Vegetation Survey and Targeted Rare Flora and Fauna Search of the Waste Rock Dump, Airstrip and Heap Leach Pad Extension Areas, Nifty Copper Operations, Western Australia

Prepared for:

Birla Nifty Pty Ltd

January 2006

Prepared by:

Martinick Bosch Sell Pty Ltd
4 Cook Street
West Perth WA 6005

Ph: (08) 9226 3166
Fax: (08) 9226 3177
Email: info@mbsenvironmental.com.au
Web: www.mbsenvironmental.com.au

MBS ENVIRONMENTAL

MARTINICK BOSCH SELL PTY LTD

ABN 60 102 614 479

MBS ENVIRONMENTAL

environmental and water resource consultants

VEGETATION SURVEY AND TARGETED RARE FLORA AND FAUNA SEARCH OF THE WASTE ROCK DUMP, AIRSTRIP AND HEAP LEACH PAD EXTENSION AREAS, NIFTY COPPER OPERATIONS, WESTERN AUSTRALIA

PREPARED FOR

BIRLA NIFTY PTY LTD

This report has been prepared for **Birla Nifty Pty Ltd** on the basis of instructions and information provided by **Birla Nifty Pty Ltd** and therefore may be subject to qualifications which are not expressed.

No other person may use or rely on this report without confirmation in writing from MBS Environmental. MBS Environmental has no liability to any other person who acts or relies upon any information contained in this report without confirmation.

This report has been checked and released for transmittal to **Birla Nifty Pty Ltd**.

PREPARED BY:
Lisa Boulden
Environmental Scientist

Signature: [signature] Date: 18/01/2006

CHECKED BY:
Kristy Sell
Director – Environmental Science

Signature: [signature] Date: 18/01/06.

TABLE OF CONTENTS

TABLES

FIGURES

1. SUMMARY

Birla Nifty Pty Ltd is proposing to construct a new Heap Leach Pad and extend its Waste Rock Stockpile and Airstrip at Nifty Copper Operations (NCO) located in the East Pilbara region of Western Australia in the Great Sandy Desert. The extensions to the Waste Rock Stockpile and the Airstrip have been addressed previously in the Native Vegetation Management Plan (MBS Environmental 2005) and were subject of a purpose clearing permit approved in October 2005. The construction of Heap Leach Pad 7 will be subject to a Notice of Intent and Purpose Permit for Clearing application that are currently in preparation.

The Heap Leach construction area and Waste Rock Stockpile and Airstrip extension areas are collectively referred to as the extension areas in this document. This survey involved botanists, zoologists and indigenous trackers traversing the extension areas searching for significant flora, fauna and vegetation communities.

Hart Simpson & Associates completed an ecological survey of the Nifty project area in 1992. Since then officers of Department of Conservation and Land Management, as well as Kings Park and Botanic Gardens, Alasdair Grigg from the University of Western Australia and MBS Environmental, have undertaken further botanical studies.

These surveys found that the Nifty lease supports primarily hummock grassland dominated by *Triodia basedowii* in interdunes and swales and *Triodia schinzii* on dunes. Typically, the overstorey of the interdunes is sparse and dominated by either *Acacia ancistrocarpa* in sandy areas and *Grevillea wickhamii* in gravelly areas. In lower lying areas with heavier soils, *Melaleuca lasiandra, M. glomerata* and *Eucalyptus victrix* are common. On the sand dune ridges however, *Grevillea stenobotrya* typically colonises the slopes, whilst *Acacia jensenii* commonly occurs on the dune tops with occasional *Corymbia chippendalei* (Sand-dune Bloodwood).

No Declared Rare Flora or Priority listed species were found on the Nifty mine lease areas during these and other previous surveys.

The Priority 2 species *Goodenia hartiana* has been found east of NCO on the gas pipeline route, but was not seen during survey of the proposed NCO extension areas.

