

DRAFT 2007-01-17
For inclusion in contract

TERMS OF REFERENCE

**FOR
A SHORT-TERM CONSULTANT
DEPLOYED UNDER THE DANISH-SOUTH AFRICAN
URBAN ENVIRONMENT MANAGEMENT PROGRAMME**

**WITHIN THE
DEPARTMENT HEALTH: POLLUTION CONTROL AND
RISK MANAGEMENT
CITY OF ETHEKWINI**

**Elaboration of a
Technical Protocol for
Monitoring + regulation of
FLARES from
Oil refineries in South Africa**

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1. Information summary

1.	<p><i>Title:</i></p> <p>TECHNICAL SCHEME FOR THE MONITORING AND ASSESSMENT OF FLARING FROM REFINERIES IN SOUTH AFRICA</p>
2.	<p><i>Client:</i></p> <p>The Urban Environment Management Programme PSC Secretariat, Department of Environment and Tourism Programme Advisor: Bo Leth-Espensen +2712 310 3228 ble@deat.gov.za</p>
3.	<p><i>Management of this project:</i></p> <p>Managing UEM-partner: eThekweni Municipality Health Unit, P O Box 2443, Durban, 4000, Siva Chetty - chettysiva@durban.gov.za 031 311 3690</p> <p>Associated UEM-partners:</p> <p>City of Cape Town Metro Municipality Ossie Oswald Ossie.Oswald@capetown.gov.za , 021 5901419</p> <p>Sedibeng District Municipality Mr Zies van Zyl ziesvz@sedibeng.gov.za 016 450 3098</p> <p>Department of Environment and Tourism Directorate: Air Quality Management Mazwi Lushaba mlushaba@deat.gov.za 012 310 3263</p>
4.	<p><i>The specific problem:</i></p> <p>In South Africa today there is no technical scheme of international standard in place for the monitoring of flaring from refineries.</p> <p>In South Africa, where most of the refineries are situated in densely populated urban areas, flaring causes threats to environmental health and is of great concern of the neighbouring public.</p>
5.	<p><i>The main output</i> to be delivered is:</p> <p>A PROTOCOL which would include:</p> <ul style="list-style-type: none">• defines a technical scheme for the monitoring of flares, tailor-made for SA refineries, and with international standards in all respects, incl. its procedures for monitoring, its prescriptions for what to monitor, prescriptions for data management, prescriptions for threshold values and events and responses to excessive flaring emissions, etc.• proposals for implementation of the proposed scheme• a budget level estimate for the implementation of the scheme <p>From a technical point of view, based on the protocol, the scheme should be directly</p>

implementable via regulatory instruments.

6. *Perspective*

This protocol will fill in the technical gap in the ongoing debate and work to ensure reliable monitoring and reporting of flare emissions. Other gaps to be filled in – not targeted by this project – are legislative and regulatory issues, political issues and the wider financial and socio-economic implications of setting up and implementing the scheme.

7. *Indicators of successful accomplishment*

1. Immediate indicator: The protocol and its prescriptions are validated by an international peer review as necessary and sufficient to ensure a monitoring and control of flares in line (but not necessarily identical) with the standards of the United States of America (more specifically California), Canada, the United Kingdom and /or the European Union. (This review is not part of the current project)

2. Intermediate indicator: That the protocol informs legislation, bylaws, public budgeting in local and national government etc.

3. Long term: The recommendations of the protocol are fully implemented and become part of a management plan to reduce flaring emissions.

8. *INPUTs*

UEM

- Consultant (days): total 30 working days
- 6 Flights , 10 x (Accommodation + pD)
- 6 flights for PAG meetings

eThekwini and partners

- All other costs related to meetings, site visits etc. for the consultant to do and to present the work.
- Staff working days as indicated in budget
- All printing costs

9. *Dates:*

Commencement: December 2007 (earliest); February 2007 (latest)
End must be before 30 June 2007

10. *Submission of all outputs*

Before 30 June 2007 to the eThekwini Project manager.

2.

