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# ESKOM

## KOEBERG NUCLEAR POWER STATION

### USER REQUIREMENT SPECIFICATION

**THE PROVISION OF CONTINUOUS MARINE ENGINEERING,  
MONITORING AND EVALUATION ON AN AS AND WHEN REQUIRED  
BASIS AT KOEBERG OPERATING UNIT FOR A PERIOD OF 5 YEARS**

|              | Name:      | Sign:   | Date:      | Designation:              |
|--------------|------------|---|------------|---------------------------|
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## 1. DESCRIPTION

A Service Provider is required to supply marine services to Koeberg Operating Unit (KOU) for the Cooling Water Intake Basin and Outfall structures together with their associated components during non-outages and outages.

## 2. OBJECTIVE

The objective is to provide KNPS with a coastal engineering overview as well as services associated with the marine structures in the Intake Basin and the Outfall. This is to provide monitoring, evaluation, analysis and oversight services to various Koeberg departments which include Inspection & Test, Chemistry, Engineering, and Environmental Services/Assurance.

## 3. SCOPE OF WORK

The activities to be provided by Service Provider are listed below.

### 3.1 Chemistry

- Retrieve marine samples from Melkbos (on a two monthly basis), Springfontein, Robben Island and Dassen Island (on a three-monthly basis) in order to quantify the impact of the KNPS operations on the marine ecological environment. Provide KNPS with both hard and electronic copy. Eskom provided the co-ordinates.
- Exchange TLD's (Thermoluminescent Dosemeter) on Robben Island (on a three-monthly basis) in order to monitor any background radiological activity (when the need arises as per instruction from Koeberg). Provide KNPS with both hard and electronic copy. There is only one (1) TLD. It is roughly 4m deep. Eskom provided the co-ordinates.

### 3.2 Environmental

- Deploy and retrieve temperature recorders at Melkbos and the round head of the southern breakwater on a two monthly basis and as required. There are two (2) temperature recorders, one in Melkbosstrand and one in the intake basin- lateral arm. Eskom provided the co-ordinates. The temperature recorders will be provided. They are roughly 4m deep. Provide KNPS with both hard and electronic copy. The reasons for monitoring sea temperatures are:
  - To evaluate the possible impact of hot water discharge from the power station on the marine ecological environment.

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- To ensure that the heated water effluent does not leak through the main breakwater (comparison of seawater temperatures at intake and outfall) for overall operations control of the temperature regime of the entire cooling water system.
- To provide updated information on extreme conditions, for safety and operating requirements.
- Marine life (i.e., jellyfish) monitoring as required or after sightings by public (when the need arises). The survey distances covered will be approximately 7km North, South and West of the CWIB.

### 3.3 Inspection & Test and Engineering

- Provide overview of the coastal engineering, marine structures status, monitoring and activities in accordance with KWU-DE-018, this will also include and not limited to attending meetings, workshops, technical training, provide technical training, reviewing technical reports, specifications & procedures, analysis of survey results, analysis of dredging results. Provide KNPS with both hard and electronic copies of the report.
- Perform the photographic surveys of the dollose and amarock structures on the breakwaters as needed but at least every five years and in years where damage to the breakwater is observed and/or a particularly large storm event has occurred. The Survey to be performed in accordance with KWU-DE-017. Compile KNPS Breakwater Stability Monitoring Report. Provide KNPS with hardcopy, electronic copy and original photos. The reason for survey is that breakwater damage is not always immediately obvious to casual inspection. Progressive settlement can occur over a long period before the effect is noted. This trend ensures that preventative maintenance action is implemented before significant level of damage occurs. The south and north of breakwaters are surrounded by the dollose on the sea side to protect them from wave and sea. The south breakwater is 922m long and 578 m long north breakwater.
- Perform an underwater laser survey of the dollose and armarock structures on the breakwaters as needed but at least every five years and in years where damage to the breakwater is observed and/or a particularly large storm event has occurred. Methodology to be submitted by the Supplier. Results of the survey shall be added to the KNPS Breakwater Stability Monitoring Report. Provide KNPS with hardcopy, electronic copy and original photos.
- Perform annual levelling surveys of the breakwaters for inclusion into the KNPS Annual Marine Structure Report to ensure that the structures fulfil their function in accordance with KWU-DE-018.