The previous owners of NCO, Western Mining Corporation, undertook several comprehensive vertebrate fauna surveys on the lease and in surrounding areas. Significant fauna that may be present on the NCO lease include Bilby, Mulgara, Northern Marsupial Mole and Great Desert Skink. Two Mulgara were captured to the east of NCO during construction of the Nifty gas pipeline in October 2005. Evidence of up to four Marsupial Moles has been found at NCO previously with three bodies being found since 1994 and evidence of a burrow being found during a targeted fauna survey of the Tailings Storage Facility area in July 2004. Indigenous trackers (Wokka and Mukki Taylor from Parnngurr Aboriginal Community) also found evidence of the Northern Marsupial Mole in October 2005 in dunes to the south of the Nifty gas pipeline, approximately one kilometre south-west of the extension areas.

Surveys of the NCO extension areas by a zoologist and indigenous trackers did not find evidence of any significant fauna species in the proposed extension areas.

2. INTRODUCTION

2.1 LOCATION

NCO is located on the western fringe of the Great Sandy Desert in the East Pilbara region of Western Australia. The regional context of Nifty is shown in Figure 1. The operation is located approximately:

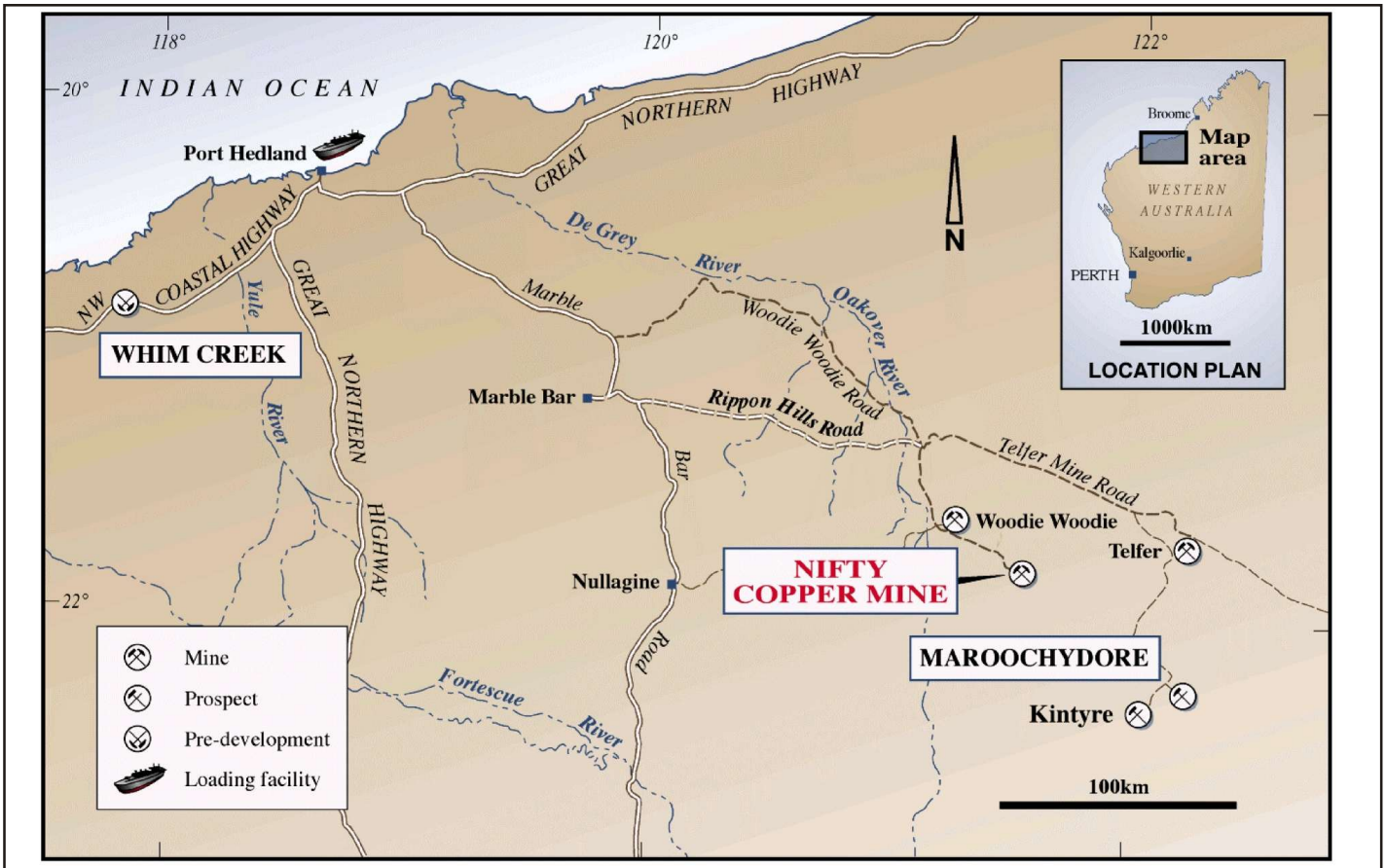
- 350 kilometres south-east of Port Hedland.
- 200 kilometres south-east of Marble Bar.
- 150 kilometres east of Nullagine.
- 45 kilometres south-east of Woodie Woodie.
- 70 kilometres west of Telfer.

