

## **PSEM: ENVIRONMENTAL MANAGEMENT (SPEC EM)**

FOR ESKOM'S OPEN CYCLE GAS TURBINE POWER PLANT, FUEL SUPPLY PIPELINE,  
SUBSTATION AND TRANSMISSION LINES AT MOSSEL BAY

December 2005

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(NOTE: Underlined text reflects 2007 on site revisions)

### **PSEM1 SCOPE**

The general principles contained within the SPEC EM shall apply to all construction activities. All construction activities shall thus observe and obey any relevant environmental legislation<sup>1</sup> and in so doing shall be undertaken in such a manner so as to minimise impacts on the biophysical and socio-economic environments.

### **PSEM2 INTERPRETATIONS**

#### **PSEM2-1 Supporting specifications (Subclause 2.1)**

Existing Eskom procedures and guidelines that shall be taken into account during construction activities include, but are not limited to, the following:

Access to farms	TRMPVACV2	October 2002
Bird perch guidelines	TRMAGAAZ2	May 2003
Gates guideline	TRMAGABE1	March 2004
Bird collision guideline	TRMAGAAZ8	December 2002
Management of erosion in servitudes	TRMAGABE0	March 2004
Vegetation management guideline	TRMAGAAZ7	May 2003
Bird nesting guidelines	TRMAGAAZ3	May 2003
Fire protection association guideline	TRMAGABD9	March 2004
EMP: Line construction	J Geeringh	2005
EMP: Substation construction/ refurbishment work	J Geeringh	2005

The procedures and guidelines listed above apply largely to electricity transmission activities and include standardised EMPs for line construction as well as substation construction and refurbishment work. Similar procedures and guidelines are unavailable for OCGT plant construction and this SPEC EM is consequently of more relevance to the OCGT plant than the transmission lines construction. However, specific project actions are not defined and this specification shall be taken to be applicable to all relevant construction activities.

#### **PSEM 2-2 Environmental Control Officer**

An Environmental Control Officer (ECO) shall be appointed for regular on site monitoring of the environmental management and compliance to the environmental regulations as contained in the Record of Decision and the Construction Environmental Management Plan. Site Visits shall be on a regular basis as to enable the ECO to submit weekly and monthly reports to the site manager and Environmental Liaisons Committee. The ECO shall be competent in the field of environmental management within a construction environment and hold at least one related qualification pertaining to

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<sup>1</sup> Other pieces of legislation specifically referred to in the Record of Decision issued for this project on 20 December 2005 by the provincial Department of Environmental Affairs and Development Planning are the:

- Occupational Health and Safety Act (85 of 1993);
- Major Hazard Installation Regulations (GN. R.692 of 30 July 2005);
- Atmospheric Pollution Prevention Act (45 of 1965);
- National Water Act (36 of 1998);
- National Heritage Resources Act (25 of 1999); and
- relevant SANS/SABS, BS, Department of Labour and Eskom standards and specifications for the construction and operation of fuel storage tanks.

interpretation and implementation of South African environmental laws, conservation or environmental management.

**PSEM3 MATERIALS**

**PSEM3-1 Materials handling, use and storage (Subclause 3.1)**

Imported materials shall be free of weeds (particularly propagative material of alien or invasive plants), litter and contaminants. The Engineer shall be advised of the areas that the Contractor intends to use for the stockpiling of both natural and manufactured materials. No stockpiling shall occur prior to the Engineer's approval of the proposed stockpiling areas.

**PSEM4 PLANT**

**PSEM4-1 Solid waste management (Subclause 4.3)**

No solid waste shall be disposed of at the construction camp or at any working area.

**PSEM4-2 Contaminated water (Subclause 4.4)**

The Contractor shall prevent the discharge of water contaminated with any pollutants, such as soaps, detergents, cement, concrete, lime, chemicals, glues, solvents, paints and fuels into any water body or drainage line. The Contractor shall not discharge the water used in cleaning equipment into any water body or drainage line.

