

**ZZ EXPLORATION** Pty Ltd

**PO Box 1603  
Hobart, Tasmania**

---

**Zeehan Mineral Field**

**Exploration Licence 20-2002**

**Annual Report For Period Ending**

**December 2003**

---

Prepared by  
Paul Heath  
Senior Geologist

March 2004



*Oaths Act 2001*  
**Statutory Declaration**

**I,**

.....

.....

*(name, address and occupation)*

do solemnly and sincerely declare that .....

.....

.....

.....

.....

.....

.....

*(facts)*

I make this solemn declaration under the *Oaths Act 2001*.

Declared at.....

*(place)*

on .....

*(date)*

.....

*(signature)*

Before me

.....

*(Justice, Commissioner for Declarations  
or authorised person)*

**Table of Contents**

<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>SUMMARY .....</b>	<b>4</b>
<b>INTRODUCTION.....</b>	<b>5</b>
LOCATION .....	6
TENURE.....	7
<b>PREVIOUS EXPLORATION AND MINING.....</b>	<b>8</b>
<b>GEOLOGY .....</b>	<b>8</b>
REGIONAL GEOLOGY .....	8
LOCAL GEOLOGY & MINERALISATION (OCEANA AREA ONLY).....	8
<b>WORK COMPLETED JANUARY 2003 – DECEMBER 2004 .....</b>	<b>8</b>
REVIEW.....	8
REGIONAL EXPLORATION ACTIVITIES.....	8
PROSPECTIVE-BASED EXPLORATION ACTIVITIES .....	8
<i>Oceana deposit</i> .....	8
<i>Honours Thesis (Oceana deposit)</i> .....	9
<i>Mariposa deposit</i> .....	9
<i>Consultant geological review (EL 20-2002)</i> .....	9
<i>Consultant geophysical review (EL 20-2002)</i> .....	9
<b>PROPOSED WORK - RECOMMENDATIONS .....</b>	<b>10</b>
<b>ENVIRONMENTAL DISTURBANCE AND REHABILITATION.....</b>	<b>11</b>
<b>EXPENDITURE .....</b>	<b>12</b>
<b>REFERENCES.....</b>	<b>12</b>
<b>LIST OF APPENDICES .....</b>	<b>13</b>
 <b>FIGURES</b>	
FIGURE 1 - Location of ZZ Exploration Pty Ltd EL20/2002.....	6
FIGURE 2 - Land Tenure within and around EL20/2002 .....	7
 <b>TABLES</b>	
TABLE 1 - Estimate of Oceana Pre Resource Mineralisation .....	8
TABLE 2 - Expenditure - January 2003 to December 2003.....	12

**Summary**

Potential exists for the discovery of new economic metallic deposits within EL20/2002 plus the opportunity to extract and process minerals from existing deposits with known resources. ZZ Exploration has focused on finding small (<0.5Mt) to large-scale (>100Mt) economic resources based on testing of previously identified and potential anomalies.

Exploration completed on EL20/2002 during the period January 2003 to December 2003 include a) collation and review of pre-existing datasets, b) creation of a base-metal priority target definition map, c) Honours Thesis and d) a comprehensive drill hole database created for the Oceana deposit using existing open-file information.

ZZ Exploration aim to be one of the leading mineral explorers in the Zeehan area and explore EL20/2002 for Category 1 mineral resources for its Zeehan Zinc Gravity Separation Plant.

## **Introduction**

Exploration Licence 20/2002 (EL 20/2002) covers 71 square kilometres and is located one kilometre southeast from Zeehan, western Tasmania (Figure 1). ZZ Exploration Pty Ltd (ZZ Exploration) is a wholly owned subsidiary of Zeehan Zinc Limited, and holds the exploration rights to EL 20/2002.