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- Perform annual cracks width and scour depth monitoring of the breakwaters for inclusion into the KNPS Annual Marine Structure Report to capture any changes in crack width to determine the cause and to specify remedial work, in accordance with KWU-DE-018.
- Provide ad hoc consulting services in response to specific marine engineering issues and structures (i.e. compiling of feasibility studies, specification, analysis/ evaluation/ assessment of structures, provide inputs/outputs to special projects).
- Compile KNPS Annual Marine Data Report. Provide KNPS with hard and electronic copies (the electronic copy to include data files such as Excel spreadsheets). The report to include sea water temperature, tide levels, bathymetric and aerial photographic surveys, marine sampling information.
- Conduct an annual aerial survey of the coastline from Melkbos to Springfontein, assess the condition and evaluate noticeable anomalies. Provide KNPS with original photographic records. The purpose is for monitoring of possible long-term erosion/accretion of adjacent beaches. The results of the survey are to be included in the KNPS Annual Marine Data Report. The survey covers coastline from Melkbosstrand approximately 6km south of Cooling Intake basin, Koeberg to Springfontein point about 7km north of Koeberg.
- Perform an annual visual inspection of the marine structures (i.e. north & south breakwaters, revetment, outfall-structures, lateral-arm, SEC channels, sea-facing walls of SEC & CRF pumphouses) in order to assess the structural integrity and state of reinforced concrete and provide repair strategies and repair recommendations. The results to be included in the KNPS Annual Marine structure report.
- Perform underwater inspection to civil marine structures during outages (i.e. outfall, CRF pump house and SEC pumphouse sea-facing walls, CFI complex- area in front of rake screens-stopgates installation areas) in order to assess the structural integrity and state of reinforced concrete and establish repair strategies in accordance with KWR-IP-CIV-046. The results with recommendations to be included in the Outage report. **During outages within this contract period.**
- Monitor tidal level and long waves (measure, maintain data base for a data trending and analysis of results and generate a report) in order to operate the intake pumps safely, specifically with regard to minimum water level. The intake pumps are designed to operate safely at minimum water level of -1.75m MSL. This will be as and on required basis by Koeberg and as per instruction from Koeberg. When the instrument is available and installed.

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- Perform beach profile survey on a quarterly basis. The distances to be covered as per figure 1. This entails monitoring the beach profiles along the same profile positions measured between 1970 and 1983 for the Koeberg site investigation in order to create a directly comparable data base of beach levels since the 1970's. The purpose is for monitoring possible long-term erosion/accretion of adjacent beaches
  - In case of Eskom being blamed by other parties of changes to the adjacent beaches the validity of such claims can be evaluated.
  - Preventative action where necessary to be specified.
- Compile Marine executive report on as and when required basis by KOU.
- Perform quarterly bathymetric surveys of the intake basin (i.e., inner bathymetric survey) and evaluate the accretion of sand in the Cooling Water Intake Basin (CWIB). Intake basin is 26.5 ha and 7.5m deep maximum. Provide KNPS with hard and electronic copies. The reason is for the management of the following:
  - Sedimentation and dredging in the basin.
  - Dredging quantity calculations which are used for payment of dredging contractor.
- Perform six monthly (coastal bathymetric survey) bathymetric surveys beyond the cooling water intake basin. The survey to be covered is 1.5km south, west and north of Intake basin and outfall structure. 8m away from the dollose to avoid breaking them and, depth vary between 8m and 12m. Provide KNPS with hard and electronic copies. The reasons are for management of the dredged spoil sand (to assist with decision-making with regard to where to discharge dredged sand) with the least impact on the environment and to assess damage to breakwaters.

**Note:** In an emergency a minimum response period (from notification to boat in the water and Koeberg site or to perform **ANY** marine monitoring tasks/activities) of two hours is required.

#### 4. DELIVERABLES

The Service Provider shall provide Eskom with the following deliverables before commencing the work.

- Health and Safety File
- Updated staff authorisation file (including divers as per diving regulation)

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- Quality Assurance Plan
- Written Practice

**Other deliverables:**

**Note:** The report for all Marine activities to be completed, approved, and submitted to Eskom **within 14 days** after the completion of the marine activity.

