

# Independent Peer Reviews

## Verification Studies

Sandpiper Project  
Namibian Marine Phosphate (Pty) Ltd

November 2014



Marine Ecosystems  
Management





# FOREWORD

Namibian Marine Phosphate (Pty) Ltd (NMP) commissioned J Midgley and Associates cc to project manage a marine verification work programme based on the NMP Environmental Management Programme (EMP) of the 2012 EIA, as submitted to the Environmental Commissioner on April 11, 2012. The verification programme as detailed in the EMP was expanded to include consideration of the comments on the EIA (2012) by the authorities, independent review parties (appointed by the Environmental Commissioner) and Interested and Affected Parties (I&APs).

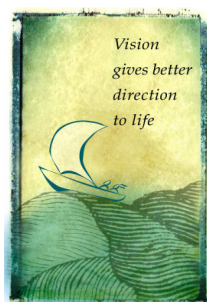
J Midgley and Associates cc in consultation with the CSIR identified a review team with established relevant experience, high integrity and known independence from the NMP phosphate project. Their brief being to provide an independent peer review assessment of the studies that comprise of the verification programme (Appendix 4, terms of reference). In order to ensure that the reviewing parties could evaluate the reports in context of the Verification Programme they has prior access to key reports and correspondence (Appendix 1, list of review documentation), which they were required to assess prior to a two-day workshop in Cape Town (13 -14 August 2014). Their independent reports are provided herein.

The NMP specialist consultants responded to the peer review findings, and their response statements are provided (Chapter 1.2, responses).

Additionally, NMP commissioned the University of Namibia to provide an independent assessment of the processes (field work and analyses) followed during the 2013 – 2014 verification programme. The assessment was undertaken through the university's Central Consultancy Bureau (UCCB). Their report is provided herein. Their terms of reference are found in Appendix 4.

The contributions and findings of these independent reviewers, is significant, as it removes any consideration of bias that has been suggested by parties who are concerned as to the independence of the environmental assessments undertaken in the evaluation of the risks associated with the proposed phosphate project of ML 170.

J Midgley and Associates undertook the project management in collaboration with the CSIR, whose appointed representative, Mr P Morant, provided the services of Independent Programme Reviewer and Process Advisor. J Midgley and Associates compiled the report.



Jeremy Midgley (Pr.Sci.Nat)



November 2014



Patrick Morant (Pr.Sci.Nat)



November 2014

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## **PART 3: APPENDICES**

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## Appendix 1, List of review documentation

### Project description

| No. | Topic / Title  | Author          |
|-----|--|-----------------|
| 001 | Phosphate project description  | Jeremy Midgley  |
| 002 | A review of offshore phosphorite deposits on the Namibian margin and preliminary model for the origin, age and deposition of phosphorite in ML 170 | Dr John Compton |

### Specialist studies of the EIA

| No. | Topic / Title                   | Author             |
|-----|---------------------------------|--------------------|
| 003 | Water Column                    | Dr Robin Carter    |
| 004 | Fisheries, Mammals and Seabirds | Dave Japp          |
| 005 | Benthos                         | Dr Nina Steffani   |
| 006 | Jellyfish                       | Prof. Mark Gibbons |

### Specialist studies of the verification program

| No. | Topic / Title   | Author                    |
|-----|---|---------------------------|
| 007 | Water Column and Sediments                                | Dr Robin Carter           |
| 008 | Fisheries, Mammals, Seabirds and Biodiversity             | Dave Japp                 |
| 009 | Benthos   | Dr Nina Steffani          |
| 010 | Meiofauna   | Physalia applied sciences |
| 011 | Biomass and Stock Estimates of Hake and Monk              | James Gaylard             |
| 012 | Fish Recruitment and Stock Dynamics                       | Dr Hilka Ndjaula          |
| 013 | Opinion on: Ecosystem impacts related to phosphate mining | Dr Kevern Cochrane        |

### Analytical procedures

| No. | Topic / Title                                   | Author          |
|-----|---|-----------------|
| 014 | Analytical Methods: Cores and Surface Sediments | Sebastian Brown |

### External reviews as commissioner by the Environmental Commissioner

| No. | Topic / Title   | Author           |
|-----|---|------------------|
| 015 | SAIEA Review of Water Column                            | Dr Mick O'Toole  |
| 016 | SAIEA Review of Fisheries Mammals and Seabirds          | Dr Mick O'Toole  |
| 017 | SAIEA Review of Benthos                                 | Dr Mick O'Toole  |
| 018 | SAIEA Review of Jellyfish                               | Dr Mick O'Toole  |
| 019 | SAIEA Review of Proposed Verification Program           | Dr Mick O'Toole  |
| 020 | Evaluation of the Sandpiper Project Benthos Assessments | Prof. Lisa Levin |
| 021 | General Review  | Prof. J Davis    |

### Verification programme scope: as submitted

| No. | Topic / Title                                | Author                      |
|-----|--|-----------------------------|
| 022 | Verification Survey Work Scope Content Final | J Midgley & NMP consultants |

### Comments presented by MFMR /NatMIRC scientists

| No. | Topic / Title   | Author         |
|-----|---|----------------|
| 022 | MFMR formal response to the NMP submitted EIA               | MFMR / NatMIRC |
| 024 | MFMR response to the verification survey work scope content | MFMR / NatMIRC |
| 025 | MFMR auxiliary concerns                                     | MFMR / NatMIRC |

### Provided at the Workshop

|     |                 |              |
|-----|-----------------|--------------|
| 026 | Plankton Report | Laura Weston |
|-----|-----------------|--------------|

