EXECUTIVE SUMMARY: DRAFT BASIC ASSESSMENT REPORT
FOR THE PROPOSED REVERSE OSMOSIS PLANT, IRON ORE HANDLING FACILITY,
PORT OF SALDANHA

DEAT REF NO: 12/12/20/958 February 2008

1. BACKGROUND

Transnet Limited (“Transnet”), a state-owned enterprise under the National Department of Public Enterprises, is responsible for ensuring that South Africa’s transport industries operate to world-class standards. Terminal operations at the Iron Ore Handling Facility at the Port of Saldanha have resulted in the need for additional water for dust suppression. Pre-feasibility level studies have indicated that water is the most viable option for dust suppression, and Transnet has identified desalinated sea water as an appropriate water supply. It is proposed that a Reverse Osmosis (RO) desalination plant be established at the Iron Ore Handling Facility to obtain water for dust suppression.

In terms of the Environmental Impact Assessment (EIA) Regulations contained in Government Notices R.385, R.386 and R.387, under the National Environmental Management Act No. 107, 1998 (NEMA), which came into force on 3 July 2006, a Basic Assessment process is required for the establishment of the proposed RO Plant, prior to a decision regarding the authorisation thereof being taken by the Department of Environmental Affairs and Tourism (DEAT).

Transnet has appointed SRK Consulting (SRK) and PD Naidoo & Associates (Pty) Ltd (hereby referred to as the PDNA/SRK Joint Venture) as the independent Environmental Assessment Practitioners (EAP) to undertake the Basic Assessment, as required in terms of NEMA.

2. APPROACH TO THE BA

The EIA Regulations contained in GN R.386 list activities which require that a Basic Assessment (BA) process be followed prior to their commencement. The proponent must obtain authorisation for the proposed activity from the designated competent authority. As Transnet is a state-owned enterprise, the competent authority is the DEAT.

The proposed establishment of a RO Plant at the Iron Ore Handling Facility entails the following listed activities1:

- 2. Construction of earthmoving activities in the sea or within 100m inland of the high water mark of the sea, in respect of: (d) embankments; (e) stabilizing walls; (f) buildings and (g) infrastructure.*
- 3. The prevention of the free movement of sand, including erosion and accretion, by means of planting vegetation, placing synthetic material on dunes and exposed sand surfaces within a distance of 100m inland of the HWM of the sea.
- 5. The removal or damaging of indigenous vegetation of more than 10m² within a distance of 100m inland of the HWM of the sea.
- 6. The excavation, moving, removal, depositing or compacting of soil, sand, rock or rubble covering an area exceeding 10m² in the sea or within a distance of 100m inland of the HWM of the sea.*
- 12. The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004).
- 13. The abstraction of groundwater at a volume where any general authorization issued in terms of the National Water Act, 2004 (Act No. 36 of 1998) will be exceeded.
- 25. The expansion of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of emissions, pollution, effluent. *

In addition to conducting a Basic Assessment, a Water Use Licence Application (WULA) will also be submitted in terms of Section 21 of the National Water Act (No. 36 of 1998) to the Department of Water Affairs and Forestry (DWAF) for the proposed discharge of water which contains waste from an industrial process or which has been heated in any industrial process (21h water use).

The NEMA EIA Regulations were promulgated to put into practice the environmental management principles espoused in the Act. The BA Report provides the competent authority with all relevant information about the proposed activity, as well as an assessment of the potential impacts in order to inform the decision as to whether the activity should be approved and, if so, under what conditions. A typical BA process is depicted in Figure 1 below.

In May 2007 a Notice of Intent to Apply was submitted to DEAT as the first step in the Basic environmental Assessment process for the proposed RO Plant. The application was accepted by DEAT and the public participation process commenced in June, with all Interested & Affected Parties (I&APs) being notified of the proposal, including those on the I&AP database for the proposed Phase 2 upgrade to the iron ore facility.

1 This list of activities includes all activities associated with all of the alternatives. Activities marked with an * are specific to the preferred alternative.
The second step entails the assessment of the activity and the production of a BA Report for public comment. Issues and concerns raised by the public will inform the Final BA Report which, together with the prescribed Comment and Responses Report, will be submitted to DEAT for a decision.