NCO is located on Mining Lease 271SA, which was granted on 29 November 1992 and covers 234.8 square kilometres.

2.2 BACKGROUND

In 2005, it was identified that the NCO Waste Rock Stockpile was nearing capacity of the existing approved design and area. In the same time frame, it was also identified that an extension to the existing gravel airstrip would be required in the near future as the current strip is too short to allow adequate transport of freight and personnel to the operations. As such an application was submitted to the Department of Environment for a purpose permit to clear an additional 124.1 hectares of land. This was granted on 24 October 2005 (CPS601/1). Conditions associated with granting of this permit required targeted flora and fauna surveys of the extension areas to be conducted prior to clearing activities commencing.

In order to decommission Heap Leach Pad 1 (HL1) and enable the reworking of the remaining Heap Leach Pads, NCO are proposing to construct an additional Heap Leach Pad - Heap Leach Pad 7 (HL7). Once constructed, material remaining on HL1 would be moved to HL7 and other existing pads. The foundations of HL1 will be removed and any contamination around or below HL1 remediated. Material on the remaining Heap Leach Pads (HL2-6) will be reworked with some material being transferred to HL7. This reworking would enable higher levels of efficiency and copper removal to be achieved from the existing pads. This proposal has been discussed with regulatory authorities (August 2005) and is the subject of a Notice of Intent (NOI) planned to be submitted to Department of Industry and Resources in late January 2006.



Environmental + Water Resource Consultants
4 Cook Street
West Perth WA 6005
Telephone: +618 9226 3166
Facsimile: +618 9226 3177
e-mail: info@martinick.com.au

Birla (Nifty) Pty Ltd
Nifty Operations

Location Plan

Figure 1

W:\birla\nifty\expansion not\F1 location.cdr 22/01/04

2.3 FLORA SPECIES OF CONSERVATION SIGNIFICANCE

No Declared Rare Flora species have been recorded from NCO. The Priority 2 species *Goodenia hartiana* has been recorded to the east of the mine, along the gas pipeline route. This species is a multi-stemmed, viscid shrub that grows at the base of small sandhills. *G. hartiana* appears to respond to disturbance and it is possible that disturbance to the soil as a result of clearing may result in further populations of this species establishing.

2.4 TARGET FAUNA SPECIES

Four fauna species of conservation significance are known to have potential to be present in the NCO area. These are discussed in more detail below.

2.4.1 Mulgara

The broad habitat requirements of the Mulgara are clayey sand and sandy loam soils with hummock grasses (i.e. *Triodia basedowii*) under the influence of paleodrainage or surface drainage system (Masters 1993). Studies have shown that the cover of spinifex within habitats known to support Mulgara is between 10 to 60 percent (Masters 1993). Read (1998) located Mulgara burrow systems most consistently in a *Triodia basedowii* swale that was burnt in 1986.

Two Mulgara were captured during construction of the gas pipeline east of NCO on 5 October 2005. Both were released unharmed and regulatory authorities notified.

