



## **ENVIRONMENTAL MANAGEMENT PROGRAMME**

**FOR THE CLEARANCE OF VEGETATION AND CULTIVATION OF CROPS  
ON PORTION 1 OF THE FARM HARRISDALE 226 (KILMOREY), BARKLY  
WEST DISTRICT, NORTHERN CAPE.**

**Ref. no. NC/EIA/03/FB/DIK/BAR1/2019**

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**Report prepared by:**



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**Site Information:**

Farm / Erf Name	: Harrisdale
Farm Number	: 226
Farm Portion	: 1
21 Digit Surveyors Code	: C00700000000022600001007
District	: Barkly West
District Municipality	: Francis Baard District Municipality
Local Municipality	: Dikgatlong Local Municipality
Site coordinates (Centre of site)	: - 28.492473° S and 24.655838° E

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## **1 Objectives of the Environmental Management Programme (EMPr)**

The Environmental Management Programme is intended to provide environmental specifications to put measures in place to mitigate and manage potential environmental impacts arising from the construction and operational phases of the establishment of an agricultural area for crop production on portion 1 of the farm Harrisdale 226, Barkly West, Northern Cape. This EMPr enables the key role players to use a pro-active approach by addressing potential impacts beforehand, thus, limiting the corrective measures needed during the construction and operational phases of the project.

This EMPr deals with the phases as set out below:

### **1.1 The Planning Phase**

The EMPr offers an ideal opportunity to incorporate pro-active environmental management measures in order to ensure that potential harmful impacts are limited and avoided as far as possible. Furthermore, by implementing this EMPr during the planning phase, the necessary corrective actions can be taken to limit future potential impacts which could be detrimental to the environment.

### **1.2 The Construction Phase**

The majority of impacts during the construction phase will pose immediate effects (e.g. noise, dust etc.). The site must be monitored on a regular basis during the entire construction phase in order to identify and mitigate impacts as they occur. These impacts can then be mitigated effectively using the measures as set out in this EMPr.

### **1.3 The Operational Phase**

Pro-active measures used during the planning and construction phases can be used to minimise potential environmental impacts during the operational phase of the project. These measures will also limit the risks related to certain impacts and reduce the intensity of monitoring during the operational phase.

## **2 Construction Phase, Operational Phase and Responsible Parties**

Formal responsibilities are necessary to ensure that procedures and EMPr measures are executed throughout the construction and operational phase by each responsible party. Responsible parties for this project include the following: Project Manager, Site Manager, Contractors, Environmental Control Officer and construction workers.

### **The Project Manager:**

- Ensure that the Applicant and on site contractors are aware of all specifications, legal aspects, and standards of procedure relating to the construction phase in terms of environmental protection.

- Ensure that all EMPr measurements and guidelines are communicated to and adhered to by all parties on site.
- Monitor the implementation of the EMPr throughout the construction phase through regular monitoring, inspections and meetings with all applicable parties on site.
- Should be completely familiarised with the Environmental Impact Assessment (“**EIA**”) for the project, the conditions of the Record of Decision (“**RoD**”) and other relevant environmental legislation.

**The Site Manager:**

- Will be familiarised with the EIA for the project.
- Will be familiarised with the conditions regarding the RoD for the project.
- Will have sound knowledge of and be familiarised with the EMPr.
- Should be aware of all specifications, legal aspects, and standards of procedure relating to the construction and operational phase in terms of environmental protection and ensure compliance with these.
- Will have an overall responsibility to implement measures as set out in this EMPr.
- Will ensure the relevant audits take place to ensure compliance with this EMPr.
- Will continuously liaise with the project manager, the environmental control officer and other role players on matters concerning the environment.
- Prevent actions that will harm or may cause harm to the environment, and take steps to prevent any form of pollution on the site.
- Confine related activities to the demarcated site.