## Appendix 2, Workshop participants

| Name                   | Contact details  | Scope of work  |
|------------------------|--|--|
| Dr Robin Carter        | Principal Marine Environmental Consultant –<br>applied marine sciences<br><a href="mailto:robin@lwandle.co.za">robin@lwandle.co.za</a><br>+ 27 829223504<br>+ 27 21 7050819  | <b>Consultant to NMP</b><br>Water column and sediments                                 |
| Dr Nina Steffani       | Principal Marine Environmental Biologist<br>Consultant<br><a href="mailto:nina@steffanienviro.co.za">nina@steffanienviro.co.za</a><br>+ 255 763 129449   | <b>Consultant to NMP</b><br>Benthic macrofauna   |
| Professor Mark Gibbons | Department Head: Department of Biodiversity and<br>Conservation Biology University of the Western<br>Cape Cape Town<br><a href="mailto:mgibbons@uwc.ac.za">mgibbons@uwc.ac.za</a><br>+27 723543291<br>+27 21 9592475       | <b>Consultant to NMP</b><br>Jellyfish  |
| Dave Japp              | Director: Principal Fisheries Consultant: Capfish:<br><a href="mailto:dave@capfish.co.za">dave@capfish.co.za</a><br>+27 827886737<br>+27 21 4256226  | <b>Consultant to NMP</b><br>Fish, fishery, marine mammals<br>and birds                 |
| Dr Kevern Cochrane     | Consultant<br>Professor Extraordinaire<br>Department of Ichthyology and Fisheries Science<br>Rhodes University<br>Grahamstown<br><a href="mailto:Kevern.cochrane@gmail.com">Kevern.cochrane@gmail.com</a><br>+27 721039547 | <b>Consultant to NMP</b><br>Commentary on Ecosystems                                   |
| Dr Hilka Ndjaula       | University of Namibia<br>SANUMARC<br><a href="mailto:opolili@yahoo.com">opolili@yahoo.com</a><br>+264 812416309  | <b>Consultant to NMP</b><br>Recruitment  |
| James Gaylard          | Consultant<br>34 Victoria Close Muizenberg<br><a href="mailto:jamesgaylard@gmail.com">jamesgaylard@gmail.com</a><br>+27 738911634  | <b>Consultant to NMP</b><br>Biomass & stock estimates                                  |
| Patrick Morant         | Principal Environmental Consultant: CSIR<br><a href="mailto:pmorant@csir.co.za">pmorant@csir.co.za</a><br>+27 762660332<br>+ 27 21 8882480   | <b>Consultant to NMP</b><br>Internal independent reviewer                              |
| Jeremy Midgley         | Principal Environmental Health & Safety<br>Consultant: J Midgley & Associates<br><a href="mailto:mwjmidg@mweb.co.za">mwjmidg@mweb.co.za</a><br>+27 832649484<br>+27 21 7886212   | <b>Consultant to NMP</b><br>Coordinating environmental<br>consultant                   |
| Jan Fordeyn            | Jan De Nul<br>Tragel 60, BE-9308 Aalst, Belgium<br>+32 53731711<br><a href="mailto:janfordeyn@jandenul.com">janfordeyn@jandenul.com</a>  | <b>Dredging Consultant to NMP</b>  |
| Dr Andy Payne          | Consultant<br>A&B Word Ltd<br>12 Hill Farm Road<br>Halesworth Suffolk IP19 8JX   | <b>Independent Party Reviewer:</b><br>Coordinator – Biomass,<br>recruitment, ecosystem |

| Name                             | Contact details   | Scope of work  |
|----------------------------------|---|--|
| Prof.<br>Alekhandra Roychoudhury | Department Chair<br>Department of Earth Sciences<br>University of Stellenbosch<br><a href="mailto:roy@sun.ac.za">roy@sun.ac.za</a><br>+27 21 8083124  | <b>Independent Party Reviewer –</b><br>Sediments and Water Column  |
| Dr Mick O'Toole                  | Marine Ecosystems Management<br>Consultant<br>Cluain NA Si<br>Kinvara<br>Co. Galway<br>Ireland<br><a href="mailto:otoole.mick@gmail.com">otoole.mick@gmail.com</a><br>00-353-85845392                     | <b>Independent Party Reviewer -</b><br>Fish, fishery, marine mammals<br>and birds, ecosystem             |
| Dr Barry Clark                   | Director: Anchor Environmental<br>Research Associate University of Cape Town<br><a href="mailto:barry@anchorenvironmental.co.za">barry@anchorenvironmental.co.za</a><br>+27 823730521                     | <b>Independent Party Reviewer -</b><br>Benthic macrofauna<br>Meiofauna                                   |
| Prof. John Rogers                | Retired<br><a href="mailto:Johnrogers1944@gmail.com">Johnrogers1944@gmail.com</a>   | <b>Guest: Marine Geoscience</b>  |
| Dr Sam Mafwila                   | Lecturer Department of Fisheries and Aquatic<br>Sciences, Faculty of Agriculture & Natural<br>Resources University of Namibia<br><a href="mailto:smafwila@unam.na">smafwila@unam.na</a><br>+264 811272486 | <b>Representing the University of<br/>Namibia.</b><br>Independent assessor of process<br>followed by NMP |
| Bill Ludick                      | Namibian Marine Phosphates<br>127 Theo Ben Gurigab Street<br>Walvis Bay<br><a href="mailto:Info-namphos@namphos.com">Info-namphos@namphos.com</a><br>+264 64 278150                                       | <b>Geologist</b>   |
| Mike Woodbourne                  | Namibian Marine Phosphates<br>127 Theo Ben Gurigab Street<br>Walvis Bay<br><a href="mailto:Info-namphos@namphos.com">Info-namphos@namphos.com</a><br>+264 64 278150                                       | <b>Client - COO</b>  |



