



## ASX Shareholder Report

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Terramin is a dedicated  
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focused on developing  
zinc mines close to  
infrastructure.

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## Positive DFS for Tala Hamza Project

Terramin Australia (ASX: TZN) is pleased to announce key results of the Definitive Feasibility Study (DFS) for the Tala Hamza zinc and lead project located near Bejaia in northern Algeria. The Study was prepared for WMZ Spa, a joint venture company comprising Entreprise Nationale des Produits Miniers Non-Ferreux et des Substances Utiles Spa (ENOF) (32.5%), Office National de Recherche Géologique et Minière (ORGM) (2.5%) and Terramin (65%).

Subject to the key assumptions used in the study, which include favourable input tax treatment, the DFS confirms the feasibility of Tala Hamza as the world's first block-cave zinc mine providing the advantage of very low mining costs. When in production it will most likely rank in the top six zinc and lead mines in the world.

Key highlights:

- **Long life mine:** Increased Probable Ore Reserve of 38.1 million tonnes @ 4.78% Zn and 1.36% Pb will support a 4Mtpa block cave mine over an initial 12 year mine life.
- **No Sterilisation:** There will be no sterilisation of any of the 69 million tonne Measured, Indicated and Inferred Resource, allowing future mine extensions of the active footprint or in new panels as metal prices change.
- **Low operating costs:** Mining costs of US\$2.97/t and processing costs of US\$9.62/t are very low in a world context, and substantially lower than the 2009 pre-feasibility estimate. Expected C1 costs of US\$32c/lb of payable zinc place the mine in the lowest cost quartile of zinc production.
- **Capital cost:** The pre-production capital for the 4 Mtpa project is US\$579 million, consistent with the pre-feasibility study (PFS) estimate of US\$285 million for a 2 Mtpa operation (see Table 1). The capital includes a significant proportion of the underground development required for the block cave mine, with the benefit of providing for very low operating costs. Capital intensity of US\$3,537/t/y is 23% below the average for 24 proposed zinc projects.

- **Attractive local infrastructure:** The nearby major port city of Bejaia (Figure 1) provides key infrastructure required for the project e.g. international airport, concentrate shipping berth, power supply and accommodation. Only a short access road is required to link the surface infrastructure with the existing local facilities.
- **High quality products:** Low iron and impurities in the zinc concentrates (zinc grade 53%) are attractive for the European smelters. The lead concentrates are also of high quality.
- **Favourable market location:** The mine is well located to supply the European zinc and lead smelters.
- **Project finance available:** A letter of intent from a major Algerian bank at the conclusion of the PFS indicates it would finance 70% of the capital over 15 years, and co-fund from project commencement.

The DFS, led by Terramin with major consultants Golder Associates Pty Ltd and Bateman Engineering, has confirmed the technical feasibility of the Tala Hamza project. The block cave mining method chosen for the project is favoured for long-life operations in many countries because of the low operating costs. Conventional processing techniques will produce an annual average of 370,000 tonnes of high quality zinc and lead concentrates. The production rate of 4Mtpa allows more of the deposit to be economically mined than a mine with a 2Mtpa throughput, leading to 45% more metal production over a similar mine life to the PFS (see Table 1).

Terramin Australia's Executive Chairman, Dr Kevin Moriarty said, "This is a good result for a project that has grown in magnitude and required us to deploy the best available technical expertise to realise its potential. It is very competitive compared to many other proposed and operational projects. It will be the largest new mine at a time when zinc supply is falling because of mine closures. No projects in the pipeline have the infrastructure advantages of Tala Hamza, and the result is very low capital and operating cost for the scale of production."

He added, "We think there is plenty of scope to get into production faster. The development rates assumed in the study look quite conservative and we think that efficient management should see considerable improvement. The use of road-headers may also substantially shorten the development time and this will be further evaluated in the lead up to project implementation."

Dr Moriarty also indicated that Terramin would provide more information on the project economics before a decision to mine by WMZ, expected early 2011. Items of influence on the economics to be resolved include VAT, customs duties and land acquisition costs.

