High grade ore on the surface at Citronen Zinc Project 2008

121

# OUARTERNY ACTIVITES REPORT

### Ending December 31, 2008

Ironbark Gold Limited ABN: 93 118 751 027



## **Quarterly Activities Report**

Ending 31 December 2008

Ironbark is a focused and dedicated base metal exploration and development company listed on the Australian Securities Exchange.

The company has a technically strong Board with significant relevant experience and owns a suite of base metal and precious metal projects in Greenland and Australia.

### Highlights During the December Quarter

#### 1. Major Resource Upgrade at Citronen

- 38% increase in contained metal
- 25% increase in resources in the Indicated JORC category
- Global 102Mt @ 4.7% zinc + lead at a 2% zinc cut-off
- Medium Grade 56Mt @ 6.1% zinc + lead at a 3.5% zinc cut-off
- Higher-grade core of 22.6Mt @ 8.2% zinc + lead at a 5% zinc cut-off
- 2. Key Items of the Process Plant and associated infrastructure Designed and Costed (subsequent to the Quarter)

### 1. Major Resource Upgrade

During the December quarter Ironbark reported an updated resource estimate (Table 1) for the 100% owned Citronen zinc-lead project in Greenland based on results from 2008 exploration drilling. Results released during the season reinforced the company's view that Citronen is a world class zinc and lead deposit with strong development potential.

#### CONTAINED ZINC AND LEAD RESOURCE HOSTS IN EXCESS OF 10.5 BILLION POUNDS OF METAL

Ordinary	Krigin	g (OK	) >2 % Zn c	utoff					
Indicated			Inferred			Total*			
Million	Zinc	Lead	Million	Zinc	Lead	Million	Zinc	Lead	
Tonnes	(Zn)	(PB)	Tonnes	(Zn)	(PB)	Tonnes	(Zn)	(PB)	Zinc + Lead
(Mt)	%	%	(Mt)	%	%	(Mt)	%	%	(Zn + Pb) %
50.2	4.5	0.5	51.6	3.8	0.6	101.7	4.1	0.6	4.7
Inverse Distance Squared (ID2) >5 %				Zn cut	off				
Indicated			Inferred			Total**			
Million	Zinc	Lead	Million	Zinc	Lead	Million	Zinc	Lead	
Tonnes	(Zn)	(PB)	Tonnes	(Zn)	(PB)	Tonnes	(Zn)	(PB)	Zinc + Lead
(Mt)	%	%	(Mt)	%	%	(Mt)	%	%	(Zn + Pb) %
14.3	7.8	0.8	8.2	7.1	0.7	22.6	7.5	0.7	8.2

#### Table 1

(\*) Equivalent of 10.5 billion lb of zinc + lead, Resources is Inferred and Indicated, Ordinary Kriging interpolation.

(\*\*) Equivalent of 4.1 billion lb zinc + lead. Resources is Inferred and Indicated, Inverse Distance Squared interpolation.

Since acquisition in early 2007, Ironbark has conducted two field seasons of exploration with a major drilling campaign undertaken in 2008, with the total contained resources for the project has now increased by 230% from 3.2 billion to 10.5 billion lb contained zinc + lead at a JORC level.

There is also a 25% increase in resources in the Indicated category as compared to 2007. This is primarily based on successful drilling at the Beach Zone and Discovery Zone deposits.

This increase in resources at Citronen was based on drilling of over 11,000m of diamond core within 43 drill holes during the 2008 field season taking drilling at Citronen to date to over 44,000m since discovery in 1993 (Figure 1).