## Appendix 3, List of presentations

### Day ONE: Wednesday 13<sup>th</sup> August 2014

| No   | Time                       | Topic  | Presenter                    | Affiliation                                     |
|--|----------------------------|--|------------------------------|---|
| 1  | 08:15 – 08:25<br>(10 mins) | Assemble – Meet & Greet                                      | Jeremy Midgley<br>co - chair | Lead Enviro Consultant to<br>NMP                |
| 2  | 08:25 – 08:30<br>(5 mins)  | Chair of session   | Dr Andy Payne                | Coordinating Independent<br>Reviewer            |
| 3  | 08:30 – 08:45<br>(15 mins) | Welcome address  | Mike Woodborne               | COO NMP   |
| 4  | 08:45 – 09:30<br>(45 mins) | Project description  | Jeremy Midgley               | Lead Enviro Consultant to<br>NMP                |
| 5  | 09:30 – 10:45<br>(85 mins) | Water Column & Sediments                                     | Dr Robin Carter              | Lwandle<br>Consultant to NMP                    |
| 6  | 10:45 – 10:55<br>(10 mins) | TEA BREAK  |                              |   |
| 7  | 10:55 – 12:10<br>(85 mins) | Fisheries mammals and seabirds                               | Dave Japp                    | CapFish<br>Consultant to NMP                    |
| 8  | 12:10 – 12:40<br>(30 mins) | Biomass and Stock Estimates of Hake<br>and Monk              | James Gaylard                | CapFish<br>Consultant to NMP                    |
| 9  | 12:40 – 13:00              | SUMMARY SESSION  | Dr Andy Payne<br>Chair       | Coordinating Independent<br>Reviewer            |
| 10   | 13:00 – 13:50<br>(50 mins) | LUNCH  |                              |   |
| 11   | 13:50 – 14:20<br>(30 mins) | Recruitment  | Dr Hilkka Ndjaula            | CapFish<br>Consultant to NMP                    |
| 12   | 14:20 – 14:50<br>(30 mins) | Opinion on: Ecosystem impacts<br>related to phosphate mining | Dr Kevern Cochrane           | CapFish<br>Consultant to NMP                    |
| 13   | 14:50 – 15:20<br>(30 mins) | Jellyfish  | Professor Mark<br>Gibbons    | University of Western<br>Cape Consultant to NMP |
| 14   | 15:20 – 15:50<br>(30 mins) | Marco Benthos  | Dr Nina Steffani             | Steffani Environmental<br>Consultant to NMP     |
| 15   | 15:50 – 16:00<br>(10 mins) | TEA BREAK  |                              |   |
| 16   | 16:00 – 17:00              | SUMMARY SESSION<br>Confirmation of day 2 agenda              | Dr Andy Payne<br>Chair       | Lead Independent<br>Reviewer                    |
| 17   | 17:00                      | Close day one  |                              |   |
| Evening time is free to pursue your own activities |                            |  |                              |   |

### Day TWO: Thursday 14<sup>th</sup> August 2014

| No | Time          | Topic   | Presenter  | Affiliation   |
|----|---------------|---|--|---|
| 1  | 09:00 – 12:00 | <b>CLOSED session.</b><br>Independent reviewers workshop<br><br>Jeremy Midgley, Pat Morant,<br>Mike Woodborne on hand as needed | Dr Andy Payne<br>Chair:<br>Attending:<br>Prof. A Roychoudhury<br>Dr. A Payne<br>Dr. M O'Toole<br>Dr. B Clark<br>* Dr S Mafwila | Independent Review team.<br><br>* Process assessor –<br>University of Namibia |
| 2  | 12:00 – 13:00 | <b>LUNCH _ all invited</b>  |  |   |
| 3  | 13:00 – 17:00 | Feed back session   | As coordinated by Dr A Payne   | Lead Independent Reviewer   |
| 4  | 17:00 – 17:30 | Closure statement   | Dr A Payne<br><br>M Woodborne  | Lead Independent Reviewer<br>NMP COO  |

## Appendix 4, Terms of Reference

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### 4.1: Terms of Reference for Independent Reviewers

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#### 4.1.1 Introduction

In consultation with the Namibian Marine Phosphate (Pty) Ltd, their appointed consultants (Carter, Gibbons, Japp and Steffani) and the CSIR, J Midgley & Associates sourced a group of internationally recognised leading scientists (specialist in their field) who could serve as independent (not associated (directly) with the NMP project) review team, to consider and evaluate the reports (in context, see Appendix 1) of the NMP verification programme.

The terms of reference of their review is presented herein along with the terms of reference of the presenting parties (NMP appointed consultants). A biogeographical profile is provided of the independent review parties (Appendix 5).

#### 4.1.2 Terms of Reference

##### Review Parties

**NOTE:** The full workshop ToRs are presented for your reference. Please allow a time period for questions, and see the Agenda for the time allocation of your presentation and discussion:

**Dates:** 13 & 14 August 2014

**Duration:** Two full days

**Day one** – 08:15 to 17:00 – (All)

**Day two** – Session 1: 09:00 to 12:00 – Independent Party review session (IPs only)

Lunch: 12:00 to 13:00 - All

Session 2: 13:00 to 17:00 - Independent Party feed back (all)

**Location:** Cape Town (Vineyard Hotel, Cape Town)

#### 4.1.3 Primary Objectives

1. For NMP's specialist consultants to present a summary review of their work, both of the initial assessments (EIA) and of the current verification assessments.
2. To obtain independent reviews of each specialist study (EIA and verification components) by acknowledged experts in their respective fields of expertise.
3. To obtain an independent review, by an acknowledged expert on the Benguela System, of the entire suite of studies undertaken by NMP's environmental consultants.
4. By means of independent review determine whether there are any shortcomings in the NMP Environmental Assessment (both EIA and verification components) and, if so, how to best address these shortcomings.
5. Ensuring the primary issues and concerns raised in the EIA process are satisfactorily addressed by the assessments undertaken by the NMP environmental consultants.