2.4.2 Bilby

The Bilby burrow is very distinctive, with a small circular mound of soil adjacent to a circular entrance to the burrow. Burrow entrances are up to 15 centimetres in diameter and are commonly located underneath or next to spinifex, tussock grass, juvenile mulga plants, fallen logs or termite mounds (Smythe and Philpott 1967; Triggs 2003). Read and Moseby (1995), Read and Niejalke (1996) and Paltridge (1997) found evidence of Bilbies at NCO to be most prominent in run-on swales dominated by *Triodia basedowii* and *Melaleuca*. These observations concur with McKenzie and Youngson (1983) that on a regional scale Bilbies were more common in alluvial regions and drainage lines rather than sandplains and dunes. This may be due to the increased moisture and nutrient levels (Southgate 1990).

2.4.3 Northern Marsupial Mole

Little is known about the habitat preferences of either species of Marsupial Moles. They are most often recorded in sandy dunes and that support various acacias and other shrubs (Corbett 1975; Johnson and Walton 1989), and often, but not always in association with spinifex (*Triodia* spp.) (Benshemesh 2004). Such habitat is widespread in and typical of the sandy deserts. While there are no clear indications of the vegetation types required by Marsupial Moles, underground signs of the Southern Marsupial Mole tend to be most common on well-vegetated dunes (Benshemesh 2004).

Three Marsupial Moles have been recorded at Nifty: one as road kill, one during drilling operations and one drowned in floodwaters after the rains from Cyclone Kirsty in March 1996 (Read 1998). All specimens were thought to be the Northern Marsupial Mole or Kakarratul (*Notorcytes caurinus*), however only one specimen was lodged with the Western Australian Museum. Read (1998) suggests that the Northern Marsupial Mole is probably relatively abundant in the region, despite the lack of further signs of the marsupial and extensive searches. Despite extensive searches for tracks no further signs of this cryptic mammal were observed at NCO until tracks were located in July 2004 (Read 1998; MBS Environmental 2004). The tracks found in July 2004 were a direct result of a targeted species search undertaken in the TSF area by Dr R Davis for MBS Environmental.

In September 2004, a live Marsupial Mole was observed by personnel involved in construction of the Port Hedland to Telfer gas pipeline. Discussions with the construction contractors Site Environmental Representative indicate that it was observed on the top of a gentle sandy rise in an area of about 600 metres by 100 metres that was bound by elevated ground water tables after Cyclone Fay. This sighting is about 32 kilometres north-north-east of Nifty.

2.4.4 Great Desert Skink

Sandplain vegetated by spinifex and scattered shrubs characterise the habitat type most widely used by the Great Desert Skink. The sandplains are characterised by a dominant cover of spinifex grasses, usually *Triodia basedowii*, but also *T. pungens* and *T. schinzii*. Growing among the spinifex hummocks are scattered shrubs and occasional trees from the genera *Acacia*, *Eremophila*, *Grevillea*, *Hakea* and occasionally *Eucalyptus*. This is a common habitat at NCO, however vast areas of potentially suitable habitat appear to be totally unoccupied by the Great Desert Skink or are at extremely low population densities (McAlpin 2001).

3. OBJECTIVES

The objectives of this study were to:

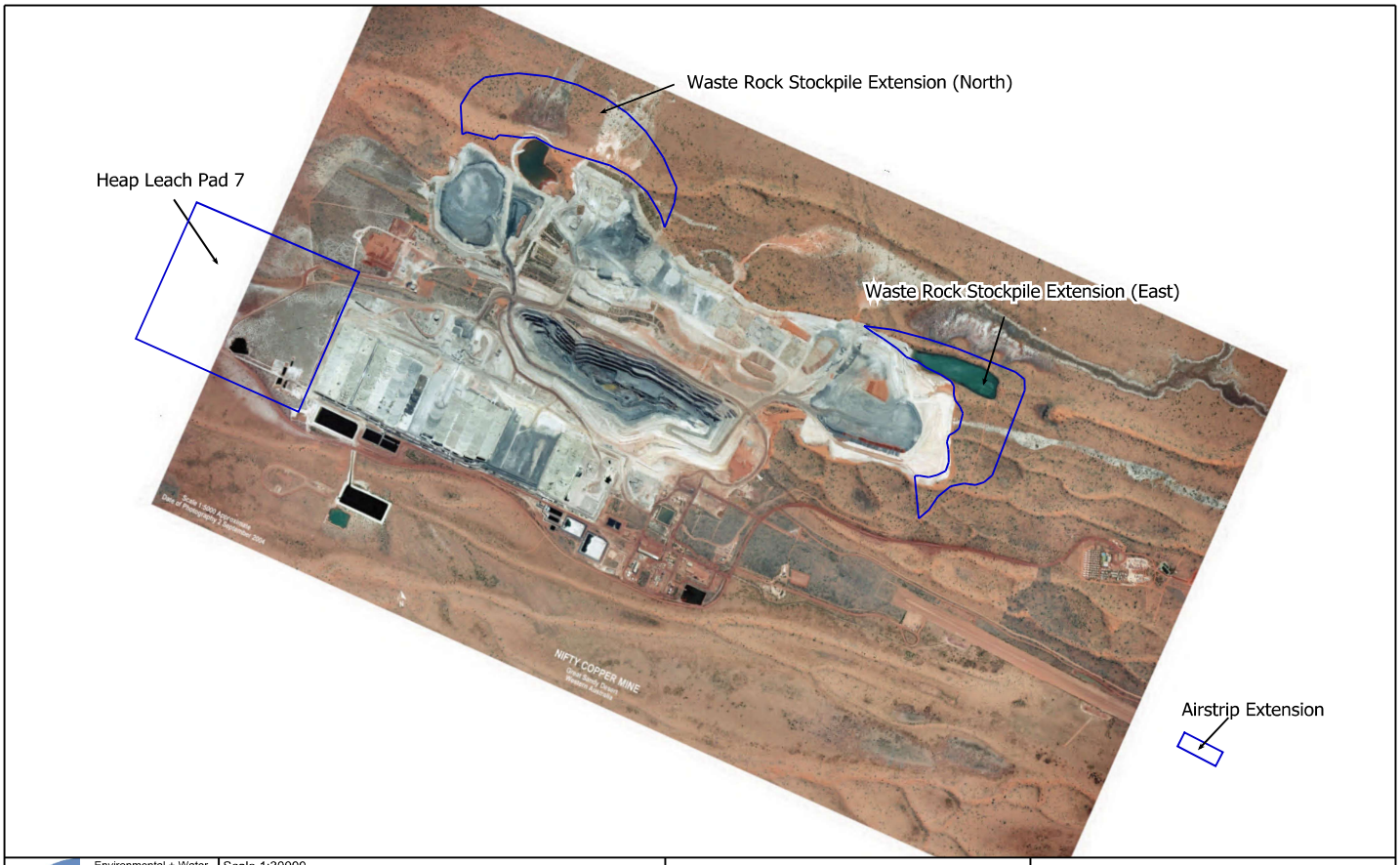
- Identify the various vegetation associations likely to be impacted upon by development of the proposed NCO extension areas.
- Conduct searches of the proposed extension areas for presence of Declared Rare and Priority flora species and threatened ecological communities.
- Conduct targeted searches of the extension areas for signs of the Marsupial Mole, Bilby, Mulgara and Great Desert Skink.
- Record opportunistic fauna sightings, tracks and scats.

4. METHODS

The vegetation survey, Declared Rare Flora search and targeted fauna search was undertaken between 23 to 28 October 2005 by MBS Environmental personnel, specifically botanists Alasdair Grigg and Christina Day, zoologist Magnus Peterson and indigenous trackers Wokka and Mukki Taylor from the Martu people, with assistance from Kris Martinick, Michael Wood and Amanda Rukuwai.

Each area was systematically walked by at least four people with two to four hours spent at each site. Rare fauna surveys were focused more in sand dune and sandy habitats as it was considered that these areas were more likely to support the species of interest.

Figure 2 shows the extension areas that were subject to these investigations.