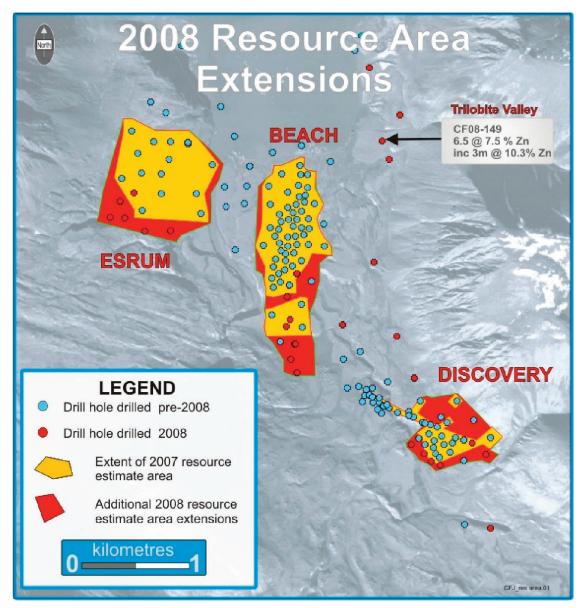


Figure 1: Plan view of Citronen showing drill collars, 2007 and additional, 2008 resource areas.

Wireframes constraining mineralisation were based on a minimum down-hole width of 2m grading >2% zinc and a higher grade resource model was constructed using wireframes constructed around minimum downhole width of 2m >5% zinc. Mineralisation envelopes were projected half drillhole spacing at edges of the deposit when mineralisation was open (Figure 2).

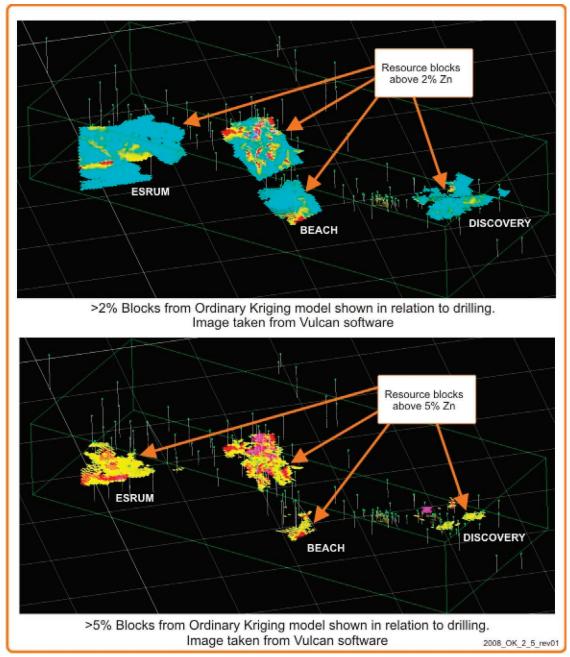


Figure 2: Resource blocks shown in Vulcan 3D software along with drilling. White grid lines are 1,000m spaced for scale. Image is elevated from south west.

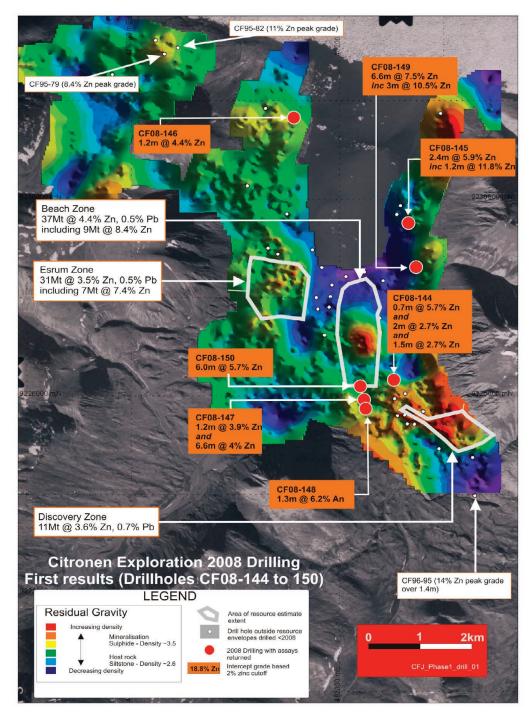
A table of resources calculated by Ordinary Kriging (OK) and Inverse Distance Squared (ID2) and Inverse Distance Cubed (ID3) methodology for a higher-grade core and quoting resources in both Indicated and Inferred categories is shown at various geologically modelled parameters (2% and 5% zinc zones) in the appendices.