#### **4.1.4 Workshop Process Overview**

1. Independent Party reviewers are persons provided with specific project related documentation in advance (via Dropbox) of the workshop. This is for review and assessment before the workshop. The progressive loading of documents to this Dropbox will be incremental from early July.
2. Day one of workshop 13<sup>th</sup> August: Chair Dr A Payne, co-chair Jeremy Midgley. (Refer to the Agenda for full details).
  - a. NMP and NMP consultant presentations (10 sessions) and relevant discussions
3. Day 2 of workshop 14<sup>th</sup> August: Chair Dr A Payne, co-chair Jeremy Midgley. (Refer to the Agenda for full detail).
  - a. Independent Party closed workshop (IPs only)
  - b. Independent Party review feed back by discipline (single discipline) (All - attendance)
  - c. Integrated Independent Party review feed back (inter discipline) (All - attendance)
  - d. Identification and discussion of omissions and matters of significance (All - attendance)
  - e. Closure of workshop, outstanding matters, time lines for delivery of Independent Party review reports
4. Post workshop
  - a. Independent Party reports submitted to Dr A Payne
  - b. Dr A Payne to consolidate and submit to NMP
  - c. Close out by NMP / Specialist consultants on matters of relevance

#### **4.1.5 Expected Outcomes of the Workshop**

1. Independent Party review and opinion on the quality/thoroughness of the various specialist studies as well as relevance of data sets, opinions and conclusions of the NMP specialist consultants presented in their EIA assessments and the verification reports
2. Statements detailing additional (as may be necessary) work recommendations and/or risk identification for determination of any further significant impacts (risk)
3. Independent Party reviewers statements of independence to the NMP Phosphate Project, objectivity of their assessment, capacity of assessment capability and knowledge of the Benguela Ecosystem / topic of assessment

#### **4.1.6 Independent Party Review Parties**

##### *Documentation Provided for Review*

The Independent review parties will be provided (see below for full listing) with:

1. project description,
2. all 4 NMP Specialists generated studies (as presented in the EIA),
3. the verification proposal,
4. the verification reports (3 main plus 3 auxiliary),
5. the queries as presented by MFMR (to both the EIA as submitted and the verification proposal),
6. the external reviews (3 of) as commissioned by the Environmental Commissioner,
7. model Origin & Age of the deposit,
8. analytical procedures and
9. the CV of all parties.

| Independent Party Reviewers | Assessing  | Topic   |
|-----------------------------|--|---|
| Dr Andy Payne               | James Gaylard<br>Dr Hilka Ndjaula<br>Prof Mark Gibbons<br>Dr Kevern Cochrane | Biomass & stock estimates<br>Recruitment<br>Jellyfish<br>Ecosystem assessment |
| Prof Alekandra Roychoudhury | Dr R Carter  | Water column & sediments  |
| Dr Mick O'Toole             | D Japp<br><br>Prof Mark Gibbons<br>Dr Kevern Cochrane                        | Fish, fishery, marine mammals and birds<br>Jellyfish<br>Ecosystem assessment  |
| Dr Barry Clark              | Dr N Steffani  | Macro benthos<br>Meiofauna  |

#### 4.1.7 Expectations of the Independent Party reviewers:

From the review of the documentation provided, the Independent Party reviewers are expected to:

1. Prior to the workshop:
  - a. Thoroughly review the specialist studies of the EIA, including verification reports *aligned with their discipline* (reference table above)
  - b. Have a reasonable comprehension of the other NMP specialist consultant studies of the EIA and verification reports, including the verification proposal
  - c. Have specific comprehension of the issues raised by the 3 external independent reviews (as commissioned by the Environmental Commissioner) of the EIA (specialist study sections only) as relates to their specific discipline.
  - d. Have a reasonable comprehension of the matters and relevance of matters raised by the Ministry of Fisheries and the NatMIRC scientists.
  - e. Have a reasonable comprehension of the phosphate project – project description
  - f. As relevant be familiar with the Dr J Compton assessment: A review of offshore phosphorite deposits on the Namibian margin and preliminary model for the origin, age and deposition of phosphorite in ML 170
  - g. Have read as relevant the CVs as provided for the project team, Independent Party review team, and NMP specialist consultants;
2. During the workshop
  - a. To consider the presentations of the NMP specialist consultants
  - b. To engage with the NMP specialist consultants during and after the respective presentations to clarify matters of interest or concern.
  - c. To provide an Independent Party review commentary of particular discipline of relevance
  - d. To provide an Independent Party review commentary of all disciplines
  - e. To discuss matters of critical management (risk), mitigation and monitoring
3. After the workshop
  - a. To provide a written Independent Party review report of the particular NMP specialist's consultant assessments related to your area of expertise / discipline(s) of assessment. (refer to the section above on: Expected Outcomes of the workshop)
  - b. To provide a statement of your competency and authority in your field
  - c. To provide a statement of your independence in respect of the NMP project.
  - d. The time line for the delivery of the particular report will be confirmed on day 2 of the workshop.
4. In addition to the particular reviews identified above, Dr A Payne will also provide a contextual summary assessment of the full suite of studies undertaken.

It may be necessary for additional engagement with NMP / NMP specialist consultants or other party to qualify any outstanding matters. In respect of retaining review party independence, consultations post workshop should coordinate their enquiries through both Jeremy Midgley and Dr Andy Payne.

#### **4.1.8 Guest delegates**

**Dr John Rogers:** Dr Rogers, who is now retired, as one of the original 'three' who defined this deposit in the 70s is invited as a guest to the Independent Party review team.

**Dr Sam Mafwila:** of the University of Namibia, has been delegated through a University of Namibia - NMP three pillar agreement to act as an independent assessor of process of the NMP verification project.

## **4.2: Terms of Reference for Review of Verification Programme Process**

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### **4.2.1 Independent Review of the Verification Programme Process**

Namibian Marine Phosphate (Pty) Ltd, through discussion with the University of Namibia's Central Consultancy Bureau (UCCB), established terms of agreement for the UCCB to review the process of the verification programme. This agreement was signed on the May 2013.

Dr S. Mafwila of the Department of Fisheries and Aquatic Sciences was appointed by the UCCB to undertake this review, his biogeographical profile is presented (Appendix 6). Although not listed specifically in the ToRs (Appendix 4), Dr S. Mafwila participated in the Independent review of the verification programme's specialist studies, attending the workshop in Cape Town (August 2014). Dr S Mafwila's comments on this workshop as part of his assessment of the process elements, the report are presented in Section A1.3.2.