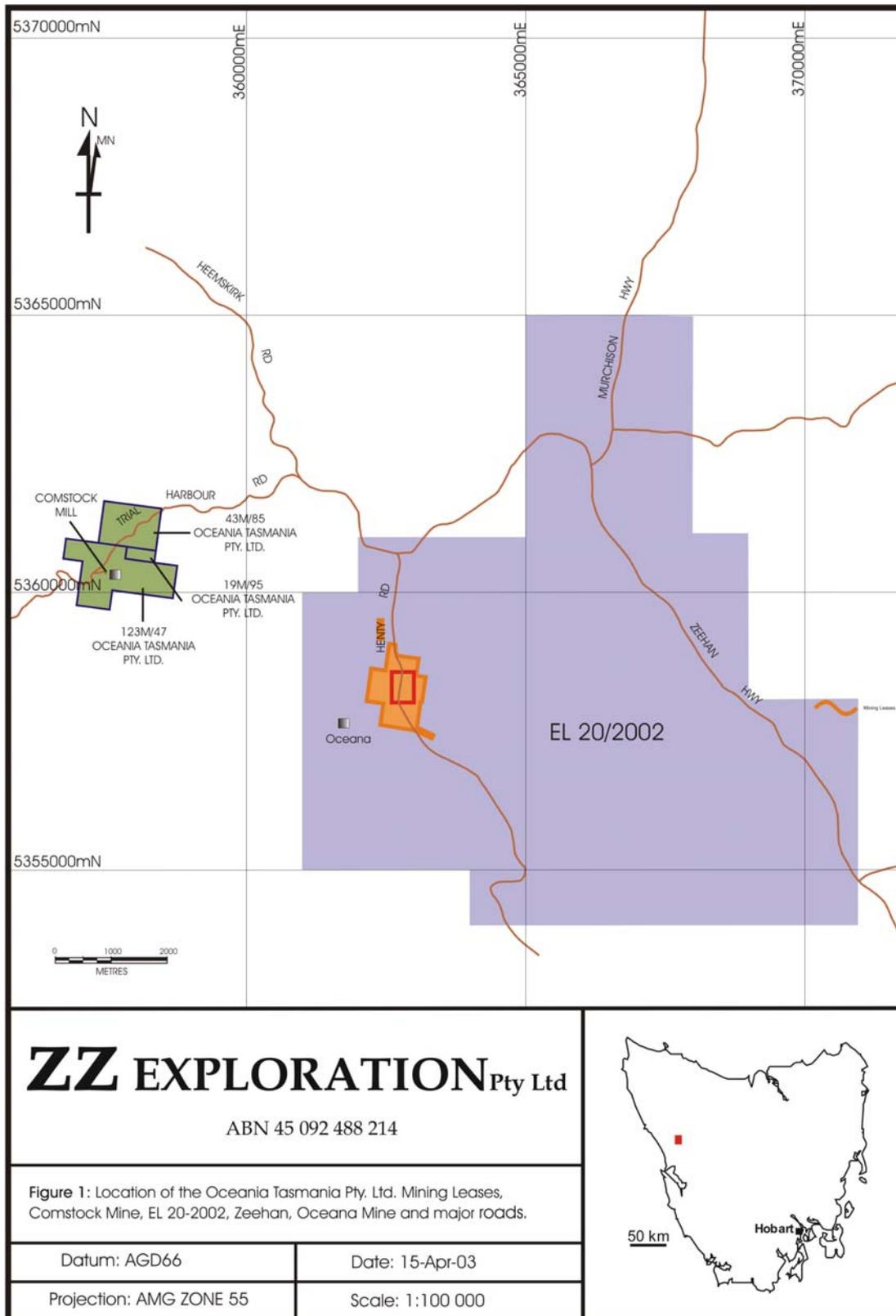
This report covers the period from January 2003 to December 2004. Work completed during this period include:

- 1) Collation and partial evaluation of historical data over EL 20/2002.
- 2) A summary list of target concepts over various deposits and old workings over EL 20/2002.
- 3) Creation of a comprehensive drill hole database around the Oceana deposit to evaluate the resource status to JORC standards.
- 4) Review of geological cross sections and plans from previous data regarding the Mariposa deposit.
- 5) Report titled 'Exploration Potential in the Zeehan Field' by Tear (2003).
- 6) Honours Thesis titled 'Geology and Mineralisation of the Oceana Zn-Pb-Ag deposit, Zeehan, Western Tasmania' by McGilvray (2003).
- 7) Preliminary investigation of geophysical, image, company and map data to determine a) areas of greater significance for future exploration b) prioritise ground held under EL 20/2002 and c) facilitate decisions regarding future possible relinquishments (Refer to Appendix 4).

The Murchison Hwy, Zeehan Hwy and Henty Rd provide access to EL 20/2002. The Emu Bay Railway and the Murchison Hwy connect Zeehan with the Port of Burnie, located 140 kilometres to the north.