The quoted estimates are based upon results from 181 diamond drill holes totalling 44,228m of diamond core drilled at Citronen to date. Resource modelling involved the use of extensive geological mapping and understanding which has identified new areas to the south west of Esrum which may represent the core of a sulphide mound (ASX release October 2008: Exploration Summary).

The 2008 exploration programme resulted in an additional 1,107 half diamond drill core samples being submitted for multi-element analysis using XRF method at ALS Laboratories in Vancouver, Canada. The Citronen drill database now contains 5,263 half diamond drill core sample assays.

Ironbark is confident in increasing resources with further drilling around the already identified Esrum, Beach and Discovery zones and is excited by mineralisation located in newly drilled resource areas such as Trilobite Valley, in which drilling targeting geophysical and rock chip anomalies intersected 6.5m@ 7.5% zinc including 3m @ 10.3% zinc in CF08-149. This highlights the projects exploration potential as it was 1,000m away from previous drilling.

Ironbark has identified several extensional and new drill targets earmarked for further exploration (ASX release 28 October 2008: Exploration Summary) which it is confident will allow continued increases in total and high-grade resources to further enhance ongoing feasibility work (Figure 3).



#### Figure 3: Drill prospects and resources over magnetic intensity image

Figure 3: Conceptual schematic cross section through the Esrum Zone showing the model for sulphide mound generation and drilling locations. Drilling prior to 2008 is highlighted. Cross section C-D location is shown in plan view on Figure 1.

## 2. Key Items of the Process Plant and associated infrastructure Designed and Costed

Ironbark released a summary of the key components from the Pre-Feasibility Study (PFS) for the Citronen zinc-lead project in Greenland subsequent to the quarter.

The PFS has been co-ordinated by Ausenco Minerals (Ausenco) based in Perth, Western Australia, in conjunction with numerous specialist consultants including;

- SRK Consulting (SRK) for mining
- Golders Associates (UK) Ltd (Golders) for the tailings storage facility
- Westmar Engineering Consultants (Westmar) for port design
- AMF Project Services (AMF) for logistics
- PTI Group Incorporated (PTI) for the accommodation village
- MT Hojgaard (MTH) for infrastructure review

The PFS is based on the development of a 3,000,000 tpa zinc-lead mining operation, processing plant, port design and associated infrastructure at Citronen, based on the previously released 2007 resource.

The recently announced resource upgrade provides a significantly larger high grade resource grading 7.5% zinc and 0.7% lead. The mining study will be re-evaluated to encompass this increased resource grade.

Process testwork on Citronen indicates that the ore upgrades well, producing a concentrate grade at 50% zinc averaging 85% recovery across all resource zones with low levels of penalty elements. This recovery is expected to improve when locked cycle testing is performed as additional sample becomes available.

The proposed process plant uses conventional flotation technology comprising crushing and grinding, pre-flotation to remove carbonaceous material, lead flotation and zinc flotation. The plant design will be in modular form and constructed off site to allow shipping in the summer months, in a similar manner as Tech Cominco's Red Dog mine, the largest zinc mine in the world which is currently operating in a similar environment.

Two base line environmental studies have been completed, with samples now collected for the third study to be completed. Three base line studies are mandatory before an exploitation license can be granted by the Bureau of Minerals and Petroleum.

A detailed shipping study by Enfotec has shown that the average navigation season for the Citronen Fjord is 91 days during which the zinc and lead concentrate would be shipped and the processing plant resupplied.