A number of alternatives to seawater have been considered, however desalinated seawater has been identified as the preferred, and most feasible, option. The use of desalinated sea water for dust suppression will also improve the self-sustainability of the Iron Ore Facility and will reduce the demand and reliance on the municipal supplies. In addition, desalinated sea water supply has the benefit of not being affected by drought situations, as is currently the case with the municipal water supply. Therefore, potable water supplied as a result of the RO Plant will be a more continuous supply and will improve dust suppression activities at the Iron Ore Facility, even during times of drought.

If the RO Plant is not approved, alternative water sources for dust control will need to be established. Transnet have identified possible alternatives including obtaining additional potable water from municipal supplies, reclaimed sewage and a number of other sources. However, due to the potential lack of available yields, environmental costs, and to ensure suitable water quality, these alternative water sources were not considered as feasible options.

4. PROJECT DESCRIPTION

The proposed activity is to generate potable water to the same quality as the existing municipal supply at the Saldanha Bay Iron Ore Terminal using RO technology to desalinate seawater. RO involves forcing water through a semi-permeable membrane under high pressure, leaving the dissolved salts and other solutes behind on the surface of the membrane. The proposed RO desalination plant will consist of up to three RO modules, each capable of producing up to 1 200m³/day of potable water (3 modules with a total capacity of 3 600m³/day potable water). Approximately 4 400m³/day of brine would be produced as a result of the RO process (at full capacity). It is proposed that brine would be discharged into the sea. Additional waste water resulting from the cleaning of the RO plant infrastructure will be disposed of via the municipal sewer line, or by a waste management contractor.

The RO Plant, as well as associated infrastructure, includes:

- A 200kl sea water buffer tank alongside the RO building,
- A 200 kilo litre (kl) potable water buffer tank alongside the RO building,
- Potable water storage reservoir(s) with a capacity of 5 Mega litres (MI),
- A brine basin (of up to 200m³) in which brine will be stored in prior to it being released back into the sea,
- Up to 3 CIP (Clean in Place) backwash tanks each with a capacity of 20m³ to store the wastewater before being discharged into the municipal sewer line or removed by an appropriate waste remover,
- Interconnecting pipelines,
- A RO containment building with room for up to three RO modules, an electrical sub station, a motor control room,
• a pump house, a store room, office and ablution facilities, and space for parking area,
• Interconnecting infrastructure including electrical and communication wiring for the RO system,
• A small service road (approximately 3 m wide).

Chemicals used in the pre-treatment process of seawater (i.e. Dual Media Filters) will be blended and discharged along with the brine. These include:
• Flocculant (Ferric Chloride);
• Non-oxidising biocide;
• Antiscalant.

The following substances used for the cleaning of the RO membranes, CIP, will be contained in waste disposed of either via the municipal sewer system (with approval from the municipality) or at a suitable disposal site, and will not be contained in the brine discharged to the sea:
• Ethylenediaminetetraacetic acid (EDTA) is an aminopolyacrylic salt that is used to bind or capture trace amounts of iron, copper, manganese, calcium and other metals. It is biodegradable under ambient environmental conditions;
• Sodium tripolyphosphate (STPP), is the sodium salt of triphosphoric acid and is a typical ingredient of household cleaning products and is thus present in domestic waters;
• Trisodium phosphate (TSP) is a highly water-soluble cleaning agent and is not limiting in marine environments as it is classified as not acutely toxic to aquatic organisms.
• Sodium lauryl sulphate (SLS) is an anionic surfactant which is a class of chemicals used for their detergent properties. It is biodegradable in surface waters and is classified as a substance of low environmental toxicity.

5. ALTERNATIVES BEING CONSIDERED

Three site locations (within Transnet boundaries) for the positioning of the main RO Plant building, and a number of alternatives for intake of seawater and discharge of brine either via pipeline or beach wells were considered during the BA process (see Figure 2 below).