- **Marine samples and sea temperature data recorders**
  - Marine samples (6 x crayfish, 6 x abalone, 75 x black mussels, 6 x rock lobsters, 6 x line fish, sand and kelp etc) are to be extracted and delivered to the Environmental Services Laboratory (ESL) at KNPS. The samples are to be taken in the sea preferably at the bottom or around the reef, 4 m deep and Eskom to provide co-ordinates.
  - Sea temperature data is to be downloaded, evaluated, compared to previous data and included in the Annual Marine Data Report.
- **Overview of marine structures**
  - Compile and provide Annual Marine Executive Report and provide KNPS with hard and electronic copies.
  - Attend and provide inputs to the quarterly co-ordination meetings.
  - Provide inputs to all relevant procedures in all levels and designs.
  - Compile civil maintenance repair procedures, specifications, feasibility studies when required by Employer and provide to KNPS with hard and electronic copies.
- **Breakwater inspections**
  - Provide original photographs of the dolosse which show the areas where damages or breakages occur.
  - Compile Annual Marine Data Report and provide KNPS with hard and electronic copies.
  - Include the crack width, scouring depths and levelling survey results in the Annual Marine Data Report.
  - A copy of the Breakwater Stability Monitoring and inspection reports to be forwarded to KNPS with original photographs.

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- **Aerial survey of the coastline**
  - Copies of the photographs are to be retained by Service Provider for future reference.
  - Original photographs are to be supplied to KNPS.
- **Bathymetric surveys of the inner basin and coastal**
  - Hard and electronic copies of the contour plot, graphs, accretion volumes showing all the calculations of the bathymetric surveys are to be forwarded to KNPS.
- **Tidal level and long waves**
  - Recorded data is to be downloaded and included in the Annual Marine Data Report. Provide KNPS with hard and electronic data file such as Excel spreadsheet.
- **Beach profile survey**
  - Provide the report to KNPS and also include in the Annual Marine Data Report.
- **Outage report**
  - Provide the Outage report to KNPS.

**Note:** Deliverables shall be task order specific as and when required. All reports to be submitted with original photographs and original footages (where there are footages).

All the reports to be signed by Engineers who are professionally registered with the Engineering Council of South Africa (ECSA).

## 5. CATEGORIES OF LABOUR REQUIRED

The Service Provider and his representatives appointed to perform the work shall be competent in the field for which they are appointed. The Service Provider is to provide Eskom with a list of similar projects demonstrating his competency and experience. Eskom reserves the right to examine the certification of appointed personnel. The Service Provider must ensure that all staff is qualified and certified. The Service Provider must personally verify and ensure that only skilled and properly authorised specialists are supplied to Eskom.

All staff must be able to communicate in English.

## 6. OCCUPATIONAL HEALTH & SAFETY REQUIREMENTS

The Service Provider is required to comply with the requirements of the Construction Regulations and Occupational Health and Safety Act, which require the following:

- The Contractor shall be registered with the Occupational Health and Safety Commission.
- Submit to the Employer or its appointed Agent a Health and Safety Plan for work to be performed.
- The Health and Safety Plan shall include a Risk assessment of all activities associated with this project.
- The Health and Safety Plan shall be implemented and monitored to ensure its integrity.
- Details of its appointed Health and Safety Committee members shall be included and appointed in writing.
- The Contractor shall appoint all competent person/s in writing.
- The Contractor is required to comply with Eskom specific procedures including KGA-073-SHE specification guide.

## 7. TIMING AND PLANNING

The duration of the contract is from 01 July 2024 to 30 June 2029.

It may be required that overtime be worked which will be communicated to the Service Provider.

KNPS normal working hours are defined as:

| <b>On-line</b>                 | <b>Outage</b>              |
|--------------------------------|----------------------------|
| Monday-Thursday                | Monday- Sunday             |
| 07H30- 16H35                   | 07H00 – 19H00 (day shift)  |
| Friday                         | 19H00- 07H00 (night shift) |
| 07H30 – 13H30 (no lunch break) |                            |

**Note: During outages within this contract period.**

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## 8. SHIFT REGIME

The activities (or any ad-hoc activities) that are directly related to outages, overtime and shift work may be required. This will be communicated by the Project Manager as applicable.

## 9. TRAINING

### 9.1 Generic Training

Prior to the commencement of any intrusive work on site, the selected Service provider and the personnel appointed to perform the work are required to complete the following training.