Key initial capital cost items are:

Mining	\$56,268,625
Process Plant	\$180,524,519
Tailings Storage Facility	\$11,614,845
Key Infrastructure	\$204,704,339

#### Table 1: Key Capital Cost Items (USD)

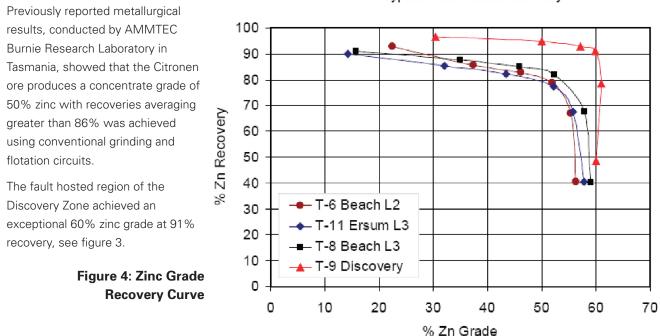
Predicted direct operating costs, using the recently announced increased resource as ore feed and current fuel prices is USD0.41/lb zinc payable (dated 20 January 2009).

#### **MINING**

The current resource is situated in three zones: Beach, Esrum and Discovery. Mining is geared at supplying 3,000,000 tpa of ore to the processing plant, consisting of 2,500,000 tpa from room and pillar underground methods (at the Beach and Esrum zones) and 500,000 tpa from ore cut methods (at the Discovery zone). Only established, well proven technologies and methods have been employed.

The recent resource estimate (November 2008) has provided Ironbark with the option to extract significantly more high grade ore (> 8% lead+zinc) than the 2007 resource. The focus on higher grade ore is a normal part of optimising mining and essential in a falling commodity environment. To this end a large amount of the SRK mining study based on the 2007 resource is now obsolete through exploration success. Ironbark aims to deliver a new mining study that includes high grade ore from the Beach zone that was not available during the recent work.

#### **METALLURGY**



Ore Types: Zinc Grade/Recovery

These results are expected to be further improved when locked cycle testing is conducted on larger sample amounts obtained from the 2008 field season, and reagent regimes are further optimised.

#### **PROCESS PLANT**

The process plant design was designed to implement the results of the metallurgical testwork and Ausenco's extensive experience with other similar lead/zinc projects. The process plant design is based on a metallurgical flowsheet with unit operations that are well proven in the base metals flotation industry. The key criteria for equipment selection have been suitability for duty, reliability and ease of maintenance. The plant layout provides ease of access to all equipment for operating and maintenance requirements, whilst maintaining a compact footprint.

The plant has been designed to:

- Process 3,000,000 tpa of ore
- Operate for a total of 8000 hrs per year (>90% availability)
- Include standby equipment in the critical areas within the circuit
- Be sufficiently automated to minimise the need for operator interface on a continuous basis; and
- Enclose all processing facilities within heated buildings to permit continuous operation and periodic maintenance within a typical arctic environment

The plant design consists of crushing and grinding through SAG and Ball Mills, pre-flotation to remove carbonaceous material, lead flotation, zinc flotation, concentrate treatment and tailings disposal.

The plant will be designed in modular form, constructed offsite and shipped in during the summer months, as accomplished at Teck Cominco's Arctic Red Dog mine in Northern Alaska.

The operation is expected to employ a total of 385 people on site and a further 11 people off site. Ironbark would seek to employ a high percentage on Greenland Nationals and would become a major Greenland employer.

Ironbark will be investigating the potential for a Dense Media Separation circuit (DMS) to pre concentrate the ore feed. This process is widely used on similar ore bodies and has the potential to substantially reduce the scale of the processing plant and related costs, reduce operating costs and extend the mine life while maintaining the same zinclead production rate.

#### **INFRASTRUCTURE**

The location of the ore body is such that there is no regional infrastructure available to support the Citronen Project, and will therefore have to be provided by the project.

Shipping access to the site is possible only during the northern summer months so infrastructure must be capable of storing 9 months of consumables and inventory on site.