### **4.2.2 Independent Observer of Field Operations (MV DP Star)**

- a. 1 x Scientist to be on-board vessel DP star as "Observer"
- b. Verify and comment on suitability of equipment and sampling techniques (gathering, handling, storage) used for specific scientific objectives as outlined in the Verification Programme
- c. Verify and comment on the suitability of on board sample processing and handling of samples (on board processing, storage, marking, transportation, record keeping) for specific scientific objectives as outlined in the Verification Programme
- d. Verify and comment on the completion of the sampling operation in accordance with the detail and coverage as outlined in the Verification Programme
- e. General comments on the overall operations

### **4.2.3 Peer Review - Analytical Processes and Results**

- a. Review the proposed set of analyses to be undertaken on samples gathered in Phase 2 field operations and confirm suitability for purpose, in accordance with the objectives of the verification work programme
- b. Meet relevant appointed specialists to discuss the defined analyses to be undertaken and the relevant service providers, and confirm suitability of laboratories and techniques to be used
- c. Representative to travel to relevant laboratories and observe data analysis techniques, equipment and procedures to confirm suitability
- d. To review and confirm the suitability and validity of the analytical sample results obtained at conclusion of the analytical process.
- e. General comments on overall analytical procedures and quality of results

### 4.3: Terms of Reference for Presenting and Attending Parties

#### 4.3.1 Presenting and Attending Parties

The presenting parties are required to:

- Present information by way of power point presentation – time variation, please see agenda.
- Engage in discussions as may be required

| Presenting / Attending Parties       | Topic  |
|--------------------------------------|--|
| Mike Woodborne                       | COO NMP ( <i>welcome address</i> )                       |
| Jeremy Midgley                       | Project description                                      |
| Pat Morant                           | Internal independent reviewer ( <i>no presentation</i> ) |
| Dr Robin Carter                      | Water column and sediments<br>Meiofauna                  |
| Dr Nina Steffani (present by proxy!) | Macrobenthos   |
| Dave Japp                            | Fish – Fishery, marine mammals and birds<br>Biodiversity |
| Dr Hilka Ndjaula                     | Recruitment  |
| James Gaylard                        | Biomass and stock estimates of hake and monk             |
| Dr Kevern Cochrane                   | Opinion on Ecosystem impacts related to phosphate mining |
| Professor Mark Gibbons               | Jellyfish  |

#### 4.3.2 Scope of Content: Presenting Parties: Specialist Consultants to NMP

The NMP specialist consultants are required to present a review of their work, which covers (where relevant) both the initial body of work as undertaken in 2012 (their contribution to the EIA assessment) and the subsequent body of work, the verification assessment. Particular attention of the presentation needs to focus on:

- The founding methods / approaches of assessment
- Closure on uncertainties expressed in the specialist assessments (EIA 2012)
- Responding to the MFMR /NatMIRC queries
- Responding to the external 3rd party reviewers comments
- The collection of data / information that is site specific
- The assessment of impacts
- The requirements of risk mitigation and ongoing management and monitoring

## Appendix 5, Curricula Vitae – Review Team

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### **Biographical Profile: Independent Review Parties**

|                                 |  |
|---------------------------------|--|
| Dr Andrew I. L. Payne           | <i>Director:</i> A&B Word (UK)<br><i>Associate:</i> Cefas (UK) |
| Dr Michael J. O'Toole           | <i>Consultant:</i> Marine Ecosystems Management (IRE)          |
| Dr Barry Clark                  | <i>Director:</i> Anchor Environmental (RSA)                    |
| Prof. Alakendra N. Roychoudhury | Marine Biogeochemist (RSA)                                     |

### 5.1: Curricula Vitae – Peer Review Team

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#### **Dr Andrew I. L. Payne**

##### **POSITION**

- International Fisheries Consultant / Editorial Consultant / Project Manager

##### **QUALIFICATIONS**

- PhD Zoology
- MSc Zoology
- BSc. (Hons) Zoology

##### **AFFILIATIONS**

- Zoological Society of Southern Africa
- Institute of Biology (London)
- Marine Biological Association of the UK

##### **AWARDS**

- Southern Africa – for services to marine science
- Poland – for contributions to fisheries science worldwide

##### **AREAS OF EXPERTISE**

- International fisheries
- UK New Nuclear Build
- All aspects of fisheries/ resource/environmental management

##### **PUBLICATIONS**

He has published widely, contributing to >50 peer-reviewed papers on his marine science discipline. Author of the book “Oceans of Life off Southern Africa”

##### **EDITORIAL POSITIONS**

- 8 years as Editor-in-Chief, ICES Journal of Marine Science
- Founding editor, (South) African Journal of Marine Science
- Series Editor, “Humanity and the Seas”, Springer books



## **Dr Andrew I. L. Payne**

Dr Payne is an international leader in Fisheries Management with more than 40 years' experience in marine science, including many years of consultancy.

He has led fisheries and ecological management advice projects, including science, strategy and policy development in southern Africa and the UK. He spent 30 years in southern Africa and left there as Director of South Africa's Sea Fisheries Research Institute, so has an intimate understanding of the southern African marine environment, its dynamics and resources, and management.

On joining Cefas in 2000 he was for several years Science Head of Fisheries Management with management responsibility for more than 100 scientific staff, provided oversight of a range of projects including the UK Fisheries Science Partnership and was project manager on Cefas New Nuclear Build (NNB) work for EDF Energy, advising on marine and coastal science requirements for NNB in the UK. He is now a formal Associate of Cefas.

Dr Payne has more than 30 years of experience of directly advising on the development of policies and infrastructural needs relating to all aspects of fisheries and sustainable marine resource management. He also has considerable editorial expertise, was the founding editor of the (South) African Journal of Marine Science (for which he is still on the international advisory panel), and until retiring was the Editor in Chief of the ICES Journal of Marine Science.

## **RELEVANT EXPERIENCE**

### **Head of Fisheries Management – Cefas**

Responsible for managing all functions within Cefas Fisheries Management, ensuring the delivery of science within the area, including the management of large national and international projects.

### **Project Manager – BEEMS Programme for EDF on New Nuclear Build (NNB)**

Leader of the consulting team on ecology, water dynamics and water quality.