**The Environmental Manager:**

- Conduct daily inspections to determine compliance with RoD using checklists.
- Submit monthly audit update report to External Auditor and Project Management, showing progress with findings.
- Facilitate reporting, recording, investigation and follow-up of environmental related incidents.
- Facilitate and integrate relevant training programs for personnel covering all activities impacting on the environment
- Ensure that the environmental commitments in this Environmental Management Plan and the RoD are complied with by the contractor and sub-contractors.
- Evaluate construction methods, techniques and procedures, identify environmental risk, draw conclusions and recommend possible solutions.
- Implement and manage the necessary construction and operational Environmental Management Measures.
- Proactively interpret and objectively analyse environmental data and initiate programs to mitigate against the environmental and related risks

- Assume a leading role in performing environmental audits and guiding other staff in the performing of external and internal audits
- Perform monthly environmental reporting for input into Divisional management information reports.

**The Environmental Control Officer:**

- Should be fully familiar with the EIA Report.
- Be fully familiar with the conditions of the RoD.
- Be fully familiar with the Environmental Management Plan.
- Be fully up-to-date with all relevant environmental legislation and policies and procedures, and ensure compliance with them.
- Ensure that periodic environmental performance audits are undertaken on the project implementation.
- Maintain the following on site:
  - A daily site register
  - A non-conformance register
  - A public complaint register
  - A register of audits
- Report to project manager.
- Convey the contents of this document to the site staff and discuss the contents in detail with the Project Manager and Contractor.
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPR.
- Take appropriate action if the specifications contained in the EMPR are not followed.
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- Ensure that activities on site comply with all relevant environmental legislation.
- Compile progress reports on a regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post-construction audit carried out by an independent auditor/consultant.

**Contractors and Service Providers:**

All contractors (including subcontractors and staff) and service providers are ultimately responsible for:

- Complying with the environmental management specifications where applicable;
- Provide Environmental Method Statements to the Site Manager with regards to how certain activities on-site will be conducted.
- Adhering to any environmental instructions issued by the Site Manager/Project Manager

- Submitting a report, in a format and frequency as decided upon by the Project/Site Manager, which will document all incidents that have occurred during the period before the site meeting
- Arrange that all his employees and those of his subcontractors receive training. Training has to be appropriate for the level of the tasks and functions undertaken.

### **3 Layout Plan**

- A copy of the layout plan must always be available on site.

## **4 Protection of the Environment**

### **4.1 Awareness Plan**

All contractors and employees must be trained and should be informed about the environmental impacts and the prevention thereof. Workers should receive Induction for environmental safety and risk management and regular "Toolbox Talks" should commence to brief and debrief workers on potential environmental issues in order to prevent an unnecessary environmental impact from occurring.

The following aspects should be taken in consideration:

1. Ensure that development only takes place within the development footprint. Any area cleared outside the scope of the initial EIA done for the project will trigger another activity in terms of the NEMA 2014 Regulations.
2. All watercourses and/or wetlands are regarded as sensitive areas and must be avoided as far as practically possible. No material/waste products may be dumped into a watercourse and/or wetland.
3. Water utilized for the project may only be abstracted from authorized sources and that no over abstraction takes place.
4. Ensure that sufficient pollution prevention measures are implemented at the site.
5. Good housekeeping on all the sites is very important. Ensure that the area is always clean as organic waste can impact on air quality.
6. No litter (General waste) should be present on site as it may end up in the Vaal River. Skips or bins should be placed at convenient intervals and the employees should be notified concerning littering.

### **4.2 Protection of Geology and Soil**

The geology of the area consists of Andesitic lavas of the Allanridge Formation and fine-grained sediments of the Karoo Supergroup. The soil consists of deep sandy to loamy soil. The



proposed site specifically has geology of sedimentary origin and red-yellow apedal, freely-drained soil with a depth of 450 mm – 750 mm (ENPAT, 2001; Mucina & Rutherford, 2006: 516). "The soils of the study area comprise of Hutton, Bloemdal, Oakleaf and Valsrivier forms. The latter, covering around 20 ha, is deemed unsuitable for irrigation due to a strongly developed structure and high clay contents. The remainder of the soils contain morphological, chemical and physical properties which complies to the Northern Cape Department of Agriculture's irrigation and cultivation requirements and are therefore suitable to highly suitable" (van Tol, 2019).

The geology of the site will not be affected by the agricultural activities as levelling the area and ploughing will not progress deeper than 3 m.

Topsoil will be removed, during levelling, and stockpiled appropriately and in such a manner to prevent any loss thereof.