Key items of infrastructure are:

- Power supply a 28 MW diesel fired power station consisting of four 7 MW generators,
- Fuel storage 50 ML of total fuel storage
- Accommodation a fully self contained, 250 person camp utilising a duel share basis. The camp is multi story, modular and will include messing and recreational facilities
- Airstrip for FIFO staff rotations
- Port for the shipping of concentrate and incoming consumables including fuel and reagents.
- Concentrate storage a concentrate storage shed will be constructed to contain 280,000 t of concentrate.
- Water storage will be developed to meet the water usage requirements of the project
- Heating heat recovery from the power generation area, supplemented by stand alone boilers
- Sewage a specialised sewage treatment plant for arctic conditions
- Waste disposal the standard arctic practice is to incinerate waste which will be used

#### LAYOUT

A draft layout of the facility is shown in figure 5:

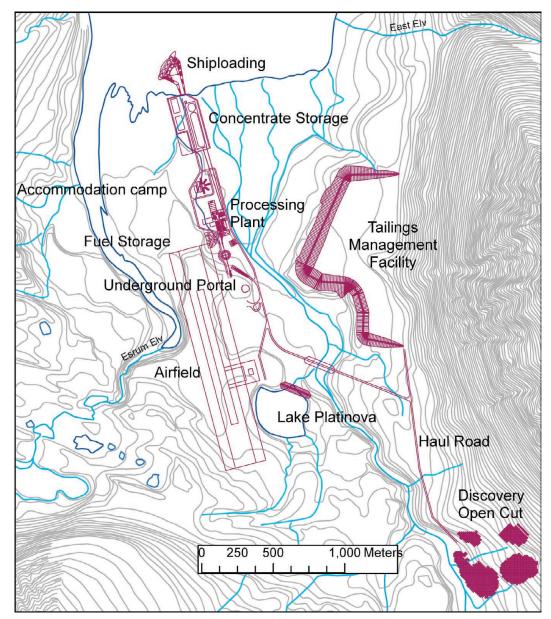


Figure 5: Draft Layout

#### **ENVIRONMENT**

Three environmental surveys were conducted in the mid 1990's. The region is classified as an Arctic Desert, and has less than 5% continuous plant ground cover (which consists primarily of lichens). The majority of birds are migratory, and there are only a few higher animal species in the area (wolves, arctic foxes). There are no resident sea-going mammals in the area.

The local rivers are fed by ice melt, and so only flow for 3 months per year. Annual precipitation is estimated to be a very low 100 to 200 mm and mainly falls as snow.

Two Environmental Baseline studies have been completed, the first in 1994 and the second in 1997. Samples were collected during the 2007 field season to allow a third study to be completed, though work on this has not been completed at this time.

#### **SITE ACCESS / SHIPPING**

A detailed study was conducted into historical ice conditions and the shipping access to Frederick E. Hyde and Citronen Fjord by Enfotec Technical Services, Montreal Canada (Enfotec). Enfotec previously had examined the shipping access from 1978 through to 1998, and were commissioned to update the report to include the years up until 2007, and focus on access to the Citronen Fjord. The study determined that in order to achieve a reliable shipping season each year, a vessel constructed to high ice capabilities, such as POLAR 30/PC 1 construction standards. For the duration of the survey, the average navigation season for this class of vessel was 91 days.

#### **CAPITAL COSTS**

The key capital cost items are shown in the following tables. The overall capital costs are presented in US dollars and

have a base at second quarter 2008, an accuracy of +/- 25% , and are based on the 2007 resource.

These costs were calculated in mid 2008. Ironbark notes expectation for capital costs have eased as evidenced by a large (greater than 35%) decrease in steel prices being seen currently.

The costs have been split into mining, processing plant and tailings storage and key infrastructure (Tables 3 and 4).

Replacement capital is estimated at USD \$21M over the life of the mine, and equipment additional equipment purchases at USD \$54M.