Environmental + Water Resource Consultants 4 Cook St West Perth WA 6005 Telephone: + 618 9226 3166 Facsimile: +618 9226 3177 rfo@mbsenvironmental.com.au	Scale 1:30000 Original Size: A4 0 1 km	Birla Nifty Pty Ltd Vegetation Survey and Targeted Fauna Search	Investigation Areas **Figure 2**

W:\Birla\Nifty\Heap Leach Pad 7 NOI 2006\Heap Leach Pad 7\Heap Leach 7.map 17/01/2006

5. RESULTS

5.1 VEGETATION ASSOCIATIONS

The vegetation of the NCO extension areas reflects the depth of sand, underlying substrate material and drainage. Three main vegetation associations occur which reflect their position in the landscape and the soil type. Each of these vegetation associations is made up of a number of vegetation units. The vegetation associations present at NCO are:

- Sand dunes (deep sand hills and upper slopes).
- Sandplains/Swale.
- Shallow sand/gravelly plains.

5.2 VEGETATION UNITS

A total of six vegetation units were described within the NCO extension areas. These are detailed in the following sections. Table 1 indicates the vegetation associations and units present in each extension area and whether any flora species of conservation significance were found.

Table 1: Vegetation Units of NCO Extension Areas, October 2005

Extension Area	Sand Dune	Sand Plain	Stony Plain	Species of Conservation Significance
North Waste Rock Stockpile Extension	Open *Triodia*/shrubs with emergent *Corymbia chippendalei* on sand dunes	*Triodia*/*Acacia ancistrocarpa* sandplain *Jacksonia* shrubland		None found
East Waste Rock Stockpile Extension	Open *Triodia*/shrubs with emergent *Corymbia chippendalei* on sand dunes	*Triodia* sandplain *Triodia*/*Acacia ancistrocarpa* sandplain	*Triodia*/ *Acacia hilliana* stony plain	None found
Heap Leach Pad Extension	Open *Triodia*/shrubs with emergent *Corymbia chippendalei* on sand dunes	*Jacksonia* shrubland *Triodia*/ *Acacia translucens*/ *Melaleuca glomerata* plain		None found
Airstrip Extension		*Triodia* sandplain	*Triodia*/ *Acacia hilliana* stony plain	None found

5.2.1 Sand Dune

Open Triodia/Shrubs with emergent *Corymbia chippendalei* on Sand Dunes
This vegetation unit is an open grassy shrubland that occurs on sand dune crests and slopes. Common species include *Triodia schinzii* and low shrubs including *Otion simplicifolium*, *Aluta maisoneuvii*, *Dicrastylis cordifolia, Dicrastylis doranii*, *Acacia jensenii* and *Petalostylis cassioides*. Scattered emergent species are usually present including *Corymbia chippendalei* and *Grevillea stenobotrya*.

This vegetation unit occurs commonly on the numerous lateral sand dunes in the NCO area. There are small areas of dune in the North Waste Rock Stockpile and Heap Leach Pad extension areas. A number of dunes run through the East Waste Rock Stockpile extension area, making this a common vegetation unit in that area.

5.2.2 Sandplain/Swale

***Triodia* Sandplain**
Triodia sandplain is dominated by *Triodia basedowii*, but where sand is deeper patches of *T. schinzii* are either dominant or co-dominant. The sandplains consist of broad areas with minimal relief. Emergent *Grevillea stenobotrya*, *G. wickhamii*, *G. eriostachya*, *Hakea lorea* and *Melaleuca glomerata* form a sparse upper storey. Other assorted shrub and herb species can be present.

This vegetation unit is very common on plains in the NCO area. It is the major vegetation unit present on the Airstrip extension area and is common in the East Waste Rock Stockpile extension area.

***Triodia*/*Acacia ancistrocarpa* Sandplain**
This vegetation unit is dominated by a dense cover of *Triodia basedowii* with a shrub layer of *Acacia ancistrocarpa* to 1.5 metres. Scattered emergent species include *Eucalyptus odontocarpa*, *Hakea lorea*, *Grevillea wickhamii* and *G. eriostachya*.

This is the major vegetation unit in the North Waste Rock Stockpile extension area and occurs commonly across the plains between lateral sand dunes throughout the NCO area. It is also present in the East Waste Rock Stockpile extension area.