The Contractor shall prevent the discharge of water contaminated with any pollutants, such as soap, detergents cement, concrete, lime, chemicals, glues, solvents, paints and fuels into any water body or drainage line.

Water that has been contaminated with suspended solids and silt shall be release into in settling ponds and will only be released once it comply to PetroSA's water license. Appropriately sited and purpose designed structures or portable pools may be used to fulfill this role and shall be subject to the Engineer's prior approval and a Method Statement shall be provided for the Engineer's approval prior to such discharge.

Drip trays shall be inspected and emptied daily, and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. Where possible, the Contractor shall ensure that equipment is covered so that rain water is excluded from the drip trays.

**PSEM4-3 Noise (Subclause 4.6)**

Any excessive noise emissions<sup>2</sup> during construction that occur outside of standard operating hours shall only be permitted when prior approval has been obtained from the Engineer or during emergency situations. In case of the latter, a motivation that comprehensively describes the incident shall be provided to the Engineer.

**PSEM4-4 Fuel and oil (Subclause 4.8)**

Fuel may be stored on site and the fuel storage area shall be located at the workshop or a fuel storage depot located within the construction camp. The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowsers. The tanks/ bowsers shall be situated on a smooth impermeable surface (plastic or concrete) base with an earth bund (plastic must have sand on top to prevent damage and perishing). The impermeable lining shall extend

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<sup>2</sup> I.e. that cause an increase of 7 dB(A)<sub>LEQ 60</sub> above the ambient noise level at the nearest habitation.

to the crest of the bund and the volume inside the bund shall be 110% of the total capacity of all the storage tanks/ bowsers. The bunded area shall be covered.

Only empty externally clean tanks may be stored on the bare ground. All empty externally dirty tanks shall be stored on an area where the ground has been protected. If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use.

The Contractor shall prevent unauthorised access into the fuel storage area. No smoking shall be allowed within the vicinity of the fuel storage area. The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

#### **SPEC EM 5.16 Fire Control**

Only fires that are in a controlled environment may be lit on site under constant and proficient supervision for bona fide braais at the Eskom office block. Permission must be obtained before lighting of a controlled fire with reference to the forecasted daily Fire Danger Index for the region. Fire extinguishers must be available at all times during a controlled fire and the fire must be extinguished afterwards.

#### **PSEM4-5 a) Dust (Subclause 4.10)**

The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Engineer. Appropriate dust suppression measures, e.g. dampening with water, shall be used when dust generation is unavoidable, particularly during prolonged periods of dry weather in summer. A water tanker should be available for the control of dust generation, and the Contractor shall ensure that the sprays do not generate excess run off.

During high wind conditions, the Contractor shall comply with the Engineer's instructions regarding dust-dampening measures. The Engineer may request the temporary cessation of all construction activities where wind speeds are unacceptably high, and until such time as wind speeds return to acceptable levels.

All stockpiles shall be protected against erosion, whether by wind or water. Vehicle speeds should not exceed 20km/h on dust roads or when traversing unconsolidated or non-vegetated areas. Disturbed areas shall be temporarily revegetated as specified in PSEM5-25.

#### **b) Sandblasting**

Sand or grit-blasting operations are prohibited unless undertaken within designated confined areas. Sandblasting may only be done in purpose-built facilities constructed on site with adequate dust containment and noise reduction measures with the approval of the engineer. Dispersal of aerated silica dusts must be avoided at all times. All relevant Occupational Health and Safety regulations shall be adhered to.

#### **PSEM4-6 Accommodation of site staff (Subclause 4.11)**

No staff shall be accommodated on site. Only security personnel will be allowed to stay on duty over night or weekend shifts.