Vegetation cover is sparse over EL 20/2002, dominated by button grass and banksias on the ridges and button grass and gorse in the marshy valley. Dense tea tree and eucalypt scrub occur along the creeks.

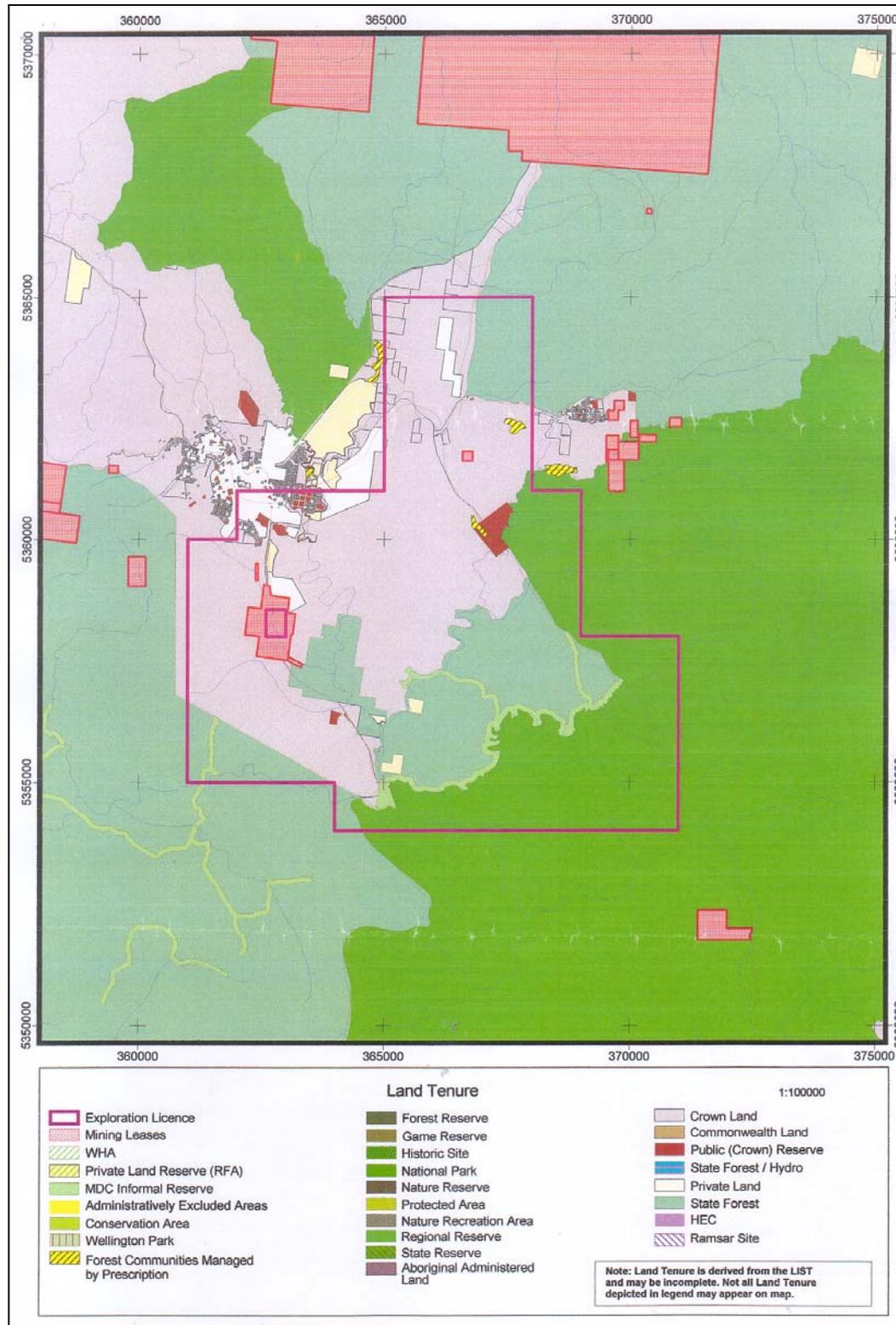
Location



**Figure 1.** Location of ZZ Exploration Pty Ltd EL20/2002

**Tenure**

EL 20/2002 was granted and to ZZ Exploration on 7 February 2003 for a period of five years and applies to all Category 1 minerals. The licence covers 71 square kilometres (Figure 1 and 2). Excluded areas include a) RL3/1996, b) any land owned or leased by the Commonwealth of Australia, c) mining leases and d) Crown reservations. Refer to Appendix 1 for EL 20/2002 Schedule.