## Permitting Process

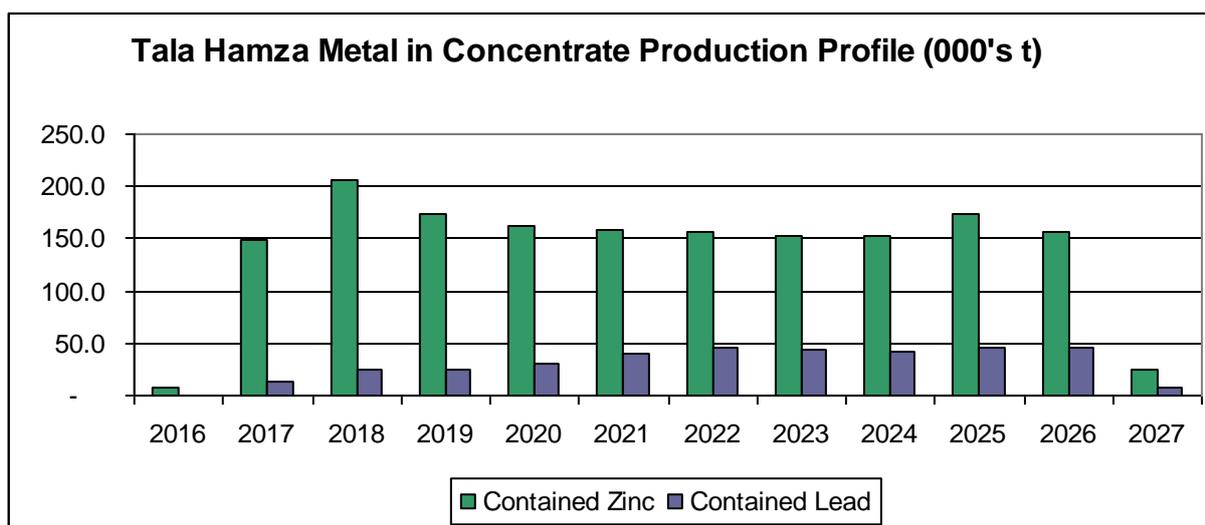
The DFS and Environmental Impact Statement (EIS) have been provided to the Algerian joint venture partners. The partners have commenced their due diligence process by engaging an international consultant to review the EIS and DFS. The work is expected to take a minimum of three months. Concurrently WMZ will consult with the Government on appropriate administrative and fiscal support. Upon successful outcomes of these reviews and consultations, the boards of Terramin and WMZ will make a decision to mine and submit the required documentation for the Mining Lease Application (MLA). The maximum statutory period for the issue of a Mining Lease is five months after the submission of the MLA, but the review process may help shorten this.

**Table 1:** Comparison of Pre-feasibility Study (PFS) and Definitive Feasibility Study outcomes

Study	Pre-Production Capex US\$m's	Total Tonnes Mined Mt	Zinc & Lead Metal in Conc Mt	Tonnes Treated Mtpa	Unit Op Costs US\$/t	C1 Cash Cost US cents/lb Payable Zinc
PFS (Block Cave)	285	25	1.41	2.0	25.3	41.5
DFS	579	40	2.04	4.0	19.6	32.2



**Figure 1:** Location of Tala Hamza deposit and major mine infrastructure at Bejaia, Algeria.



**Figure 2:** Expected production profile of contained metal in concentrates for the Tala Hamza project.

## KEY PROJECT OUTCOMES

The following is a summary of the key project fundamentals:

Material Mined	39.9Mt of ore is contained in the block cave design of which 38.1Mt is in the Probable Reserve. It is anticipated that if the deposit is extended to the south at depth then additional material could be included in the block cave.
Grades	LOM average 4.71% zinc and 1.33% lead for the Material Mined. The Probable Reserve portion has a grade of 4.78% Zn and 1.36% Pb.
Resource	68.6Mt (Measured, Indicated and Inferred) at 4.6% zinc and 1.2% lead at a cut off of 2.5% zinc equivalent.
Pre-production Capital Cost	US\$579M (US\$191m mining, US\$222m direct processing and surface infrastructure, US\$166m indirect, owners and contingency costs). All costs assume VAT and custom duty exemption.
Cash Costs	C1 cash costs of US32.2 cents/lb payable zinc after lead credits
Mining Method	Block cave mining with stepped extraction levels to take account of the orebody dip.
Concentrate	Average annual production of 310,000 tonnes of zinc concentrate and 60,000 tonnes of lead concentrate containing 164,000 tonnes zinc and 36,000 tonnes of lead respectively. Peak production of 380,000 tonnes of zinc concentrate occurs in the second year of production.
Metal production	1.68 million tonnes of zinc and 0.37 million tonnes of lead over the life of mine (LOM).