#### **PSEM 4-7 Eating Areas**

The storage and consumption of food will only be allowed in areas specifically designed for this purpose and must meet the Occupational Health and Safety standards as defined in the Act. Specific reference is made to sections 4 (3), 5 (1) a-c and 5 (2) of the facilities regulations of GNR 924 of

August 2004. Non-compliance to this regulation may lead to penalties (see PSEM 6-1) or closure of the facility as prescribed by the Engineer.

**PSEM 4-8 Water wastage prevention**

Water supply infrastructures on site shall be maintained and monitored as to prevent any unnecessary wastage of water. Leaking taps, pipes, tanks or pumps shall be repaired immediately or be replaced to prevent wastage of water especially during dry seasons. Recycled water shall be used for dust suppression and irrigation where necessary.

**PSEM5 CONSTRUCTION**

**PSEM5-1 Method Statements (Subclause 5.1)**

The following Method Statements shall be provided by the Contractor within 7 days of the Engineer requesting them and prior to the activity covered by the Method Statement being undertaken:

- a) Location and structure of the fuel storage site, including the type and volume of storage containers and the design and capacity of the bund (Subclause 4.8 & PSEM4-4).
- b) Solid waste (refuse) control and removal of waste from the Site, including the number, type and location of rubbish bins, the manner and frequency with which the waste will be removed from site and the disposal site (Subclause 4.3 & PSEM4-1).
- c) Contaminated water management system, including an indication of the source and volume of contaminated water and how this would be disposed of, and the design of settlement structures for the removal of suspended solids and silt (Subclause 4.4 & PSEM4-2).
- d) Dust control, including methods to prevent dust generation and methods to reduce dust where its generation is unavoidable (Subclause 4.10 & PSEM 4-5).
- e) Logistics for the environmental awareness courses, including the date, time and location of the courses and who will present them (Subclause 5.2 & PSEM5-2).
- f) Location and layout of the construction camp in the form of a plan showing offices, stores for fuels and lubricants, vehicle parking, access point, equipment cleaning areas and staff toilet placement (Subclause 5.5).
- g) Location of proposed site access routes and proposed traffic safety measures (Subclauses 5.11 & 5.23 & PSEM5-4 & 5-16).
- h) Emergency procedures for fire, and accidental leaks and spillages of hazardous materials (Subclause 5.17).
- i) Extent of areas to be cleared, the method of clearing and the preparation for this clearing so as to ensure minimisation of exposed areas (Subclause 5.4 & PSEM5-9).

- j) Methods for all construction activities within any 1:50 year floodplain including details of methods to cross rivers, vehicle crossings and width of working areas<sup>3</sup> (PSEM5-13).
- k) Location, layout and preparation of cement/ concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas. An indication shall be given of how concrete spoil will be minimised and cleared (Subclause 5.12 & PSEM5-10).
- l) Method of undertaking earthworks, including spoil management, erosion and dust controls (PSEM5-7 & 5-9 & Subclause 5.20 & 5.4), as well as the construction and installation of retaining walls and gabions (PSEM5-14).
- m) Method of establishing and managing the “no go” areas, including their demarcation, fencing and its maintenance, monitoring and control . (Subclause 5.7 & PSEM5-3)

**PSEM5-2 Environmental awareness training** (Subclause 5.2)

All the Contractor’s employees, Sub-Contractors’ employees and any suppliers’ employees that spend more than one day a week or four days a month on site must attend an Environmental Awareness training course presented by the Contractor within seven days of the commencement of the contracted service or supply. The Environmental Control Officer will supply the course content.

No more than 20 people shall attend each course and the cost, venue and logistics for these courses shall be the Contractor’s responsibility.

**PSEM5-3 “No go” areas** (Subclause 5.7)

“No go” areas shall established around the areas of high botanical sensitivity in the northwest corner of the OCGT plant site, as well as the triangular area along the railway line below the existing 132 kV transmission line, and the triangular area on the bend of the PetroSA boundary to the southwest.