**Figure 2.** Land Tenure within and around EL20/2002.

## **Previous Exploration and Mining**

A review of previous mining and exploration is documented in McGilvray (2003). See Appendix 5 attached to this report.

## **Geology**

### Regional Geology

The regional geology of the area has been described in Blissett (1962), Taylor (1983), Jones (1988) and McGilvray (2003).

### Local Geology & Mineralisation (Oceana area only)

The local geology and mineralisation of the Oceana deposit is described in chapters three and four, respectively, in McGilvray (2003), attached as Appendix 5 of this report.

## **Work Completed January 2003 – December 2004**

### Review

ZZ Exploration has not limited the scope of its exploration program to look only for granite-related or Irish-type deposits and associated metal types. ZZ Exploration has focused on finding small (<0.5Mt) to large scale (>100Mt) economic resources based on the testing of previously identified and potential anomalies. Exploration activities previously undertaken within EL 20/2002 include detailed geological mapping, geophysical surveys, costeaning, rock-chip, soil, stream and bedrock geochemistry, basin analysis studies, extensive aircore and diamond drilling.

### Regional exploration activities

ZZ Exploration's objective has been to collate and enter geological information from various reports/drill logs into one comprehensive database to enhance the prospectivity of deposits for commercial extraction. This includes reviewing 48 of the known old workings, prospects and deposits that occur within EL 20/2002 (Appendix 2). Target summaries of Blackjacks, Mariposa, Sunny Corner – Bannockburn, Pyramid, Tom Creek, Westerway, Leatherwood and Oceana deposits are shown in Appendix 8.

### Prospective-based exploration activities

#### *Oceana deposit*

A detailed drill hole database has been created for the Oceana deposit with the guidance of consulting geologist, Simon Tear (Benmore Exploration Pty. Ltd.). The Oceana database comprises 142 drill holes that include recoveries, assays, lithologies, surveys and collars (Appendix 6). Investigations have found valuable old reports and drill logs not previously recorded within the MRT library database. The drill hole database will assist ZZ Exploration with their review of the resource status (JORC compliant) for the Oceana deposit. Previous potential resource calculations have been calculated in Saxon (1995) as 2,285,000 tonnes @ 7.5%Pb, 2.6%Zn and 51 g/t Ag. However, a recent report by Cordery (1998) shows the potential for shallow (surface to 50m) mineralisation existing within the Oceana deposit (Table 1).

**Table 1.** Estimate of Oceana Pre Resource Mineralisation (Cordery, 1998)

Depth (m)	Volume (cubic m)	Tonnes (SG=2.7)	Pb (%)	Zn (%)	Ag (oz/t)	W:O
50m	50,000	135,000	12	2.8	2.2	10:1
25m	31,000	83,000	12.6	2.5	2.6	5:1

The resource shown in Table 1 is of interest to ZZ Exploration for short-term extraction of minerals for the Zeehan Zinc Gravity Separation Plant located 4 km to the west of the Oceana deposit. ZZ Exploration is assessing the Oceana deposit to confirm, enhance or deny the prospectivity for commercial extraction.

*Honours Thesis (Oceana deposit)*

An Honours thesis titled 'Geology and Mineralisation of Oceana Zn-Pb-Ag Deposit, Zeehan Tasmania' by McGilvray (2003) (Appendix 5) reports on a) lithostratigraphy and diagenetic history of carbonates for additive basin analyses, b) structural elements of the Oceana deposit and examination of style and distribution of metals, c) spatial and temporal associations of mineralogy and alteration textures, d) fluid geochemistry of paragenetic ore phases, f) interpretation of available geophysical datasets, and e) construction of a genetic model that can be utilised as an exploration tool within EL 20/2002.

*Mariposa deposit*

A review has begun on the resource potential of the open-cut potential of the Mariposa deposit. Geological plans, longitudinal- and cross sections and 3D form have been derived and redrawn from existing data shown in Appendix 7.

*Consultant geological review (EL 20-2002)*

Consulting geologist Simon Tear has produced a summary report titled 'Exploration Potential in the Zeehan Field' (Tear 2002), shown in Appendix 3, that reviews the status of the Oceana and Mariposa prospects, as shown, from past reports.

