.8 billion while capital expenditure for environmental projects was limited to R104 million (website: www.iscor.co.za).

⁸ In our experience, it is always easier to conduct compliance and enforcement campaigns at a time or in an industry sector that is experiencing a growth phase.

⁹ Mittal Steel South Africa , Highveld Steel and Vanadium, Cape Gate , SCAW Metals , Acerinox - Columbus Stainless, Herculon Ferrochrome, Merafe, Samancor Manganese, Samancor Chrome, Manganese Metal Company, Vametcor (could now be Rhovan Vanadium - check), Assmang Manganese (previously Ferralloys) (3 sites), Kumba Resources, International Ferrometals, ASA Metals, Richards Bay Minerals and Ticor SA.

¹⁰ In South Africa, both air and waste permits are currently still issued by national government, while provinces issue authorizations pursuant to Environmental Impact Assessments and municipalities issue effluent discharge permits.

¹¹ Air pollution priority areas have been declared by the national department (e.g. Vaal triangle).

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