Project Budget Frames

Consultant days and staff days

	UEM Cons. Days	eThe	CT	Sedi-b eng	DEAT
Preparation	5	5			
Task no. 1: Site visits + meetings	5	5			
Task no. 2: Assessment write up	15	5			
Reporting + wrap up	3	5			
PAG meetings	2	5	5	5	5
TOTAL	30	20	5	5	5

The total number of 30 consultant w-days can not be exceeded

Other expenses

Maximum prices:	UEM	eThek wini	Cape Town	Sedi-be ng	DEAT
Flights between Jbg, CT and eTh, consultant: 6@4000	24,000				
Consultant 10 x accommodation + p. diem 6 days car hire	7.000 2.400				
Flights between Flights between Jbg, CT and eTh, staff: 6@4000 (2 meetings)	24,000				
All other travel expenses		X	X	X	X
All printing costs		X	X	X	X
All costs related to meetings, etc for the consultant to do and to present the work		X	X	X	X
TOTAL	57,400				

* Car hire: 6 days @R400/day

3.

Introduction and Background

In South Africa today there is no technical scheme in place, which is comparable to international best practice for the monitoring or regulation of flaring from oil refineries.

Most refineries (most of the country's refinery capacity) are situated in densely populated urban areas, implying a high impact on the people's environment and health.

Flaring is the process whereby refineries combust waste gas streams, usually arising out of systems designed to protect equipment during abnormal or emergency events, before discharge into the atmosphere.

In international best practice, flaring is to be used strictly as a means of safely venting flammable gases arising out of uncontrolled or emergency events on the refinery, not to handle normal venting operations. All flaring is monitored and recorded with regard to content, toxicity, technical background (causes of the flaring event) in the plant, etc.

In South Africa flaring is a frequent event. Over the last few years there have been numerous complaints of excessive flaring emissions from the two Durban refineries (Sapref and Engen, 60 % of national capacity) as well as from the refineries in Cape Town and the Vaal Triangle.

In South Africa flaring pollutant emission rates and composition (toxicity) are essentially unknown; hence the health impacts and environmental impacts of these emissions are unknown.

Further the flaring of emergency vent gases may reflect instability, operation flaws or possibly design flaws in a refinery, and be a precursor to a major hazard incident such as a fire, explosion and/or large scale release of toxic chemicals. Insufficient monitoring will not provide these warnings.

The national legislation guarantees the citizens a clean environment and the air quality management act prescribes the development of monitoring mechanisms. As this legislation will come in place there will be a need to implement a monitoring and control of flares which meets the international standard.

In eThekweni flaring is one of the main themes of the Air Quality Management Plan, (AQMP), reflected in the municipal IDP which identifies the AQMP as a prioritised project. A great number of citizens and civil society groups articulate strong concerns about the frequent flares.

Hence the need and importance of instituting technology and regulatory measures to achieve objective monitoring and control of flaring emissions in South Africa. This project will provide the technical platform for this and in this way contribute to the legislative process, regulation, provision of information to the public etc.

4.

Objectives

The immediate objective is to establish a technical platform, a scheme, for this monitoring, which is reliable objective and has the threshold values and other prescriptions matching the best international standards and make this available for decision makers and officials as a guideline of the work for accountable and acceptable ambient air quality.

The development objective is that in the long run this scheme and this standard will feed into new legislation, public budgets and environmental management plus materialize benefits in other ways, such as alleviating the environmental health situation of the population.

5. Main Output

The main output is *a protocol* which will draw up the technical frames and specifications of this scheme. The protocol shall focus on the aspects of technique and budgeting, leaving the legislative and the policy issues to others.

The **scheme defined by the protocol** should include (but not be limited to) the following (Recommendations of EC, see references, sect. 13)

- The reliable collection of information that will enable a close scrutiny of all information with relevance to air emissions, including flare systems' design, flowsheets, data on RVs not flared, etc
- Requirements for mass-flow measurement of process stream flows to the flare systems (volumetric flow measurements may already be in place on the total flows)
- Sampling, both continuous and periodic or 'on-demand', and chemical analysis of flows to flare stacks.
- Continuous visual monitoring, archiving and submission of video clips of flaring events
- Proper and reliable reporting of flared SO₂ and H₂S emissions
- Prescriptions for monthly air emissions reports in a revised electronic format, including video clips of flaring incidents

- Requirements for Data management
- Requirements for Data publishing
- An integrated framework for assessment and response to flares and flaring emissions

The protocol shall have the following basis. See references for specifications:

- The technical situation around refining oil in South Africa
- The technical know-how which is worked into already operational international schemes, such as the schemes of the EU or the Bay Area, California, USA or Canada, all applied to the South African context
- Other international strategies and know-how for the monitoring and regulation of flare emissions and related emissions (for example, from relief valves) from oil refineries.