***Triodia*/*Acacia translucens*/*Melaleuca glomerata* Plain**
This vegetation unit is dominated by *Triodia basedowii* with an open shrub layer to 1.5 metres of *Acacia translucens* and *Melaleuca glomerata*. The *M. glomerata* becomes denser in areas prone to inundation. The overstorey is predominantly scattered *Eucalyptus victrix*.

This is the predominant vegetation unit on the Heap Leach extension area. Large parts of this unit are heavily degraded by contamination following Cyclone Fay.

***Jacksonia* Shrubland**
These shrublands occur in sandy swales between low dunes and at the base of dunes. This vegetation unit is dominated by *Jacksonia aculeata* or *Acacia translucens*. Numerous other shrubs also occur within this vegetation unit including *Dampiera candicans* and *D. cinerea*, *Isotropis atropurpurea*, *Newcastelia cladotricha* and *Gompholobium polyzygum*. The upper

storey consists of emergent *Acacia ancistrocarpa*, *Melaleuca lasiandra*, *Grevillea eriostachya* and occasional *Eucalyptus kingsmillii* and *Corymbia opaca*.

This vegetation unit occurs occasionally in small pockets throughout the NCO area. Small pockets are found in the North Waste Rock Stockpile and the Heap Leach Pad extension areas.

5.2.3 Shallow Sand/Stony Plains

***Triodia*/*Acacia hilliana* Stony plain**
This vegetation unit occurs in small pockets where stony ground occurs within sandplains. *Triodia basedowii* and *Acacia hilliana* are co-dominant species to 0.5 metre.

Small patches of this vegetation unit are found in the East Waste Rock Stockpile and Airstrip extension areas.

5.3 FLORA OF CONSERVATION SIGNIFICANCE

The survey did not find any Declared Rare Flora species in the extension areas.

The Priority 2 species *Goodenia hartiana* has been found east of the NCO on the gas pipeline route, but was not seen during the survey of the proposed NCO extension areas.

5.4 TARGETED FAUNA SEARCH

Searches by indigenous trackers Wokka and Mukki Taylor focused particularly on sand dune areas. No evidence was found of Marsupial Mole, Bilby, Mulgara or Great Desert Skink in the NCO extension areas during the October 2005 survey.

Two Mulgara were recovered from the pipeline trench during the construction of the Nifty gas pipeline to the east of the NCO lease. These were found approximately 10 kilometres east of the Nifty mine site and the proposed extension areas. Marsupial Mole tracks and holes were also identified by the same trackers in dunes to the south of the pipeline route approximately one kilometre south-west of the proposed extension areas.

5.5 OTHER FAUNA

While no fauna species of conservation significance were recorded from the extension areas, evidence of more common species was found. Tracks, scats and burrows that were evident in extension areas included:

- *Notomys alexis* (Spinifex Hopping Mouse).
- *Nephrurus laevissimus* (Knob-tailed Gecko).
- *Moloch horridus* (Thorny Devil).

- *Ramphotyphlops* species.
- *Vulpes vulpes* (Fox).
- *Felis catus* (Cat).
- Frog.
- Scorpion.
- Pigeon.

A number of fauna species were also recovered from the gas pipeline trench that ran approximately 100 metres south, parallel to the airstrip extension. The species recovered were:

- Dragons:
  - *Ctenophorus clayi*.
  - *Ctenophorus isolepis*.
  - *Ctenophorus nuchalis*.
- Geckos:
  - *Diplodactylus conspicilatus*.
  - *Nephrurus levis*.
  - *Rhynchoedura ornata*.
  - *Strophrurus elderi*.
  - *Strophrurus ciliaris aberrans*.
  - *Strophrurus jeanae*.
- Pygopids:
  - *Lialis burtonis*.
- Elapids:
  - *Pseudonaja nuchalis*.
- Monitors:
  - *Varanus gouldii flavirufus*.