- The topsoil which was removed will be placed back onto the appropriate area before ploughing and planting activities start.
- Stockpiles may not exceed a height of 1.5 m.
- Soil loss through erosion will be reduced by implementing storm water management practices as well as minimizing the time an area is left open.
- Equipment and machinery on site will be maintained and drip trays will be used to prevent spillages of petrochemical products which may cause contamination of soil. There will be no storage of hazardous substances on the site. If the need arises that such substances need to be utilized, mobile tankers containing the substances will be used.
- Any spills of hazardous substances will be cleaned immediately by disposing of the affected soil as hazardous waste.

#### **4.3 Protection of Plant and Animal Life**

"According to Mucina & Rutherford (2006) the area consists of Kimberley Thornveld (SVk 4). This vegetation type is currently listed as being of Least Concern (LC) under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). The vegetation type is not currently subjected to any pronounced transformation pressures. Riparian vegetation associated with the Vaal River consists of Highveld Alluvial Vegetation (Aza 5), also listed as being of Least Concern (LC) but does not form part of the proposed site." (van Rensburg, 2019).

According to van Rensburg tracks and signs of mammals are present on the site but notably diminished and probably due to the largely transformed vegetation type on the site and its isolation from larger areas of natural vegetation by surrounding crop fields.

- No open fires are allowed on the site.
- No animals will be harmed and/or killed on the site. If any animals are encountered, they will be relocated from the site.

- Any sensitive, protected or endangered plant and animal species found on site during and after construction should be safely removed and relocated to a suitable habitat elsewhere.
  - Care will be given to the wetland and riparian vegetation adjacent the Vaal River, as no activities will take place there and the area will be left undisturbed
- Alien plant species on site will be removed to prevent the spread of these plants to the surrounding environment.
  - Removal of alien plants must adhere to the Alien and Invasive Species Regulations.

#### **4.4 Protection of Surface Water**

There are no surface water features on the study area, but Kilmorey includes the Vaal River, to the West, as well as being proceeded by wetlands and a single drainage line bordering the study area, flowing from South to North. The Vaal River is located within 55 m of the proposed site.

- No over abstraction of water from authorised source will occur.
  - Every abstraction point will be fitted with a water meter to accurately gauge volumes abstracted from these sources.
- An adequate storm water management system should be implemented during the construction and operational phases to accommodate runoff during rain events as well as to divert the water around the development to the surrounding drainage lines.
  - Berms will be constructed around the site, especially at the western border, to divert clean water around the site to drain into the natural drainage lines of the environment.
  - Stormwater will not be allowed to drain into the natural drainage lines from the operational area as this area is regarded as a dirty area.
- The site will be kept clean and tidy to prevent general waste and littering from occurring in the surrounding surface water resources.
- Spillages of hazardous substances will be cleaned by removing the spill and contaminated soil and disposing of it as hazardous waste.
  - Any incidents on surface water resources during construction will be reported to the relevant authorities within 24 hours of the incident.
- The site will be monitored for any erosion trenches. Trenches will be rectified, and erosion control measures will be implemented.
- It is recommended that the water quality of the surface water resources be tested either annually or bi- annually to determine the suitability of water for the crops and if any pollution from the site has occurred.

#### **4.5 Protection of Groundwater**

Since the area is so closely situated to the Vaal River, it is expected that the water level will be close to the surface approximately around 10 meters below ground level ("mbgl"). The actual aquifer might be deeper around 20 -30 mbgl and exists as either; (1) an intergranular aquifer consisting of consolidated sands and clays or (2) contact aquifer between sandstones and the prevailing igneous rocks (dyke or sill). Due to the proximity of the aquifer to the Vaal River it can be assumed that these two systems are reliant on each other. The quality of the groundwater is expected to be good to moderate as extensive agriculture takes place in the surrounding environment and is highly likely that nitrate rich fertilizer and pesticides have infiltrated the aquifer causing elevated values of total dissolved solids.

Note that there are no boreholes on site and any given information is on groundwater resources are estimated.