The following site alternatives, and intake and discharge alternatives, were assessed as part of the BA process:

Site 1
This site is located to the east of the Iron Ore Handling Facility, adjacent to the reclamation dam. Most of the area proposed for the RO Plant building and the associated infrastructure is located in the primary dunes which is particularly sensitive from a floral and dune functioning perspective. There is much greater sand and dune mobility at this site due primarily to low plant cover. Part of the site was disturbed in the past, mainly by earthmoving activities and the construction of the reclamation dam. The vegetation at this site can be described as Langebaan Dune Strandveld which, although being previously disturbed, has recovered to a stable condition. The alternative intake and discharge infrastructure locations at this site include:
• Beach well intake and pipeline discharge (Big Bay) (1a);
• Pipeline intake and pipeline discharge (Big Bay) (1b);
• Beach well intake and beach well discharge (Big Bay) (1c).

Site 2
This site is located north and northwest of the Iron Ore Handling Facility, and the small beach has been heavily impacted on by the construction of the quay and the activities at the facility. Stockpiles of gravel and construction rubble are evident at this site, and the site is separated from the main dune system to the north by a road and railway line. Only a few pioneer species are found at this site, and the functioning of the primary dune system has been lost as the area is cut off from the parabolic dune system to the north. The alternative intake and discharge infrastructure locations at this site include:
• Beach well intake and pipeline discharge (Small Bay) (2a);
• Pipeline intake and pipeline discharge (Small Bay) (2b).

Site 3
This site alternative is located on the southern section of the quay of the Iron Ore Handling Facility, on a gravel area adjacent to the Multi-Purpose Terminal. The beach area at this site is very small, compared to Sites 1 and 2. The “environment” at this site is entirely man-made and there are no indigenous species, or any vegetation found on the site. The alternative intake and discharge infrastructure locations at this site include:
• Pipeline intake (Small Bay) and pipeline discharge (Small Bay) (3a);
• Pipeline intake (Small Bay) and pipeline discharge (Big Bay) (3b);
• Borehole intake on the quay (stockpiles) and pipeline discharge (caisson 3, Big Bay) (3c);
• Borehole intake on the quay (Multi-Purpose Terminal) and pipeline discharge (caisson 3, Big Bay) (3d – preferred alternative);
At the onset of the BA process, Site 1 was considered the preferred site alternative. However, after consultation with various specialists Site 3 has evolved to be the preferred alternative. Therefore Site 3 is the preferred site alternative and the option of borehole intake on the quay (adjacent to the Multi-purpose Terminal) and a pipeline discharge (at caisson 3 into Big Bay) is the preferred layout option (3d).

6. PUBLIC PARTICIPATION PROCESS

A comprehensive public participation process aimed at allowing the public to participate meaningfully and to be involved at an early phase of the environmental process was followed. The public participation process included:
- Placement of newspaper advertisements in local and regional newspapers;
- Notifying all I&AP’s registered on the proposed Phase 2 EIA database of the proposed development;
- Inviting all interested parties to formally register as I&AP’s for the RO Plant Basic Assessment process;
- Distribution of a Background Information Document (BID) which provided information of the proposed RO Plant; and
- Meetings with various government officials, including representatives from:
  - Department of Environmental Affairs and Tourism (DEAT);
  - Marine and Coastal Management (MCM);
  - Department of Water Affairs and Forestry (DWAF),
  - West Coast District Municipality (WCDM);
- Distribution of the Update Newsletter

A number of I&AP’s including residents from Saldanha Bay and surrounds, and various government representatives submitted comments on the proposed activity. The main issues that were identified during the 1st round of public participation have been included in the assessment of impacts by a number of specialists and can be broadly summarised into the following categories:
- Increased salinity in the bay due to brine discharge
- Alternative dust suppression methods
- Chemical usage in the desalination process
- Alternative uses of brine
- Alternative Sites inside and outside the Port and
- Alternative Intake and Discharge points

7. ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

A number of specialist studies were commissioned to assess the potential impacts identified by the environmental team and through the public participation process. These included:
- Botanical Study – assessment of the impact of the proposed RO Plant infrastructure on the sensitive dune system at site alternative 1 and the impact on the flora found at each of the site alternatives;
- Marine Study – assessment of the impact of sea water intake and brine discharge (4 400m³/day brine discharge with a salinity of 63.5 ppt) of each site, intake and discharge alternative on the marine environment. This included 3D hydrodynamic and water quality modelling of
- the impact of the brine discharge on the marine environment and evaluation of the impact of the proposed RO Plant and associated infrastructure on the beach areas and marine fauna and flora in these areas;
- Groundwater Resources Study – assessment of the impact of intake and discharge via beach wells on the groundwater of the area; and
- Heritage Study – assessment of the impact of the proposed RO Plant and associated infrastructure on any archaeological features of cultural/heritage importance.

Additional impacts, including noise and energy use were also identified and an assessment has been included in the BA Report. Relevant observations with regard to the overall impact ratings, assuming mitigation measures are effectively implemented for the preferred alternative (3d) are:
- The potential insignificant impact on vegetation and flora associated with the construction of the RO Plant building and associated infrastructure;
- The potential insignificant impact on groundwater resources;
- The potential insignificant impact on heritage resources associated with the drilling of boreholes;
- The potential very low impact on marine species associated with the construction of the RO Plant building and associated infrastructure;
- The potential low impact on salinity levels associated with the brine discharge;
- The potential low impact associated with the temperature of the brine discharged;
- The potential insignificant impact associated with the visual impact of the RO Plant;
- The potential insignificant impact associated with the noise impact of the RO Plant;
- The potential very low impact associated with the addition of oxygen-scavenging compounds in the brine discharge2; and
- The potential very low impact associated with the discharge of brine containing increased Oxidising Biocides (NaOCl);
- The potential low impact associated with the discharge of brine containing increased Non-oxidising Biocides (DBNPA);
- The potential insignificant impact associated with the entrainment of biota;
- The potential very low impact associated with co-discharged constituents;
- The potential low impact on flow distortion due to brine discharge; and
- The potential insignificant impact on sediment dynamics due to brine discharge.

2 The use of oxygen scavenging compounds and oxidising biocides are not part of the current project description but have, however, been included for completeness purposes.
8. FINDINGS AND RECOMMENDATIONS

The key findings of the Draft BA Report are as follows:

- Transnet Limited are proposing to construct, and install, an RO Plant (and associated infrastructure) at the Iron Ore Handling Facility;
- Additional water supply is required to meet current dust suppression requirements at the Iron Ore Handling Facility;
- It is proposed that the RO Plant be located at the Iron Ore Handling Facility in Saldanha Bay, which is already a built environment;
- Water has been identified as the most viable and appropriate means of dust suppression at the Iron Ore Handling Facility;
- Desalinated sea water, using reverse osmosis has been identified as the appropriate method of water supply, due to the required standard and quantity of water;
- No visual impacts of significance of the proposed RO Plant have been identified at any of the sites;
- No heritage resources of significance have been identified at any of the sites;
- No groundwater impacts of significance of the proposed intake or discharge for the RO Plant have been identified other than the discharge of brine via beach wells (S1c) which makes this alternative non-viable;
- Site 1 has been disturbed in the past by activities at the Iron Ore Handling Facility, but has recovered well and the parabolic and primary dune system at this site alternative are of ecological importance;
- The flora and vegetation at Site 1 is considered rare and sensitive, and a permanent loss of dune habitat as well as the loss of a number of Red Data floral species is likely if the RO Plant is located at this site;
- The dune system and vegetation at Site 2 has been heavily impacted on by activities at the Iron Ore Handling Facility;
- There are no indigenous flora or vegetation at Site 3;
- Plume footprints (as modelled by the marine specialist) of salinity, seawater temperature, biocide and potential co-discharge impacts do not extend as far as any existing or proposed mariculture activities, seawater intakes for fish processing factories, recreational and commercial gill-netting areas, or National Parks and Marine Protected areas at Site 1 and 3;
- At Site 2, however, the plume footprints for salinity, seawater temperature, biocide and potential co-discharged constituents extend close to the eastern boundary of the area demarcated for seaweed harvesting.