Staff brought on site shall complete the following *Consultant* Induction FFD (fitness for duty) Program:

- Enrolment on the FFD System
- Criminal Background Verification (Security screening)
- Drug tests (Substance abuse testing)
- Plant Induction Training (PIT)
- Site Induction Training (SIT) OCA (Owner Controlled Area) and the LAA (Limited Access Area) permit holders Only
- Medical examination (to be done prior to and at completion of each task order)-
- Radiation Workers training course -Class room training (2½ days or 3 days or requal ½ day)
- Human Performance Training (HP)
- Foreign Material Exclusion Training (FME)
- Safety Induction Course before any work commences on site. The duration of this course will vary according to the experience of the individuals.
- ALARA Induction training course (prior to start of work, 2 hours)

Site Access Specific Training:

- Working in confined spaces Training
- Working at height and material handling

**Note:** Divers to do relevant diving training and provide Eskom with the relevant document as require by Diving Regulations and as per instruction from Eskom Health & Safety Department before any work commences on site.

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**Note:** The trainings are categorized as online and classroom training. The technical assessments to be performed at Koeberg FFD System. The Site Representative will provide the information and guidance to the Supplier staff.

Note: The Supplier to appoint their own FFD Site Representative. The person who will represents the Supplier staff on site. The person who will make sure that the Supplier individual/staff meet the requirements of Fitness For Duty (FFD).

**Note:** The Supplier or subcontractor personnel/staff needs to perform exit procedure when they leave the Supplier/ subcontractor or no longer part of the contract scope.

**Note:** Additional FFD training requirements maybe added based on the OE (operating experiences) to mitigate incidents/ to implement the best practices. Therefore, the Supplier will be informed on time.

**Note:** The Supplier to adhered to COVID-19 requirements includes and not limited to Koeberg additional requirements.

## 10. ACCESS FORMALITIES

### 10.1 Personnel

All personnel must have a valid identification document or passport. All personnel must be cleared to work at the Site by the South African authorities, prior to being cleared as a Temporary worker (Fitness for Duty). Allow 2 to 3 days for clearance.

Security clearance or refusal thereof will not constitute a compensation event.

On a daily routine all personnel will access and leave the Site via the security-controlled access point, where all are subjected to security screening procedures including alcohol testing.

**Note:** Additional compulsory drug testing or other testing based on OE to mitigate incidents, will be or can be implemented. Therefore, the Supplier will be informed on time.

### 10.2 Vehicles and Tools/Equipment

All tools and equipment are subject to a security screening before they are allowed on the Site. All tools and equipment must be listed and specified before they are brought on Site. This list will serve as evidence for removal permits. Vehicles will only be allowed on Site, if proof is provided to the Employer that there is a requirement that such a vehicle is necessary to complete the Works.

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The Service Provider is required to provide all relevant equipment for performing the work as defined in section 3.

### **10.3 Photography of KNPS features**

All personnel using cameras must be authorised by Eskom. Security must be informed prior to photography. All photos to be given to Eskom and deleted from the Service Provider once not required. The Service Provider will not disclose any photographs, irrespective of the format, to any third party that does not require it for the purpose of engaging in business with Eskom. The Service Provider shall not photograph and security systems or components unless authorized by the security manager.

## **11. ESKOM SCOPE OF SUPPLY**

Eskom shall make available all relevant information (specifications, drawings, historic sea water temperature data etc.) pertaining to the work. None of the information provided to the Service Provider shall be copied in any form and shall be returned to Eskom on completion of the work.

Eskom shall provide the Service Provider and his representative with the relevant access to perform the work, provided Eskom is given adequate notification of such requirement. Eskom will provide the Service Provider with four (4) sea water temperature recorders for deployment (if required and when available).

Note: The Supplier personnel to sign a NDA (Non-Disclosure Agreement) prior working on these documents.

## **12. QUALITY REQUIREMENTS**

The Service Provider shall be a Q3 approved supplier as per Procurement Quality Engineering (PQE) assessment.

The tasks will be executed in accordance with Eskom authorised procedures. These procedures will be supplied.