The protocol should address the following target groups

- Primary: Technicians/ engineers, officials, law-makers, implementers, planners consultants,
- Secondary: Decision-makers

The protocol should have the following format

- A preamble describing its technical – not political – intent and content. The preamble should state that from a technical point of view this is what it takes to make objective, reliable monitoring in South Africa (or similar, the statement must be true). Also a statement of the relationship to one or more international schemes used as template.
- A section with the list of exhausts – chemicals or groups of chemicals - to be monitored
- A section with a framework for pertinent and reliable monitoring of flares – demands to equipment, timing, etc.
- A section of threshold values, event definitions and the appropriate responses.
- A section of demands to data management
- A section with the organisational set-up required to do the monitoring, in the public sector (and in the private sector)
- A section with a 2 (?) year plan, steps to be taken and budgets to bring the scheme into satisfactory operation
- Lists and practical recommendations for funding opportunities identified in South Africa and internationally.
- Lists of websites for further documentation (10-20 main sites)

The protocol's format should further accommodate the following requirements.

- Can be used as the basic technical prescription (master plan) to establish and run the monitoring schemes.
- Can be subject to an international peer review

6. Other outputs

In total the assignment will produce the following outputs:

1. A draft work plan including a draft outline of the protocol
2. A work plan including an outline of the protocol
3. A draft protocol
4. A presentation to PAG
5. The Protocol (= main output, above)
6. A draft completion note for the coordinator to submit to the UEM secretariat
7. A draft press release for the UEM or eThekweni to publish to the media or on a home page.
8. Minutes of the PAG meetings (to be done by manager)
9. (Notes on changes of outputs or work plan – if any)

7. Scope of work, management etc:

The consultant will refer to the project manager and liaise closely with manager as indicated in these terms of reference. Decisions about changes in outputs and in the process will be proposed in writing or when this is not possible confirmed in writing no later than 48 hours after. No outputs may be cancelled.

8.

Management, Administration, Reporting

Manager of the project will be

Siva Chetty - chettysiva@durban.gov.za , +2731 311 3690

eThekwini Municipality Health Unit,

P O Box 2443,

Durban, 4000

Resource persons in EtheKwini: Raj Hooblal, Bheki Shongwe, Sam Sewlall

A Project Advisory Group (PAG) will be formed of the associated partners on the initiative of the manager. The group will function by email and convene at least

- once to discuss output 1 or 2
- once to discuss output 3

The project manager will convene the group and provide it with the necessary arrangements, incl. agenda, documents for discussion, minutes and practicalities.

Expenses for two meetings are covered by the UEM budget.

The outputs 1-8 will serve also as formal reporting and be made available to the PMG and the UEM-PSC Secretariat.

9. Inputs

The Consultant will provide

- Specialist background oil refinery environmental emissions and impacts with both a strong theoretical and practical knowledge base.
- Application of specialist knowledge to works towards a solution for the management of flaring from refineries.
- Literature, etc. in electronic form on relevant National and International policies and know-how
- All necessary word processing equipment and IT for the assignment

eThekwini Municipality and associated partners will provide

- Staff time as indicated in the budgets
- Background information, as available and pertinent
- Site visits and meetings of relevance to the assessment.
- All practical arrangements in connection to meetings etc., including to output 5

10. Monitoring, Reporting

The outputs (list above) will serve, also as formal reporting.

They will be public and may be published (ex. by website and in print) and may be used for further development of the monitoring and regulation as pertinent. All the documents will be public by the end of the project and may be so before, if agreed between the consultant and the manager.

The manager is responsible for the reporting to the PSC Secretariat (as described in the UEM-Manual for STTA projects). Outputs should be delivered when done. As completion all outputs should be delivered in one email.

All outputs are delivered electronically.