6. CONCLUSIONS

A total of six vegetation units were described for the proposed extension areas. These were Open *Triodia*/Shrubs with emergent *Corymbia chippendalei* on Sand Dunes, *Triodia* sandplain, *Triodia*/*Acacia ancistrocarpa* Sandplain, *Triodia*/*Acacia translucens*/*Melaleuca glomerata* Plain, *Jacksonia* Shrubland and *Triodia*/*Acacia hilliana* Stony Plain. None of these were considered to be of conservation significance.

No Declared Rare Flora species were located during the survey. Although the Priority 2 species *Goodenia hartiana* has been located along the Nifty gas pipeline route, this species was not located during the survey of the NCO extension areas.

Thorough searches of the sandier habitats were conducted by a zoologist and indigenous trackers. These searches did not find any evidence of the Marsupial Mole, Bilby, Mulgara or Great Desert Skink. However, Marsupial Mole tracks and holes were found in sand dunes approximately one kilometre south-west of the extension areas. In addition, two Mulgara were recovered from the gas pipeline trench approximately ten kilometres to the east of the Nifty mine site.

Construction of Heap Leach Pad 7 and development of the extensions to the Waste Rock Stockpiles and Airstrip are considered unlikely to impact upon vegetation communities, flora or fauna species of conservation significance.

7. REFERENCES

Benshemesh, J. 2004, *DRAFT Marsupial Mole Recovery Plan*. Unpublished report for Birla Nifty Pty Ltd.

Corbett, L.K. 1975, 'Geographical distribution and habitat of the Marsupial Mole, *Notoryctes typhlops*.' *Australian Mammalogy*, vol. 1, pp. 375-378.

Johnson, K.A. and Walton, D.W 1989, 'Notoryctidae. Fauna of Australia: Volume 1B Mammalia', Eds: Walton, D.W. and Richardson, B.J., Canberra, Australian Government Printing Service: 591-602.

Masters, P. 1993, 'The effects of fire driven succession and rainfall on small mammals in spinifex grassland at Uluru National Park, Northern Territory', *Wildlife Research*, vol. 20, pp. 803-813.

MBS Environmental 2004, *Northern Marsupial Mole Management Plan*. Unpublished report for Birla Nifty Pty Ltd.

MBS Environmental 2005, *Vegetation Management Plan*. Unpublished report for Birla Nifty Pty Ltd.

McAlpin, S 2001, *The Recovery Plan for the Great Desert Skink (Egernia kintorei) 2001-2011* [Online], Available: http://www.deh.gov.au/biodiversity/threatened/recovery/great-desert-skink [2004, July 14].

McKenzie, N.L. and Youngson, W.K. 1983, 'Mammals. Part 3 of the Great Sandy Desert', Eds: Burbridge, A.A and McKenzie, N.L., *Wildlife Research Bulletin of Western Australia*, vol. 12, pp. 62-93.

Paltridge, R. 1997, *Bilbies and Predators at Nifty, WA*, WMC Resources, Nifty Western Australia.

Read, J. 1998, 'Vertebrate fauna of the Nifty Region, Great Sandy Desert, with Comments on the Impacts of Mining and Rehabilitation', *The West Australian Naturalist*, vol. 22, no. 1.

Read, J. and Moseby, K. 1995, *Fauna survey of the Nifty Region II*, WMC (Olympic Dam Operations), Olympic Dam.

Read, J. and Niejalke, D. 1996, *Fauna survey of the Nifty Region III*, (Olympic Dam Operations), Olympic Dam.

Smythe, D.R. and Philpott, C.M. 1967, 'Field notes on rabbit bandicoots *Macrotis lagotis* Reid (Marsupialia), from central Western Australia', *Transactions of the Royal Society of South Australia*, vol. 93.

Southgate, R 1990, Habitat and diet of the greater bilby *Macrotis lagotis* Reid (Marsupialia Peramelidae), pp. 73-84 in: *Bandicoots and Bilbies* (Ed. J. Seebeck, P. Brown, P.Wallis and C. Kemper), Surrey Beatty, Sydney.

Triggs, B. 2003, *Tracks, Scats and other Traces: A Field Guide to Australian Mammals*, Oxford University Press, South Melbourne.