## **13. REFERENCES**

|               |  |
|---------------|--|
| OHSA No 85/93 | Occupational Health and Safety Act No 85 of 1993                       |
| DSG 318-087   | Quality requirements for the procurement of assets, goods and services |

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240-166151023 (KSA-128) Civil Preventative Maintenance Strategy for Koeberg Nuclear Power Station

240-166150507 (KAA-672) Management of Non-Licence Binding (including SR structures) Civil Surveillances at Koeberg Nuclear Power Station

240-166149425 (KAU-029) Basis and Scope for Non-License Binding Civil Surveillances at Koeberg Nuclear Power Station

KWU-DE-018 Outfall structure and breakwater stability monitoring/blowhole maintenance

KWU-DE-017 Photographic surveying of the dolosse on the breakwaters of the Cooling Water Intake Basin at Koeberg Nuclear Power Station

KAE-004 Marine Ecological Monitoring Programme a Koeberg Nuclear Power Station

RD-0034 Quality and Safety Management Requirements for Nuclear Installations

KAA-501 Project Management Process for Koeberg Nuclear Power Station Modifications

KAA-502 Project Management process for new facilities and changes to existing facilities at Koeberg Nuclear Power Station

Diving Regulations, 2009: In terms of the Occupational Health and Safety Act, Act 85 of 1993

KGA-073 SHE specification guide

KWR-IP-CIV-046 Visual inspection of the SEC pumphouse and galleries (structural integrity)

KGR-008 Guide to the Analysis and classification of defects on civil buildings and structures

240-165425812 Civil Ageing Management Programme Requirements Manual (CAMPRM)

#### 14. DOCUMENTATION

All reports and documents supplied to Eskom shall be in hard copy and electronic format. Electronic copies of text files shall be in '.doc','pdf','xls' and drawings in '.dgn' format.

## 15. APPENDICES

### APPENDIX 1: The task schedule activities and frequency per year:

The Task schedule activities (lump sum/fixed item):

| N O. | Description  | Frequency            | Qty per year | Unit price |
|------|--|----------------------|--------------|------------|
| 1    | Retrieve marine samples from Melkbos   | On a 2 monthly basis | 6            |            |
| 2    | Retrieve marine samples from Springfontein   | Quarterly            | 4            |            |
| 3    | Retrieve marine samples from Robben Island   | Quarterly            | 4            |            |
| 4    | Retrieve marine samples from Dassen Island   | Quarterly            | 4            |            |
| 5    | Exchange TLD's at Robben Island  | Quarterly            | 4            |            |
| 6    | Deploy & retrieve temperature recorders at Melkbos and the round head of the south breakwater  | On a 2 monthly basis | 6            |            |
| 7    | Jellyfish monitoring on a required basis.  |                      |              |            |
| 8    | Perform photographic survey of dollose and amarock structures on the breakwaters   | Every 5 year         | 1            |            |
| 9    | Perform underwater laser survey of the dollose and amarock structures on the breakwaters as needed.  | Every 5 year         | 1            |            |
| 10   | Levelling survey of the breakwaters  | Annual               | 1            |            |
| 11   | Crack monitoring of the breakwaters  | Annual               | 1            |            |
| 12   | Aerial survey of the Coastline from Melkbos to Springfontein   | Annual               | 1            |            |
| 13   | Visual Inspection of the marine structures   | Annual               | 1            |            |
| 14   | Perform underwater inspection to civil marine structures during outages (outfall- chambers, CRF pumphouse and SEC pumphouse) during outage | Per outage           |              |            |
| 15   | Perform underwater inspection  | Per outage           |              |            |

|    |   |                |   |  |
|----|---|----------------|---|--|
|    | to civil marine structures during outages (CFI complex- area infront of rake screens- stopgates areas) outage on required basis |                |   |  |
| 16 | Monitoring tidal levels and long waves on required basis.   | Annual         | 1 |  |
| 17 | Beach profile survey  | Annual         | 1 |  |
| 18 | Bathymetric survey of the intake basin  | Quarterly      | 4 |  |
| 19 | bathymetric survey beyond the CWIB  | Every 6 months | 2 |  |