MINING	
Open Pit	\$1,560,000
Capital Development Portal Boxcut Excavation	\$71,971
Capital Development Horizontal	\$14,984,941
Capital Development Vertical	\$2,672,777
Mobile Equipment Development and/or Production	\$30,807,800
Mobile Equipment Service	\$3,280,750
Mobile Equipment Light Vehicles	\$381,780
Fixed Primary Ventilation Equipment	\$1,694,790
Fixed Plant Other	\$670,968
Plant Magazines	\$142,848
Sub Total Mining	\$56,268,625

#### Table 3: Mining (USD)

PROCESS PLANT	
General	\$16,318,537
Crushing	\$14,609,859
Grinding	\$36,528,067
Pb Flotation	\$16,829,609
Zn Flotation and Regrind	\$39,985,110
Concentrate Thickening, Filtration and Handling	\$18,734,013
Tailings	\$9,465,994
Reagents	\$5,859,993
Services	\$22,193,337
Total Processing Plant	\$180,524,519
Tailings Storage Facility	
Tailings Storage	\$6,968,907*
Tailings Delivery System	\$3,369,990
Decant System	\$1,275,948
Total Tailings Storage Facility	\$11,614,845

Table 4: Process Plant and Tailings Storage Facility (USD)

\* The tailings storage facility will be partially constructed using overburden from the open cut mining at the discovery zone and proportional costs have been applied to mine development

MT Hojgaard (MTH), based in Denmark has reviewed the infrastructure costs and made some suggested reductions in capital cost for the key infrastructure items. MTH has recently completed a number of projects in Greenland, including the Olivine Mine at Fiskerfjorden where they established and operated an open pit mine, including the necessary infrastructure required, and is involved with the Feasibility Study for the large Malmbjerg molybdenum deposit on the east coast of Greenland. MTH are also involved in many runways and ports around the world.

The reviewed capital costs produced by MTH have been highlighted below, and may not be to the same level of accuracy as the costs produced by Ausenco. Proposed changes suggested by MTH result in total savings of USD \$82.6M (Table 5).

KEY INFRASTRUCTURE	
Mining General	\$4,319,000
Miscellaneous Buildings	\$11,308,000
Power Supply	\$42,454,351
Heating	\$15,258,145
Fuel Storage	\$13,104,119*
Reagents Storage	\$1,408,000
Water Supply	\$4,061,737
Effluent and Waste Disposal	\$2,778,278
Airstrips	\$3,605,525
Roads	\$3,470,557
Aggregate Plant	\$5,241,154
Clinker Handling	\$8,667,973
Port - General	\$5,000,000
Port - Upland Site Preparation	\$7,424,000
Port - Storage and Stockpile	\$33,700,000*
Port - Reclaim and Shiploading	\$14,000,000*
Port - Wharf	\$14,903,500*
Accommodation	\$14,000,000*
Total Key Infrastructure	\$204,704,339

#### **OPERATING COST**

The direct costs are shown in table 6. This cost is has been calculated based on the recent reduced fuel price (USD 504/t MGO ex Rotterdam, 09/1/09) and free backloading of fuel and reagents to site, based on concentrate sales bearing the full shipping cost. These costs have been estimated on a 7.5% zinc and 0.7% lead head grade, as supported by the 2008 resource model. Further work is required to bring the 2008 resource model into an updated mining study.

#### Table 5: Key Infrastructure (USD)

\* Costs adjusted by MTH

	USD/Ib Zinc
Ore Mining	\$0.14
Other Mining Activities	\$0.05
Power (surface)	\$0.06
Reagents	\$0.07
Other Processing Costs	\$0.08
Admin & Others	\$0.02
Mining, Milling, Admin total	\$0.41

#### Table 6: Direct Costs per Payable Pound Zinc

At this head grade, the first six years of production would yield approximately 2 .5 billion lbs of zinc metal and would be a globally significant operation.