### **Director of the Sea Fisheries Research Institute, South Africa**

Five years as Director and seven years as Deputy Director of the Sea Fisheries Research Institute in Cape Town, South Africa.

### **Expert in Regional Fisheries and Marine Environment Management**

Deeply involved in many of southern Africa's marine environment and research initiatives (BENEFIT, BCLME) and expert for the EU project sustainable management of Caspian fisheries (TACIS), interacting and advising scientists and managers in Azerbaijan, Kazakhstan, Iran and Russia.

### **Expert external reviewer**

Hake fisheries management in Argentina (Argentine Government). For the Marine Stewardship Council, full accreditation assessment of Antarctic krill (twice) and for Russian pollock in the Western Barents Sea, Navarinsky and Sea of Okhotsk. Peer reviewer of several other projects.

Specialist expert advisor, multiple assignments (USA)

### **Dr Michael J. O'Toole**

Dr Michael O'Toole is an independent consultant and advisor with over forty years of experience in marine environment and ecosystem based science and management

He has recently completed a contract with the Marine Institute in Galway, Ireland (2008-2014) where he was responsible for policy research and coordination of projects in relation to the marine environment, integrated coastal management and climate change.

From 2002 to 2007, he was employed by the United National Development Programme (UNDP) as Chief Technical Advisor (Regional Coordinator) of the Benguela Current Large Marine Ecosystem Programme (BCLME) and was responsible for developing the Transboundary Diagnostic Analysis (TDA) and implementing the Strategic Action Programme (SAP).

He has been closely involved with all stages of the development, management and implementation of the BCLME Programme including the establishment of the Interim Benguela Current Commission. Dr O'Toole also worked for two years (2001-2002) with the Food and Agriculture Organisation of the UN (FAO) as Chief Technical Advisor for the Bay of Bengal Large Marine Ecosystem Project (BOBLME) based in Chennai, India.

Prior to this, he worked as a staff member for several years as a biological oceanographer and marine environmental scientist with the Ministry of Fisheries and Marine Resources in Namibia and with the Sea Fisheries Research Institute in Cape Town, South Africa and is a specialist on the Benguela Current Large Marine Ecosystem.

Dr O'Toole has been an active member of the IOC/IUCN/NOAA Consultative Committee on Large Marine Ecosystems over the last 14 years (IOC-UNESCO Paris) and had co-chaired the ICES/LME Working Group on Large Marine Ecosystems Best Practices from 2010 to 2012. He has carried out consultancies for a number of private companies involved in oil and gas exploration and production, fisheries, sea bed mining and offshore renewable energy and also UN agencies such as the World Bank.

Dr O'Toole graduated from the National University of Ireland, Galway with a BSc Hon. and MSc Degree in Marine Biology and has a PhD in Biological Oceanography from the University of Cape Town, South Africa.

## **Dr Barry Malcolm Clark**

**BORN:** 25 August 1968; Livingstone, Zambia **AGE:** 46 YEARS

**NATIONALITY:** British, South African

**POSTAL ADDRESS:** 8 Steenberg House, Silverwood Close, Tokai 7945

**PHONE:** +27-21-6853400

**MOBILE:** ++27-82 3730521

**E-MAIL:** barry@anchorenvironmental.co.za **FAX:** +27 (0) 865428711

### **ACADEMIC QUALIFICATIONS:**

- Ph.D. Marine Biology, 1997, University of Cape Town
- BSc (Hons) Marine Biology, 1991, University of Cape Town

**OTHER QUALIFICATIONS:** Scientific diver, Diving supervisor, Small boat skipper

**LANGUAGE PROFICIENCY:** English (Excellent), Afrikaans (Good)

**COUNTRY EXPERIENCE:** South Africa, Namibia, Mozambique, Tanzania, Kenya, Mauritius, Seychelles, Angola, Ghana, Cote d'Ivoire, Nigeria, Egypt, United Arab Emirates, Azerbaijan

### **EMPLOYMENT HISTORY:**

- 1991-1993 – Scientific Officer, University of Cape Town
- 2000-2002 – Marine Coordinator, Cape Peninsula National Park
- 1996-Present - Director, Anchor Environmental Consultants CC
- 2002-Present – Research Associate, University of Cape Town

### **SUMMARY PROFILE**

Dr Barry Clark has twenty-one years' experience in marine biological research and consulting on coastal zone and marine issues. He has worked as a scientific researcher, lecturer and consultant and has experience in tropical, subtropical and temperate ecosystems. His main area of scientific study involved fisheries management and the biology and ecology of marine and estuarine fishes. He is presently Director of an Environmental Consultancy firm (Anchor Environmental Consultants) and Research Associate at the University of Cape Town. As a consultant has been concerned primarily with conservation planning, monitoring and assessment of human impacts on estuarine, rocky shore, sandy beach and temperate and coral reef communities as well as coastal and littoral zone processes, aquaculture and fisheries. Dr Clark is the author of 27 scientific publications in class A scientific journals as well as numerous scientific reports and popular articles in the free press. Geographically, his main area of expertise is southern Africa (South Africa, Lesotho, Namibia, Mozambique, Angola, Tanzania, Mauritius and Seychelles), but he also has working experience from elsewhere in Africa (Cote d'Ivoire, Ghana, Nigeria), the Middle East (UAE) and Europe (Azerbaijan).

### **MEMBERSHIP OF PROFESSIONAL BODIES/ORGANISATIONS**

- Professional Natural Scientist, registered with the South African Council for Natural Scientific Professions (2004-
- Professional member of the South African Institute of Ecologists and Environmental Scientists (2000-)
- South African representative to the SURVAS Network (Synthesis and Upscaling of Sea-level Rise Vulnerability Assessment Studies) (2000-)
- Member of the International Association of Impact Assessors (IAIA) (2000-)
- Member of the Subsistence Fisheries Task Group (1999-2000)
- Member of the Subsistence Fisheries Advisory Group (2000-2002)
- Member of the South African Network for Coastal and Oceanic Research (SANCOR) Economics Task Team

## **Prof. Alakendra N. Roychoudhury**

Department of Earth Sciences                      Tel: +27 (0)21 808 - 3124  
University of Stellenbosch,                      Fax: +27 (0)21 808 - 3129  
Stellenbosch, 7602 South Africa                      roy@sun.ac.za

**Employment** *Professor and Head (Permanent, Full time)*, Department of Earth Sciences, University of Stellenbosch, Stellenbosch, South Africa (01/09 – Present)  
*Senior Lecturer (Permanent, Full time)*, Department of Geological Sciences, University of Cape Town, Cape Town, South Africa (07/01 – 08/08)  
*Lecturer*, Environmental Sciences Program, Northwestern University, Evanston, IL, USA (01/99 – 06/01).