In December 2003, ZZ Exploration commissioned Ochre Australia Pty. Ltd. to complete a Phase 1: 'Image Processing and Target generation' map over EL20/2002 (Appendix 4).

*Consultant geophysical review (EL 20-2002)*

Phase 1 includes:

Characterising available datasets, including geophysical satellite, topographic and report data.

- a) Preliminary processing of main datasets including, where available, magnetics, radiometrics, gravity and EM
- b) Comparison with mapped geology and geological trend
- c) Preliminary target definition
- d) Summary report

Below are some target concepts sought by ZZ Exploration:

*Target concepts for Devonian granite-related sediment-hosted Zn-Pb-Ag deposits:*

- a) Carbonate-replacement associated with extensions of known structures (e.g. Sylvester, Balstrup, Bendall's and the Tenth Legion Faults) as well as other structures active during the Tabberabberan Orogeny and/or associated with Devonian granite emplacement (e.g. Balstrup Massive Sulfide Body and Bendall's Sulfide Body).
- b) High-grade mineralised linkage structures associated with tensional opening between major faults (e.g. Allison's Lode).
- c) Zn-Pb-Ag sulfide replacement of Upper Oonah Formation carbonates at lithological and sheared lithological contacts (e.g. Main Lode and Hooke's Lode).
- d) Stratabound Zn-Pb-Ag sulfide replacement of Upper Oonah Formation carbonates (e.g. Boss Lode).

- e) Known Zn-Pb-Ag lodes and Upper Oonah Formation carbonates extending from the Comstock Mining Leases.
- f) Outcropping Fe-stones along strike from, and similar to those within the Comstock Mining Leases.

*Target concepts for Ni-enrichment associated with Devonian granite-related hydrothermal fluids interacting with Cambrian Mafic-Ultramafic Complexes:*

- a) Granite-related magnetite-pentlandite enrichment associated with lithological/faulted contacts between Mafic-Ultramafic Complexes and Oonah Formation carbonates, carbonaceous shale, siltstones and sandstone.
- b) Pyrrhotite-pentlandite deposits hosted by Oonah Formation sediments proximal to Mafic-Ultramafic Complexes.
- c) Massive pyrrhotite-pentlandite deposits proximal to Mafic-Ultramafic Complexes and associated with magnetite-serpentine skarn localised (at depth) along major structures.

*Target concepts for Ordovician carbonate-hosted Pb-Zn-Ag deposits within concealed Gordon Group Limestone ( $\pm$ correlates) and overlying sediments:*

- a) Syngenetic (?) stratiform carbonate-replacement in the middle portion of the Gordon Limestone.
- b) Epigenetic (?) submarine gravitational debris flow breccias related to coeval tectonism (Pre-Tabberabberan) at the margins of the depositional basin.
- c) Pre-Tabberabberan listric roll-overs or domal structures.
- d) Structurally controlled vein or breccia zones in sediments overlying the Gordon Limestone.

### **Proposed work - Recommendations**

During 2003, ZZ Exploration has focused its effort on reviewing mineral deposits within EL 20/2002 (Appendix 2). Investigations have established priority areas (Appendix 4) and potential deposits, (Oceana & Mariposa deposits) which could contribute resources to the nearby Zeehan Zinc Gravity Separation Plant.

ZZ Exploration intends to carry out exploration for all category 1 minerals over EL 20/2002. Several short-term targets have been prioritised which include:

- 1) The feasibility of extracting minerals within the Oceana deposit down to 50m and
- 2) The resource potential and feasibility of extracting minerals for the Mariposa deposit using open-cut methods and
- 3) Reviewing priority targets as described in Appendix 4.

ZZ Exploration are continuing to review the JORC resource status of the Oceana deposit with the guidance of consulting geologist, Simon Tear (Benmore Exploration Pty. Ltd.).

Commodity prices have been down over the past few years, however, recent increases (Appendix 9) in prices will make projects such as the Oceana deposit more viable, particularly with the development of a nearby gravity plant.

A review is currently underway for areas that could be relinquished within EL 20/2003.