11. Financial Management

This follows the procedures outlined in the contract of the assignment.

12. Annexes

- A. Minutes of stakeholder meeting at Settlers School
- B. A power point presentation on the issues surrounding flaring
- C. Write up on the technical aspects of flaring
- D. Pollution Control Statistics 2005
- E. AQMP Stakeholder Discussion 23 May 2006
- F. About the UEM programme
- G. Motivation and UEM-checklist (Why this project fits into the UEM-programme)

13. References

- H. Flaring and other unregulated emissions from the South Durban oil refineries
E. Cairncross, 2005
- I. "Recommendations for comprehensive monitoring and reporting of oil refinery flare emissions" E. Cairncross, 2005

Annex G: Motivation and UEM Checklist

Motivation for this project in eThekweni and partners:

In South Africa a vast residential populace of poor and better off people exists on the doorsteps of refinery installations. In the case of the South Durban, eThekweni, the prevailing wind conditions coupled with a unique topography enhances the impacts. This makes it imperative for source based solutions. Many refinery installations are more than half a century old and therefore prone to poor performance and failure.

In general flaring accounts for a significant proportion of air pollution complaints. In the South Durban Basin flaring accounts for 10 % of pollution related complaints. The concerns with flaring relate to:

- the frequency of flaring,
- the environmental and health impact of the emissions from the flaring process,
- unreported emissions and percentage of this to reported emissions,
- the linkages between a flaring incident and the state of operation and stability in a refinery complex,
- evaluation against international best practice and regulatory and technology measures to achieve control.

The recent health study conducted for eThekweni Municipality has shown that people living in the South have a two-three fold increased chance of acquiring pollution induced asthma as compared to the less polluted northern suburbs. Generally it is found that the exposed communities are economically marginalised and are more vulnerable to pollution exposures. The poverty is deepened due to large medical bills, schools absenteeism, etc.

This scheme will provide direct guidance towards best available technology and international best practice of monitoring and regulation. The scheme will have a national focus benchmarking with international refinery facilities.

UEM – Checklist

1. *Describe the contribution of the output to the UEM-Programme development objective and the immediate objective (Component 1 or 3 respectively)*

Contribution to D. O.:

Sustainable and poverty oriented management of urban areas in South Africa:

The project will provide improved municipal capacity for integrated urban environmental management, planning and monitoring

The project and its outputs will enable the development of a scientific and regulatory approach to flaring from refineries. This will provide a firm institutional response to air quality management from a significant industrial sector. Developing an approach to flaring management with TA support will extend the regulatory control to the effective management and control of refinery

operations, which in turn will positively benefit poor communities adjacent to these operations from an environmental health perspective.

2. *State which of the Programme's 5 thematic foci the project will address? Explain how and why this will have a substantial impact.*

Air quality management (theme 4) - developing a strategy to bring the flaring component of refineries within an integrated regulatory system with related institutional development (theme 1).

3. *State the outputs of the programme (National, Provincial, resp. Municipal) which the applied project will support, and explain why this particular support is necessary and sufficient to initiate the step in the right direction, which the project aims to provide*

National- the project will result in the development of national standards and guidelines for the regulation of flaring from refinery operations. This will feed into the regulatory framework of NAQM Act and enforcement at the local level.

Provincial – The province will have the regulatory framework developed for national government to apply NEMA requirements for reporting and measurement of flaring impacts.

Local – the output from the project will form the input into writing of permits for refineries on flaring management and reporting. The output will also provide a quantitative framework to audit the flaring component of refineries.

4. *Document and explain the alignment with the politically approved priorities of your institution (National, Provincial and/or Municipal)*

The development of the Air Quality Management Plan (AQMP) is a strategic IDP deliverable to achieve sustainable development. Investigation into flaring as a core element of the plan and the development of a programme of action and a firm set of recommendations will go a long way in resolving the problems associated with flaring. Stakeholders from within government and community have identified flaring as an issue of concern (these are captured in minutes of stakeholder engagements, attached – Annexure A).

5. *Explain the links to the other activities, which your institution is conducting in relation to the UEM programme.*

Development of the AQMP phase 1 which is the framework component of the broad plan.

6. *You may annex electronic copies for documentation:*
See annexes of the ToR