As far as construction of the transmission lines is concerned, “no go” areas shall extend for 15 m or to the outer edge of riverine vegetation<sup>4</sup>, on either side of any water course that the line crosses, and shall be demarcated accordingly. Any areas of indigenous vegetation encountered along the route of the transmission lines shall be regarded as “no go” areas and their demarcation will be at the discretion of the Engineer.

Besides ensure that all “no go” areas are demarcated, the Contractor shall ensure that no unauthorised entry, stockpiling, dumping or storage of equipment or materials shall be allowed within the demarcated “no go” areas. The specification for the “ no go” fencing is to be presented in a Method Statement, per PSEM5-1 m) above.

Outcrops, rock faces, trees and natural vegetation or any other natural or special features encountered during construction of the transmission lines shall not be defaced, painted for benchmarks or otherwise damaged even for survey purposes without the prior approval of the Engineer. Such features may be demarcated as “no go” areas and require fencing or similar protection measures, as determined by the Engineer.

**PSEM5-4 Access routes/ haul roads** (Subclause 5.11)

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<sup>3</sup> Applies particularly to transmission line construction activities.

<sup>4</sup> Whether indigenous vegetation or not.

Access to the Construction camp and working areas shall utilise existing roads or tracks. Entry/ exit points onto public roads shall take cognisance of traffic safety. Traffic safety measures shall include appropriate signage and signalmen where relevant.

The Contractor shall gravel access roads at points where vehicles leave the construction site i.e. instate a buffer area to drop mud and sediment and avoid transportation of particles onto the road surface. The gravel buffer area/ temporary gravel construction entrance shall consist of coarse aggregate (4-9cm) layered 15cm thick. It must extend the full width of the vehicular ingress and egress area. The length of the entrance must be at least 20m and the entrance should widen at its connection to the roadway in order to accommodate the turning circle of large trucks.

Mud and sand deposited onto public roads by construction activities shall be cleared on a weekly basis.

All users of access/haul roads shall not exceed 20km/h.

**PSEM5-5 Construction Personnel Information Posters (Subclause 5.3)**

The Contractor shall erect and maintain information posters for the use of his employees depicting actions to be taken to ensure compliance with aspects of the specifications. The information boards shall be erected at locations agreed by the Engineer and should contain the following signals:

- a) At working areas: use of drip trays, use of toilets, no eating, no littering, no fires.
- b) At eating areas: use of toilets, no littering, no fires.

**PSEM5-6 Community relations (Subclause 5.19)**

Public information boards shall be erected adjacent to the N2 National Road at the t-junction to the landfill site at the southwestern corner of PetroSA's security fence.

The A0 poster to be placed on the information boards will be supplied to the Contractor. The Contractor shall mount the posters on a 0.6mm white chromodek backing with a 50mm by 50mm by 1.6mm square tube frame. This frame shall be mounted on a 100mm diameter wooden pole, 1.5m above the ground as directed by the Engineer. The Contractor shall be responsible for making up and erecting the information boards at the locations indicated above and for maintaining them to the satisfaction of the Engineer.

The public information boards will include the Contractor's cellular telephone number, to facilitate complaints/ queries by members of the public.

**PSEM5-7 Erosion and sedimentation control (Subclause 5.20)**

The works should be phased, and development staged so that stripped areas are kept to a minimum to avoid erosion.

Any runnels or erosion channels developed during the construction period or during the maintenance period shall be backfilled and compacted, and the areas revegetated as specified in PSEM5-25. Stabilisation of cleared areas to prevent and control erosion shall be actively managed. Consideration and provision shall be made for various methods, namely, brushcut packing, mulch or chip cover, straw stabilising (at a rate of one bale/square metre and rotovated into the top 100mm of the completed earthworks), watering, soil binders and anti erosion compounds, mechanical cover or packing structures (e.g. Hessian cover).

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised area shall be repaired and maintained to the satisfaction of the Engineer.

**PSEM5-8 Aesthetics (Subclause 5.21)**

The Contractor shall ensure that the construction camp and working areas are kept neat and tidy at all times.