- No ponding of water on the irrigated fields are allowed as this increases the water's time to absorb chemicals and increases the amount of water that infiltrates to the aquifer.
- Spillages of hydrocarbons will be prevented by using drip trays.
- Spillages of any potentially hazardous substances should be cleaned by removing the spill and the contaminated soil and disposing thereof as hazardous waste.
- It is recommended that a monitoring borehole be drilled, and the water quality be analysed annually to determine the influence of the agricultural activity on the groundwater quality and quantity.

#### **4.6 Protection of the Air Quality and Regulation of Noise Levels**

The ambient air quality in the region is good due to the lack of heavy industrial complexes. However, the air quality in the area can be negatively impacted on by the areas cleared of vegetation for crop production. The risk of air pollution is especially high during the ploughing of soil and soil laying bare during very windy conditions.

Noise will be generated as a result of agricultural related activities. These will include noise generated from agricultural vehicles such as ploughing and harvesting equipment. Also, noise will be generated from the pump near the Vaal River banks. It must be noted that the area is situated far from any urban areas, between existing agricultural areas, and any noise generated will be small to insignificant.

- Construction and operational activities, especially activities contributing to dust emissions should be avoided during windy conditions.
- Vehicle movement and speeds at which vehicles travel on the site will be kept to a minimum.

- Waste will not be burned on site and open fires will not be permitted.
- Construction and operational activities contributing to elevated noise levels will be restricted to normal working hours.

#### **4.7 Protection of Site and Surrounding Land Use**

The current land use is classified as being vacant and only used for the grazing of cattle. The study area of the Kilmorey site was used in the past (more than 10 years ago) for the pivot irrigation of crops which can still be seen from aerial photos. The whole Kilmorey site was also used for the mining and extraction of alluvial diamonds. The tailings dumps are situated outside the study area boundaries and will be left as is. This site has been dormant for more than 10 years and the applicant has indicated that they have a desire to start cultivating crops again. Lucerne, of approximately 40 ha, will be cultivated on the previous pivot irrigation area. The remainder of the study area, of approximately 28 ha, will be utilized to plant Pecan nut trees. The riparian vegetation, close to the Vaal River, will not be removed and left as is.

The impacts on land use is unavoidable. However, rehabilitation afterwards may restore its potential to be used for other activities and agricultural projects.

- Construction and operation activities will only take place within the site boundary to limit disturbance.
- The surrounding area consists of irrigated pivot points and will not have a significant impact on the surrounding areas.
- It must be ensured that general and/or construction waste be stored in the correct locations on the site in order to keep the site clean and tidy.
  - The site must be equipped with necessary waste bins.

#### **4.8 Protection of Cultural, Archaeological and Palaeontological Heritage**

It was confirmed by Dr. Rossouw that the site has been severely degraded by previous agricultural activities. "There are no indications of rock engravings, prehistoric or historical structures within the footprint area. The survey revealed no evidence of or Stone Age archaeological sites along the section. Isolated stone tools were recorded on the surface. Uncapped and exposed, these artefacts are most likely out of context, being laterally displaced over time. Two separate grave localities have been recorded but these are not located within in the demarcated development area." (Rossouw, 2019)

- If any archaeological objects or palaeontological remains are found, work will stop immediately and SAHRA will be notified.

#### **4.9 Protection of Aesthetics (Visual) Exposure**

The area surrounding the site is used for cultivation and is therefore significantly degraded and has low visual significance. The riparian vegetation has been left intact along the border of the Vaal River and Kilmorey property retaining some of its aesthetic value. The site itself was also used for agricultural activities and alluvial diamond mining in the past and this has a negative impact on the aesthetics of the area.

- The riparian vegetation should be left undisturbed.
- Alien vegetation should be cleared regularly.
- Waste should be disposed of in the correct manner regularly.
- Separate skips and/or bins should be available for the separate waste streams.
- Any spills and/or leakages should be cleaned immediately in the correct manner.

### **5 Inspections and Monitoring**

- Ongoing and regular reporting of the progress of implementation of this EMPR will be done.
- Inspections and monitoring shall be carried out on both the implementation of the EMPr and the impact on water quality/quantity, plant- and animal life.
- Visual inspections on erosion and physical pollution shall be carried out on a regular basis.
- General cleanliness of the site will also be inspected.