**Education** **Ph.D.** Aqueous Geochemistry, School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA, USA.  
**Minor:** Environmental Engineering.  
**Interdisciplinary Certificate in Geohydrology**, Georgia Institute of Technology, Atlanta, GA.  
**Master of Science and Technology**, Applied Geology, Indian School of Mines, Dhanbad, India.  
**Bachelor of Science**, Holker Science College, Indore, India.

**Professional Activities & Honors** Associate Editor, Applied Geochemistry 2006-present; Fellow, International Congress of Chemistry and Environment; Council Member: International Association of GeoChemistry (IAGC) Aug 2004 – July 2012; Steering committee: International GEOTRACES PROGRAM; Steering committee: ACCESS; Founder Member – AEON (Africa Earth Observatory Network); Board Member – Marine Research Institute (MA-RE), University of Cape Town, 2006 - Present; Associate Member – Institute for Microbial Biotechnology and Metagenomics; University of the Western Cape 2007 – Present

**Student supervision** Graduated -15 MSc (by research); 3 PhD; Currently supervising - 3 PhD; 3 MSc

**Courses taught** Environmental Geochemistry – Third Year Level; Hazardous waste site assessment – Honors Level; Aqueous environmental geochemistry – MSc Level; Hazardous waste site assessment – MSc Level; Transport-Reaction modeling – MSc Level; Environmental Geochemistry – Honors Level; Geology for Civil Engineers – First Year Level

## **Research**

Over 20 years of research experience in Aqueous and sediment geochemistry. Recently funded project proposals:

1. Roychoudhury AN (2014 – 2016) Iron nanoparticles in environment, NRF Competitive Rated Researcher Grant, R 1,427,220
2. Fietz, S and Roychoudhury, AN (2014- 2016) Southern Ocean Phytoplankton adaption to mimicked future changes in light and iron availability – molecular bases and modeling, South Africa – Norway bilateral grant, R2,421,712 + NOK1,453,027
3. Roychoudhury, AN (2012 – 2014) Bioactive trace metals in the Southern Ocean: Capacity development and an integrated measurement-modeling approach to understand ocean primary productivity, SANAP, R 1,200,000
4. Roychoudhury, AN (2011) Building of a class 100 clean laboratory at Earth Sciences, Stellenbosch University Strategic funds and co-funding from DST, R 2,200,000
5. Roychoudhury, AN and Bucciarelli, E (2011-2013) Speciation of iron nanoparticles in Southern Ocean. Bilateral grant NRF, South Africa and France R200,000 + €50,000

6. Roychoudhury, AN, Speciation of dissolved iron in Southern Ocean. Discretionary funds, Vice Rector, Research, University of Stellenbosch, R200,000
7. Roychoudhury AN and Routh, J (2010-2012) High-resolution millennial scale climate and precipitation variability in South Africa: Impacts on terrestrial ecosystems and societal development. Bilateral grant NRF, South Africa and SIDA Sweden. R500,000 + SKr450,000
8. Roychoudhury AN (2010 – 2012) Method development and measurement of Si and Ge isotopes using femtosecond MC-LA-ICPMS and MC-ICPMS: productivity and ecosystem change over glacial-interglacial periods in Benguela Upwelling System. NRF-DEAT, R846,640
9. Roychoudhury AN, and Clarke, C (2009-2011) Nanoparticles in environment: unraveling a mechanistic understanding for surface reaction processes. NRF-Blue Skies, R1, 246,500