**PSEM5-9 Site clearance (Subclause 5.4)**

The Contractor shall ensure that the clearance of vegetation is restricted to that required to facilitate the execution of the works. Vegetation clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible. The detail of vegetation clearing shall be subject to the Engineer's approval.

All topsoil shall be stripped to a depth of 150 mm and stockpiled separately from subsoil for subsequent use during rehabilitation and revegetation. Topsoil shall not be compacted. All vegetation covering the areas to be stripped of topsoil shall be removed and either mulched and mixed into the stockpiles or disposed of at an approved disposal site. The disposal of vegetation by burying or burning is prohibited.

The size of the construction areas shall be minimised and all areas disturbed during construction shall be rehabilitated.

**PSEM5-10 Cement and concrete batching (Subclause 5.12)**

The permitted location of the batching plant (including the location of cement stores, sand and aggregate stockpiles) will be indicated by the Engineer. The concrete/cement batching plant shall be kept neat and clean at all times. No batching activities shall occur directly on the ground. The batching plant shall be located on a smooth impermeable surface which shall be bunded and sloped towards a sump to contain runoff and spillage. All wastewater resulting from batching of concrete shall be disposed of via the wastewater management system and shall not be discharged into the environment. Concrete shall not be mixed directly on the ground.

Emptied cement bags shall be stored in weatherproof containers to prevent wind blown cement dust and water contamination. Such bags shall be disposed of on a regular basis via the solid waste management system, and shall not be used for any other purpose.

Unused cement bags shall be stored so as not to be affected by rain or runoff events. In this regard, closed steel containers should be used for the storage of cement powder and any additives. The Contractor shall ensure that sand, aggregate, cement or additives used during the mixing process are contained and covered to prevent contamination of the surrounding environment.

**PSEM5-13 Bridges and culverts**

The Contractor shall minimise the extent of any damage to any flood plain to only that necessary to complete the works and shall not pollute any river system as a result of construction activities. No construction materials shall be stockpiled on a floodplain.

The Contractor shall not divert, dam or modify any water course or stream without the approval of the Engineer.

**PSEM5-14 Retaining Walls and Gabions**

If rocks are required for use in gabion baskets/ reno mattresses, these shall be obtained from a source approved by the Engineer. The Contractor shall not collect rocks for use in gabion baskets/ reno mattresses from any water course.

**PSEM5-15 Temporary revegetation of the areas disturbed by construction (Subclause 5.30)**

Landscaping and revegetation of disturbed areas and the site in general shall be in terms of site rehabilitation and closure specifications. However, where there is likely to be a delay of greater than two weeks in the landscaping and revegetation of a disturbed area or where that site is likely to be the subject of further construction activities at a later stage, the Contractor shall ensure that the area is temporarily revegetated to combat dust generation and prevent erosion. This revegetation shall occur incrementally immediately upon completion of the construction activities at the subject location.

The Engineer may recommend other methods to prevent wind and water erosion of disturbed areas where immediate revegetation is impractical due to further work required at the subject location. These methods may include layering or rotovating of hay-bales over the disturbed area or covering with natural decomposable materials like Hessian or Geo-jute.

Prior to revegetation, structures and material not forming part of the Permanent Works, including remnants of building materials, concrete foundations, timber and other foreign debris, shall be removed and disposed of via the solid waste management system. The area shall be revegetated as follows:

- a) The surface shall be levelled by hand or machine as far as practically possible.
- b) Alien vegetation shall be cleared by cutting the plants off at ground level, and painting the stump with 0.5% Garlon in diesel.
- c) For areas with a slope of greater than 1:3, straw shall be utilised as a binding material to stabilise the soil during revegetation and rehabilitation of the site. Straw shall consist of natural seed-free, dried fibres of hay or chaff of various lengths between 50 mm and 400 mm, delivered to Site in bales and shall be applied evenly by hand or machine at a rate of 1 bale per 10 m<sup>2</sup> over the area to be revegetated. It shall then immediately be rotovated into the upper 100 mm layer of soil.
- d) The prepared area shall be hydro- or hand-seeded at a rate of 40 kg/ ha using Rye grass (*Lolium multiflorum*). In the event of hand-seeding, the seed mixture as specified shall be mixed with two parts per volume of clean dry plaster sand, then divided in half and applied evenly in two successive applications, one after the other, by means of an approved hand seeding machine (known colloquially as a “tefsaaier”). On completion of the seeding the surface shall be lightly raked to cover the seed with no more than 5 mm of soil.
- e) Water used for the irrigation of vegetated areas shall be free of pollutants that will have a detrimental effect on the plants. The vegetated area shall only be watered once, immediately following seeding. Watering should be carried out from a tanker, using a fine nozzle spray to avoid erosion and disturbance of the vegetation. Water for irrigation purposes may be drawn from the quarry water body.

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been vegetated. Only persons or equipment required for the preparation of areas, application of fertiliser and maintenance of revegetated area shall be allowed to operate on these areas.

**PSEM5-16 Access to site (Subclause 5.23)**

The Contractor shall ensure that access to the Site and associated infrastructure and equipment is off-limits to the public at all times during construction. If so required, to ensure effective control of access to the site, the contractor shall fence the site. This fence shall be a diamond mesh

fence or similar, with a minimum height of 1.8 m, erected around the site and shall be maintained for the duration of the contract.

The Contractor shall ensure traffic safety at all times and shall implement safety measures to this end. General and personal traffic safety is the responsibility of the individual.

## **PSEM6 TOLERANCES**

### **PSEM6-1 Penalties (Subclause 6.2)**

Penalties will be issued for the transgressions listed below. Penalties may be issued per incident at the discretion of the Engineer. Such penalties will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications. The Engineer will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract.

Penalties for the activities detailed below, will be imposed by the Engineer on the Contractor and/or his Sub-contractors.

a) Any employees, vehicles, plant, or things related to the Contractor's activities operating within the designated boundaries of a "no-go" area.	R5 000
b) Any vehicle driving in excess of designated speed limits.	R500
c) Persistent and unrepaired oil leaks from plant and machinery.	R2 000
d) Persistent failure to <u>use</u> , monitor and empty drip trays timeously.	R2 000
e) Persistent failure to avoid incidental spillage of fuels and oils at the construction camp, working areas or elsewhere on site, e.g. during refuelling.	R2 000
f) Litter on site associated with construction activities.	R500
g) Deliberate lighting of illegal fires on site.	R800
h) Any employee eating meals on site, outside of the defined eating area.	R200
i) Employees not making use of the site ablution facilities.	R300
j) Failure to obtain specific approval for events that exceed noise standards.	R5 000
k) Failure to empty waste bins on a regular basis.	R1 000
l) Inadequate dust control.	R3 000
<u>m) Any employee found guilty of deliberately harming or killing an animal which is not regarded as a pest or problem animal on or around the site without the consent and approval of the ECO. Repeat transgressions will lead to dismissal.</u>	<u>R500</u>
<u>n) A spillage, pollution, fire or any damage to the biophysical environment resulting from negligence on the part of the Contractor.</u>	<u>R10 000</u>
<u>o) Any employee tampering with emergency spill, fire or safety control mechanisms which form part of the site contingency measures. A repeat transgression will lead to immediate dismissal.</u>	<u>R500</u>

For each subsequent similar offence the penalty shall be doubled in value to a maximum value of R 100 000

The Engineer shall be the arbitrator as to what constitutes a transgression in terms of this clause, subject to the provisions of Clause 60(1) of the General Conditions of Contract. In the event that transgressions continue, the Contractor's attention is drawn to the provisions of Sub-clause 58(1)(b)(vi) of the General Conditions of Contract under which the Engineer may cancel the Contract.