### **6 Compliance Reporting/Submission of Information**

- An internal environmental officer will be appointed. The officer is responsible to monitor all the environmental management measures and ensure compliance with the EMPr.
- A compliance assessment will be undertaken by an independent Environmental Control Officer once during construction (levelling and preparation of land) and once during operation (ploughing and harvesting) to verify compliance with the EMPr and the RoD.
- Any changes of the layout and/or rehabilitation plan or technology will be submitted to the Northern Cape Department of Environment and Nature Conservation ("**DENC**") for approval.
- Reports confirming compliance with various points identified in the EMPr will be kept and made available when requested.
- Any emergency or unforeseen impact will be reported within 12 hours after identification to the DENC telephonically and confirmed in writing.

## **7 Rehabilitation**

It is not anticipated that the proposed project will undergo decommissioning and / or closure in the near future. However, should it be decided to rehabilitate the site in future, the site will be rehabilitated to its original state as far as practicable possible, depending on the end land use to be decided upon at that time. The final rehabilitation of the site will, amongst other, include the following activities:

- All infrastructures, equipment and other items used during the operational period will be removed from the site.
- Scrap metal will be sold to be recycled.
- Waste material of any description will be removed entirely from the site and disposed of at a recognised landfill facility in the area.
- Waste will not be permitted to be buried or burned on the site.
- Any concrete surface will be removed and compacted areas will be ripped.
- The site will be profiled with acceptable contours and erosion control measures.
- Measures will be implemented to accommodate the regrowth of indigenous vegetation.

**Table 1: Mitigation measures and monitoring, responsible person(s) and time frames**

Activity	Potential Impact	Mitigation	Responsible Person	Performance Indicators	Time Frame
<b>Construction Phase</b>					
Clearance of site (vegetation and topsoil)	<ul style="list-style-type: none"> <li>• Loss of potential significant vegetation</li> <li>• Loss of animal life</li> <li>• Erosion</li> <li>• Loss of topsoil</li> <li>• Contamination of soil</li> <li>• Establishment of invasive alien plant species</li> <li>• Negative aesthetic impact on passing motorists</li> <li>• Unearthing of significant heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>• Limit construction activities and movement of construction vehicles to the site under construction.</li> <li>• Stockpile topsoil in an area not prone to erosion for re-use during rehabilitation or for levelling purposes after construction.</li> <li>• Limit levelling of site during windy conditions.</li> <li>• Topsoil stockpile heights may not exceed 1.5 m.</li> <li>• Topsoil will not be used for construction purposes.</li> <li>• Any spills of hazardous substances will be cleaned immediately by disposing of the affected soil as hazardous waste.</li> <li>• The site will always be kept clean and neat by</li> </ul>	Environmental Officer	<ul style="list-style-type: none"> <li>• No erosion</li> <li>• Minimum soil loss</li> <li>• No loss of heritage resources, significant plant species and animal life</li> </ul>	During construction phase

Activity	Potential Impact	Mitigation	Responsible Person	Performance Indicators	Time Frame
		housekeeping. <ul style="list-style-type: none"> <li>Removal of alien plant species on a regular basis.</li> <li>Removal of alien plants must adhere to the Alien and Invasive Species Regulations.</li> <li>If any objects of archaeological or palaeontological significance are found, SAHRA must be notified immediately and all work must stop.</li> </ul>			
Removal of animals	<ul style="list-style-type: none"> <li>Relocation of all animal life on site</li> </ul>	<ul style="list-style-type: none"> <li>Monitor site for sensitive species that will have to be relocated. PLEASE NOTE: No sensitive species were identified during the Ecological Assessment.</li> </ul>		<ul style="list-style-type: none"> <li>All sensitive species safely relocated from site.</li> </ul>	
Waste Management	<ul style="list-style-type: none"> <li>Littering</li> <li>General and construction waste</li> <li>Aesthetic impact</li> </ul>	<ul style="list-style-type: none"> <li>Building material and general waste must be disposed of at an authorised landfill site and may not be dumped in the veld or on site.</li> </ul>		No pollution and/or littering	