#### **Recent publications (Total ca. 45)**

1. A. Sako, L. Lopez and A. N. Roychoudhury (2009) Adsorption and surface complexation modeling of palladium, rhodium and platinum in surficial semi-arid soils and sediment. *Applied Geochemistry* V 24(1), pp 86-95, doi:10.1016/j.apgeochem.2008.11.005
2. A. Sako, A. Mills and A. N. Roychoudhury (2009) Rare earth and trace element geochemistry of termite mounds in central and northeastern Namibia: mechanisms for micro-nutrient accumulation *Geoderma* V153, pp 217-230, doi: 10.1016/j.geoderma.2009.08.011
3. S. Staniland, A. N. Roychoudhury and D. Cowan (2010) Cobalt uptake and resistance to trace metals in *Comamonas testosteroni* isolated from heavy-metal contaminated sites in the Zambian Copperbelt. *Geomicrobiology Journal*, V 27, pp 656-668; doi:10.1080/01490450903527994
4. Clarke, J. Aguilar-Carrillo and A. N. Roychoudhury (2011) Quantification of drying induced acidity at the mineral-water interface using ATR FTIR spectroscopy. *Geochimica et Cosmochimica Acta*, V75, pp. 4846-4856; doi:10.1016/j.gca.2011.06.012
5. Tagliabue, Alessandro, Mtshali, T., Aumont, O., Bowie, A. R., Klunder, M. B., Roychoudhury, A. N., and Swart, S (2011) A global compilation of over 13 000 dissolved iron measurements: focus on distributions and processes in the Southern Ocean, *Biogeosciences Discuss.*, 8, 11489-11527, doi:10.5194/bgd-8-11489-2011,
6. B.P. von der Heyden, A.N. Roychoudhury, T.N. Mtshali, T. Tyliszczak and S.C.B. Myneni (2012) Significant Chemical Variations exist in the Fe-rich Nano- and Colloid-sized Particles in the South Atlantic and Southern Oceans. *Science* (In review)
7. Porter, D. Cowan and A. N. Roychoudhury (2012) An integrated microbiological and geochemical study of sulfate reduction in hypersaline pans. *Geobiology*
8. M Smith and A. N. Roychoudhury (2013) Mobilization of iron from rocks in a fractured aquifer: Lithological and geochemical controls. *Applied Geochemistry*. V31, pp 171-186, DOI: 10.1016/j.apgeochem.2013.01.002
9. A. N. Roychoudhury, D. Cowan, D. Porter, and Angel Valverde (2013) Dissimilatory sulphate reduction in hypersaline pans: An integrated microbiological and geochemical study. *Geobiology*, DOI: 10.1111/gbi.12027.
10. Coleen L. Moloney, Sean Fennessy, Mark J. Gibbons, Alakendra Roychoudhury, Frank A. Shillington, Bjorn P. von der Heyden, Kate Watermeyer (2013) What is the evidence for offshore marine ecosystem change in South Africa? *African Journal of Marine Science*, (Accepted)
11. Treasure, A.M., Moloney, C.L., Bester, M.N., McQuaid, C.D., Findlay, K.P., Best, P.B., Cowan, D.A., de Bruyn, P.J.N., Dorrington, R.A., Fagereng, A., Froneman, P.W., Grantham, G.H., Hunt, B.P.V., Meiklejohn, K.I., Pakhomov, E.A., Roychoudhury, A.N., Ryan, P.G., Smith, V.R., Chown, S.L. and Anson, I.J. (2013) South African research in the Southern Ocean: new opportunities but serious challenges. *South African Journal of Science*. V109, pp 1-4, DOI 10.1590/sajs.2013/a009
12. A Baker, J. Routh, M. Blaauw and A.N. Roychoudhury (2014) Geochemical records of palaeoenvironmental controls on peat forming process in the Mfabeni peatland, KwaZulu Natal, South Africa since the late Pleistocene. *Paleogeography, Paleoclimatology and Paleoecology* 395; pp 95-106

13. C. Clark, S. le Roux and A. N Roychoudhury (2014) The physicochemical controls on the formation of secondary Cu hydroxyl minerals in the arid Namaqualand soil system of South Africa. Applied Geochemistry
14. Bjorn P. Von der Heyden, Emily J. Hauser, Bhoopesh Mishra, Gustavo A. Martinez, Andrew R. Bowie, Tolek Tyliczszak, Thato N. Mtshali, Alakendra N. Roychoudhury, Satish C.B. Myneni (2014) Ubiquitous presence of Fe(II) in aquatic colloids and its association with organic carbon. Environmental Science & Technology, Letters
15. A. N. Roychoudhury and J Petersen (2014) Geochemical evaluation of soils and groundwater affected by infiltrating effluent from evaporation ponds of a heavy mineral processing facility, West Coast, South Africa. Journal of Geochemical exploration
16. P. J. Lam, B. S. Twining, C Jendel, A.N. Roychoudhury, J. Resing, W. Geibert, P. Santschi, R. F. Anderson (In review) Methods for analyzing the composition and speciation of marine particles, Progress in Oceanography

## 5.2: Curriculum Vitae of Process Assessor

### Curriculum vitae (consolidated): Profile: Appointed Reviewer

Dr S Mafwila, Department of Fisheries and Aquatic Sciences, University of Namibia.

#### Dr Samuel Kakambi Mafwila: Abbreviated Curriculum Vitae

**Name:** Samuel Kakambi Mafwila (PhD)  
**Date of birth:** 20 January 1974  
**Place of birth:** Mahundu  
**Nationality:** Namibian  
**Spoken languages:** English, Subiya, Silozi, Afrikaans  
**Driver's licence:** BE  
**Home address:** 39 Stephenson Street, Windhoek North, Windhoek, Namibia  
**Postal address:** P.O.Box 96063, Windhoek, Namibia  
**Telephone number:** +264811272486 and +26461272275(h)  
**e-mail address:** smafwila@unam.na

#### Educational History:

- 2011: **PhD**, Marine Science, University of Cape Town, Department of Zoology. "Ecosystem effects of bottom-trawling in the Benguela System: experimental and retrospective data analysis"
- 2002-2003: **MSc Applied Marine Science**, University of Cape Town, Zoology Department.
- 2000: **BSc (Honors)**, Marine Biology, Rhodes University, Entomology and Zoology Department
- 1998: **PGDE** (Physical Science and Biology), Faculty of Education, University of Namibia
- 1994 -1997: **BSc** with majors Zoology and Geography, and other subjects include Chemistry, Botany, Mathematics, and English. Biology Department, University of Namibia
- 1987–1992: **Matric Certificate**, Cape Education, Sanjo Senior Secondary School

#### Work Experience:

**Senior Academic:** lecturing at the University of Namibia (Department of Fisheries and Aquatic Sciences), since 2003- present. Responsible for: Physical Oceanography, Chemical and Biological Oceanography, Integrated Coastal Zone Management and Law of the Sea, Other courses includes Invertebrate Biology, Aquaculture, Benthic Ecology, and Biodiversity.

*Postgraduate Student Supervision:*

**Research and Publication Officer:** Faculty of Agriculture and Natural Resources

**Research Coordinator:** Department of Fisheries and Aquatic Sciences, UNAM

**Founder and Chairman:** Centre for Environment and Natural Resources CC

**Chairman:** SKM Trading Enterprises, Windhoek, Namibia

**Benguela Current Commission (BCC):** Training and Capacity Building Expert member

**UNAM Climate Change Committee Member:** Namibian Delegate to COP17, Durban, RSA, On Science & Technology, And Capacity Building, 2011.

**Research Coordinator:** SECUREFISH Project, 2011-2014, EC Funded Project. EU Project Number:289282. Improving Food security by reducing post-harvest losses in the fisheries sector.

**Principal Investigator:** NANSCLIM Project, Task Group on Demersal Fishery and Climate variability. NORAD Funded Project, 2010 – 2012.