## APPENDIX 2: The staff rates:

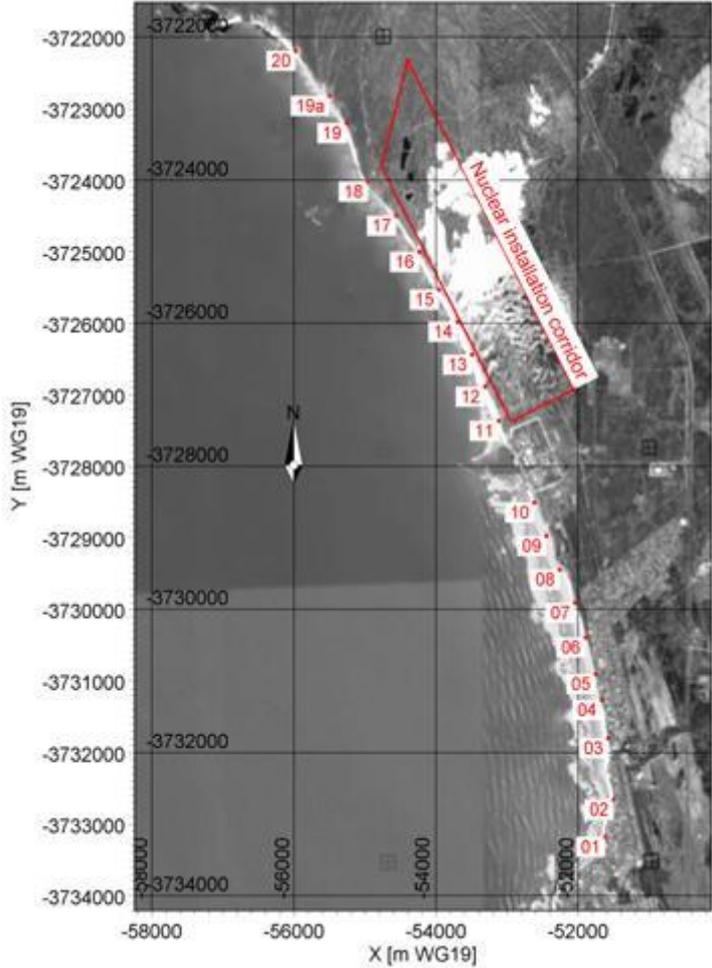
The staff rates are applicable to the following activities and not limited to these:

- Provide overview of the coastal engineering, marine structures status, monitoring and activities in accordance with KWU-DE-018, this will also include and not limited to attending meetings, workshops, technical training, provide technical training, reviewing technical reports, specifications & procedures, analysis of survey results, analysis of dredging results. Provide KNPS with both hard and electronic copies of the report.
- Provide ad hoc consulting services in response to specific marine engineering issues and structures (i.e., compiling of feasibility studies, specification, perform analysis/ evaluation/ assessment of structures integrity, provide inputs/outputs to special projects & survey results & KOU structures).
- Compile KNPS Annual Marine Data Report. Provide KNPS with hard and electronic copies (the electronic copy to include data files such as Excel spreadsheets). The report to include sea water temperature, tide levels, bathymetric and aerial photographic surveys, marine sampling information.
- Compile Marine executive report on as and when required basis by KOU.

The staff rates are as follows:

| No. | Designation (or category) or name of staff member                              | Rate per hour, excluding VAT |
|-----|--|------------------------------|
| 1   | Marine/ SME Specialist   |                              |
| 2   | Chief Engineer   |                              |
| 3   | Senior Engineer  |                              |
| 4   | Engineer   |                              |
| 5   | Chief Technologist   |                              |
| 6   | Chief Technician   |                              |
| 7   | Senior Technician  |                              |
| 8   | Technologist   |                              |
| 9   | Technician   |                              |
| 10  | Junior Engineer  |                              |
| 11  | Junior Technologist  |                              |
| 12  | Junior Technician  |                              |
| 13  | General Worker   |                              |
| 14  | Dive Team (consists of one diving supervisor, two divers and online attendant) |                              |
| 15  | Sea-going boat and diving (ad-hoc services – excluding dive team)              |                              |
| 16  | Cadet Technician   |                              |
| 17  | Cadet Technician trainee   |                              |
| 18  | Senior Administrator   |                              |
| 19  | Administrator  |                              |
| 20  | Safety Officer   |                              |
| 21  | Skipper  |                              |

Figure 1: Beach survey locations



**APPENDIX 3: Marine samples and teperature recorders co-ordinates:**

|               | Latitude    | Longitude   | Distance from Koeberg CWIB |
|---------------|-------------|-------------|----------------------------|
| Melkbosstrand | 33°43.849'S | 18°25.683'E | 5.8km S                    |
| Dassen Island | 33°24.712'S | 18°04.517'E | 44km NW                    |
| Springfontein | 33°37.322'S | 18°22.939'E | 7km NNW                    |
| Robben Island | 33°47.494'S | 18°22.614'E | 13km SW                    |

| Temperature recorders |             |             |  |
|-----------------------|-------------|-------------|--|
| Melkbosstrand         | 33°43.911'S | 18°25.985'E |  |
| Intake Basin          | 33°40.644'S | 18°25.360'E |  |