Activity	Potential Impact	Mitigation	Responsible Person	Performance Indicators	Time Frame
		<ul style="list-style-type: none"> <li>The site will always be kept clean and neat by correct waste disposal measures and housekeeping.</li> <li>Separate waste skips or bins for the different waste streams must be available on site. Where possible they should be lined and covered.</li> </ul>			
Storm Water Management	<ul style="list-style-type: none"> <li>Contamination and siltation of surface water</li> <li>Erosion</li> <li>Loss of fertile soil</li> </ul>	<ul style="list-style-type: none"> <li>Implement appropriate storm water measures.</li> <li>Channels, diversion berms, and/or culverts will be constructed (especially on the western border) to prevent any pollution or erosion and to divert any storm water around construction sites</li> </ul>		No erosion No contamination and/or siltation of surface water	
EMPr compliance monitoring: Construction Phase	N/A	<ul style="list-style-type: none"> <li>Environmental compliance assessment to verify compliance with the EMPr during construction.</li> </ul>	Independent Environmental Control Officer	Full compliance with the EMPr and RoD, Minimum environmental impacts	Once during construction
<b>Operational Phase</b>					
Waste Management	<ul style="list-style-type: none"> <li>Littering</li> <li>General waste</li> </ul>	<ul style="list-style-type: none"> <li>General waste must be disposed of at an</li> </ul>	Environmental Officer	No pollution and/or littering	Ongoing during operation

Activity	Potential Impact	Mitigation	Responsible Person	Performance Indicators	Time Frame
	<ul style="list-style-type: none"> <li>Aesthetic impact</li> </ul>	<p>authorised landfill site and may not be dumped in the veld or on site.</p> <ul style="list-style-type: none"> <li>The site will always be kept clean and neat by correct waste disposal measures and housekeeping.</li> <li>Separate waste skips or bins for the different waste streams must be available on site. Where possible they should be lined and covered.</li> </ul>			
Storm Water Management	<ul style="list-style-type: none"> <li>Contamination and siltation of surface water</li> <li>Erosion</li> </ul>	<ul style="list-style-type: none"> <li>Implement appropriate storm water measures.</li> <li>Channels, diversion berms, and/or culverts will be constructed (especially on the western border) to prevent any pollution or erosion and to divert any storm water around construction sites</li> </ul>		<p>No erosion No contamination and/or siltation of surface water</p>	
Operation of agricultural area	<ul style="list-style-type: none"> <li>Increased infiltration of contaminated runoff to the aquifer.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of fertilizer and pesticides being used as well as</li> </ul>		<ul style="list-style-type: none"> <li>Good quality groundwater and surface water during</li> </ul>	

Activity	Potential Impact	Mitigation	Responsible Person	Performance Indicators	Time Frame
	<ul style="list-style-type: none"> <li>• Potential for alien species to establish themselves.</li> <li>• Possible over abstraction from the Vaal River.</li> <li>• Siltation and contamination of Vaal River through runoff.</li> <li>• Dust fallout during ploughing of land.</li> <li>• Petrochemical spills and the contamination of soils and aquifer through infiltration.</li> <li>• Generation of excess organic waste during harvesting.</li> </ul>	<ul style="list-style-type: none"> <li>limiting irrigation volumes to prevent ponding and infiltration to the aquifer.</li> <li>• All water abstraction points will be equipped with water meter readers.</li> <li>• Ensure that the agricultural area is surrounded by berms which separate the clean and dirty water before entering the Vaal River.</li> <li>• Limit the amount of ploughing during windy conditions to keep dust generation low.</li> <li>• Petrochemical spills need to be clean immediately and disposed of as hazardous waste. Still standing and vehicles under maintenance must make use of drip trays underneath the vehicle.</li> <li>• No burning of organic</li> </ul>		<ul style="list-style-type: none"> <li>analysis.</li> <li>• Clean and neat site including no alien invasive species, petrochemical spills and waste on site.</li> <li>• Berms separating clean and dirty water are of sufficient size and maintained.</li> </ul>	

Activity	Potential Impact	Mitigation	Responsible Person	Performance Indicators	Time Frame
		waste may take place and has to either be re-used or disposed of at an authorised landfill site.			
EMPr compliance monitoring: Operational Phase	N/A	<ul style="list-style-type: none"> <li>Environmental compliance assessment to verify compliance with the EMPr during operation.</li> </ul>	Independent Environmental Officer	Full compliance with the EMPr and RoD	Once during operation