It is believed that sufficient information is available for a decision regarding the proposed RO plant to be made. If DEAT approves the proposed RO Plant, a condition of approval should be that the recommendations and essential mitigation measures presented below are effectively implemented by Transnet.

General Recommendations

- Commit to and effectively implement the essential mitigation measures listed in the Basic Assessment Report;
- Consider implementing the optional mitigation measures listed in this Basic Assessment Report; and
- Implement an Environmental Management Plan (EMP) for the construction and operational phases of the project.

Annex A: Essential mitigation measures (for the preferred alternative)

Noise

- House the RO Plant pressurization pumps and the entire plant in a separate building which should be sound proofed and have internal acoustic treatment (if the noise ratings from the equipment in the building exceed 85dBA).
- Limit internal noise to below 85dBA as measured at the entrance door to the structure.

Geohydrological:

- Use only biodegradable non-toxic drilling additives (e.g. Polyflip) during borehole construction.
- Contain the silt-laden water from the boreholes (airlifted during cleaning and development) in the same "mud pits" used for mixing the drilling additive in and once the work is completed backfill and clean the site.
- Enforce “good-house keeping” during the construction phase.

Marine:

- Manage all construction in the coastal zone to a strictly enforced Environmental Management Plan.
- Design pipeline discharge with an optimal diffuser.
- Develop a monitoring programme to assess the impact of the brine on potentially affected communities, and to monitor the brine for heavy metals. This monitoring programme must also include testing for toxicity at the discharge point as well as testing for tainting substances to ensure their absence from the effluent.

General

- Limit the usage of chemicals in the RO process and in the cleaning process to those listed and assessed in this report. If any additional chemicals proposed are proposed for use in the RO process and in the cleaning process DEAT, DEA&DP and DWAF must be informed of these immediately.
- Appropriately store all chemicals used in the RO process as prescribed in the Occupational Health and Safety Act, 85 of 1993 and obtain all relevant permits from the local authority prior to storage of the chemicals.
- No wastewater associated with the cleaning and backwashing of the RO plant may be disposed of via the municipal sewer system without written confirmation from the relevant authority who would need to be made aware of all the chemicals contained in the wastewater.

6. WAY FORWARD

The Draft BA Report is not a final report and will be amended based on comments received from I&APs. The public participation process has given I&APs the opportunity to assist with identification of issues and potential impacts, and further opportunities are provided as indicated below.

The second round of public participation commences on the 19th of February and concludes on the 19th March.
The Executive Summary of the Draft BA Report will be sent to I&APs. Full copies of the Draft BA Report are available for viewing at the following venues:

- Saldanha Public Library;
- Diazville Public Library;
- Langebaan Public Library;
- The Blue Bay Lodge in Blouwaterbaai; and
- The offices of SRK Consulting, Rondebosch.

The Draft Basic Assessment Report can also be accessed electronically on SRK’s website www.srk.co.za (via the ‘public documents’ link) or on Transnet’s website www.transnet.net (click on Business with us – Transnet Projects – Environmental Public Documents).

I&APs are also invited to attend a Public Open Day, which will be held on 5 March 2008, where members of the project team will be available to present and discuss the information in the Draft BA Report. Details of the Public Open Day are as follows:

Venue: Protea Hotel, 51 B Main Road, Saldanha  
Date: Wednesday 5 March 2008  
Time: 15h00 – 19h00

Written comments on the Draft BA Report should be submitted by 19 March 2008 to:

**Monique Sham / Sharon Jones**  
SRK Consulting  
Postnet Suite #206  
Private Bag X18  
Rondebosch 7701  
Email: msham@srk.co.za / sjones@srk.co.za

Once I&APs have commented on the information presented in the Draft BA Report, the Final BA Report accompanied by a Comments and Responses Report will be made available for a third and final round of public comment. The Final BA report will then be completed and submitted to DEAT for their decision. The public is therefore urged to submit comment, as comments will affect the Final BA Report and the decision taken by DEAT.

Please contact SRK immediately if you require a copy of this document in Afrikaans or Xhosa