Figure 2: Temperature recorder at Melkbosstrand

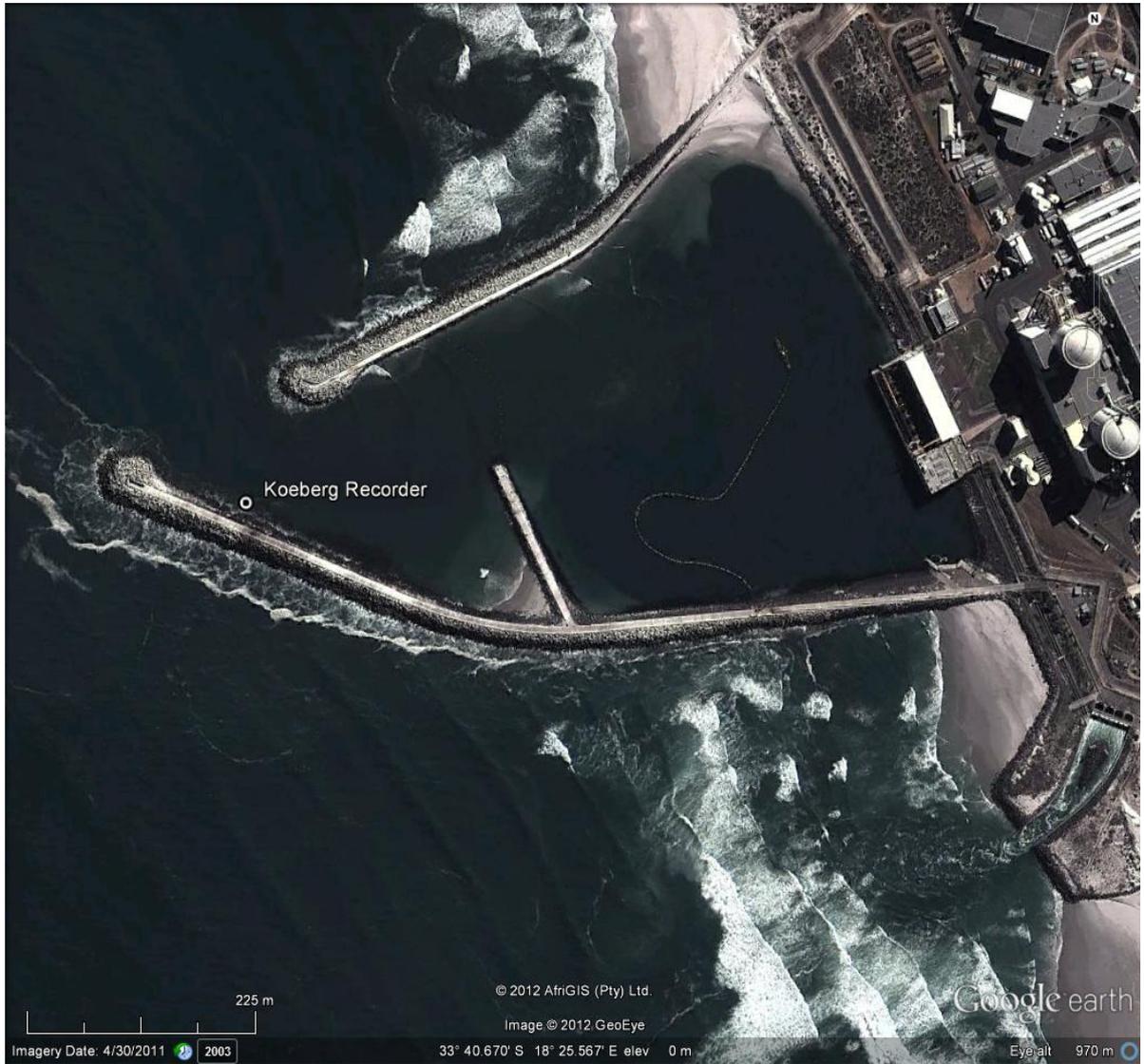


Figure 3: Temperature recorder at Intake Basin