**Environmental disturbance and rehabilitation**

Exploration over EL20/2002 was environmentally low impact due to the existence of numerous sealed and unsealed roads and tracks. ZZ Exploration is confident that the experience of developing the Comstock Mine will greatly assist in exploring the potential of EL20/2002 and that any future developments will be carried out in an environmentally sensitive, responsible and competent manner.

**Conclusions**

Potential exists for the discovery of new economic metallic deposits within EL20/2002 plus the opportunity to extract and process minerals from existing deposits with known resources.

## Expenditure

**Table 2.** Expenditure - January 2003 to December 2003

<b>Expenditure Statement</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Total</b>
Geology	69,273.07	16,042.50		2,632.50	<b>87,948.07</b>
Geochemistry					-
Geophysics - air				2,200.00	<b>2,200.00</b>
Geophysics - ground					-
Feasibility studies	5,488.00				<b>5,488.00</b>
Rehabilitation					-
Drilling (metres)					-
Gridding (line km)					-
Administration	7,679.61	1,829.25		483.25	<b>9,992.11</b>
Other	2,035.00	2,250.00			<b>4,285.00</b>
<b>Total</b>	<b>84,475.68</b>	<b>20,121.75</b>	-	<b>5,315.75</b>	<b>\$ 109,913.18</b>

## References

Akerman, T., 1998. Annual Report for RL 8809 – Oceana, Zeehan. Mineral Resources Tasmania 014914-15.

Blisset, A.H. 1962. Geology of the Zeehan sheet, 1- mile Geological Map Series K/55-5-50, Explanatory Report, Geological Survey of Tasmania.

Cordery, G.R. 1998. RL 8809 Oceana, Zeehan Tasmania. Project Review and Resource Potential. Unpublished. Mancala Report No. Oceana498.doc, May 1998.

Ingham, P., 1988. Oceana project, Tasmania, retention licence application, feasibility study; Cyprus Gold Australia Corporation; report 574, part 2.

Jones, P.A. 1988. Geological. Retention Licence Application. Oceana-Austral, Zeehan, Tasmania; Unpublished. Cyprus Gold Australia Corporation. Report 574, part 1.

McGilvray, C. T., 2003. Geology and Mineralisation of Oceana Zn-Pb-Ag Deposit, Zeehan Tasmania. Unpublished. University of Tasmania.

Ochre Australia., 2003. Investigation of geophysical and image data over the Zeehan field. Unpublished. *In*: Heath, P., 2003. 2003 annual exploration report, ZZ Exploration Pty Ltd. Appendix 4.

Saxon, M. S., 1995. Oceana RL 8809 JV annual report September 1994 – 1995. Pasminco Exploration: report number T95-14.

Taylor, B. L., 1983. Amco – E.Z exploration of the Gordon Limestone: Electrolytic Zinc Co. of Aust'asia Ltd. & Amoco Minerals Aust. Co.: [84-2192].

Tear, S., 2002. Exploration potential in the Zeehan field. Unpublished. Benmore Exploration. *In*: Heath, P., 2003. 2003 annual exploration report, ZZ Exploration Pty Ltd. Appendix 3.

**List of Appendices**

- Appendix 1** Schedule from Exploration Licence 20/2002.
- Appendix 2** Location of Deposits within EL20/2002 (MIRLOCH mineral locations).
- Appendix 3** Tear, S., 2002. Exploration Potential in the Zeehan Field (Benmore Exploration Pty. Ltd.).
- Appendix 4** Ochre Australia., 2003. Investigation of geophysical and image data over the Zeehan field. Unpublished Report.
- Appendix 5** McGilvray, C. T., 2003. Geology and Mineralisation of Oceana Zn-Pb-Ag Deposit, Zeehan, Tasmania. Unpublished. University of Tasmania.
- Appendix 6** ZZ Exploration Pty Ltd database of drill hole: collars, surveys, assays, lithologies and recoveries within the Oceana area.
- Appendix 7** Mariposa – longitudinal- and x-sections, plan & 3D form.
- Appendix 8** Target Summaries (Blackjacks, Mariposa, Sunny Corner-Bannockburn, Pyramid, Tom Creek, Westerway, Leatherwood, Oceana).
- Appendix 9** Zinc Prices (London Metal Exchange) – Jan 01, 2003 to Dec 31, 2003.  
Lead Prices (London Metal Exchange) – Jan 01, 2003 to Dec 31, 2003.  
Silver Prices (London Fix) - Jan 01, 2003 to Dec 31, 2003.