Construction Time	A period of 57 months is required to construct the project until first concentrate production is achieved. The long lead time is due to the extensive underground development to access to the cave and the extraction level development.
Ramp up	Production will commence at 3.5Mtpa and ramp up to 4Mtpa over a 15 month period.
Funding	When a decision to mine is taken Terramin's partners will participate in the project funding on a prorata basis.
Employment	The project will employ 620 people at production start-up, including 568 Algerian nationals.

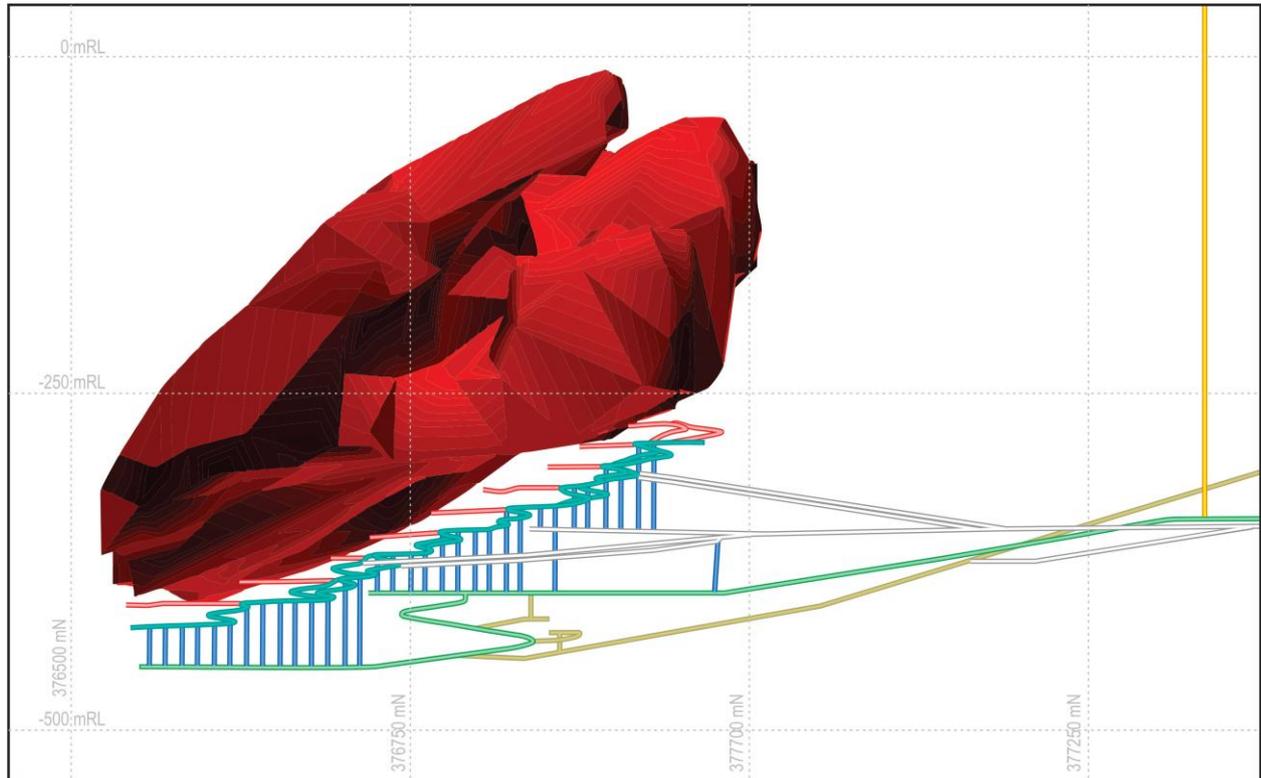
## MINING

Key technical aspects of the mine are:

- **Mining Method:** Block cave with stepped undercut and extraction levels (see Figure 3). Mining will commence in the up dip section of the orebody and progressively move down dip over the life of the mine. The mining method will allow a seamless extension of the block cave into the open southerly down dip potential of the deposit. The mine design encompasses a total of 709 drawpoints accessing 364 drawbells.
- **Waste Extraction:** The stepped undercut and extraction levels are placed below the orebody in order to benefit from improving rock conditions anticipated in the footwall. Therefore waste will be produced from each drawpoint prior to ore and an average of 630,000 tpy will be removed out of the mine.
- **Orebody Access:** The orebody will be accessed by two declines commencing close to the processing plant. A straight decline (3.5km) with a gradient of 1:5.8 will house an ore conveyor, while the second decline at 1:7 gradient will be used for vehicle access including waste rock haulage. A shaft near the orebody but outside the projected cave subsidence zone will augment ventilation.
- **Annual Production:** First full year production will comprise 3.5Mtpa ore and 0.8Mt of waste material, rising to 4Mtpa ore design rate in the second year and beyond.
- **Haulage:** Ore from cave draw points will be transferred by load haul dump equipment to the underground crusher, then by conveyor to the processing plant.

The decline and pre-production development typical for block cave mines results in a 57 month lead time before first ore production. The potential to introduce road-headers or more efficient conventional techniques may bring forward the development schedule significantly. In any case this early development provides for the key benefit of very low LOM mining costs of US\$2.97/t, competing well with open pit mines.

The stepped development will favour extensions in a down dip direction where recent drilling showed the deposit is open. The main cave can be extended continuously without significant access investment.



**Figure 3:** Section looking west showing the Measured and Indicated Resource with the undercut and extraction level development stepping down to the south to follow the footwall contact.

## PROCESSING

Construction of the 4.0Mtpa processing plant will commence after the start of underground development. The plant comprises conventional SAG, ball mill, fine grind and flotation circuits:

- **Crushing and Ore Storage:**  
Ore will be crushed underground and then conveyed via decline to a surface stockpile;  
Three apron feeders will remove ore from the stockpile and transfer by conveyors to the grinding section.
- **Grinding:**  
Crushed ore is fed to the 6.1m diameter, 5MW SAG mill; then  
Two 5.5m diameter, 5MW ball mills, product 80% passing 53 $\mu$ m.
- **Flotation and Fine Grinding:**  
Lead rougher float through a single bank of cells;  
A densifying classifier followed by a lead regrind mill with 80% passing 10 $\mu$ m;  
Three stage cleaning;

Tails to the zinc rougher circuit;

Zinc float cleaning circuit;

Zinc regrind mill with 80% passing 14µm;

Lead and zinc concentrate thickeners.

- Concentrate Dewatering:

Concentrate pumped to lead and zinc filters;

Horizontal lead and zinc horizontal kiln dryers.

- Tailings Disposal:

Detoxification circuit by injection of peroxide;

A tailing thickener and tails pumping to the Tailings Storage facility.

- Recovery and Grade:

Zinc concentrate grading 53% Zn (with 89% recovery);

Lead concentrate grading 61% Pb (69% recovery).

## INFRASTRUCTURE

Site infrastructure includes the decline portal, crushed ore stockpile, mill circuit, concentrator, dewatering plant and offices situated close to the tailings storage facility (TSF). Power supplies for the mine will be sourced from the local power grid (linked by high voltage line). The concentrate product will be trucked from the onsite storage facility to the port facility about 9 kilometres from the concentrate loading site. All workers will be housed in the local Bejaia community and will commute daily to the mine site. Water will be sourced from the mine and other local underground aquifers.

## CAPITAL COSTS

Table 2 sets out the key components of the pre-production capital costs and contingencies. A total of \$34.4 million is included in owner's costs for land acquisition, however these costs are considered excessive for the locality and quality of the land and will be the subject of further investigation. Additionally the Mining Act allows for government leaseback of land in such circumstances.

**Table 2:** Pre-Production Capital Costs

Facility/Element	US\$M
Mine	191.0
Process Plant	116.7
Tailings (TSF)	40.1
Infrastructure, Services & Reagents	72.7
EPCM Services	33.4
Owners Costs & Other	82.6
Contingency	42.6
<b>Total</b>	<b>579.1</b>

**OPERATING COSTS****Table 3:** The table shows key components of the C1 cash costs and direct cash operating costs

Production Costs	US cents/lb Payable Zinc	Operating Cost by Facility	US\$/t Ore
Mining	3.8	Mining	3.0
Processing	12.2	Processing	9.6
Administration	3.1	Other Production Costs	1.5
<b>Realisation Costs</b>		Other Non Production Costs	4.6
Transport & Handling	3.9	<b>Sub-Total</b>	<b>18.7</b>
Zinc Treatment Charge	23.9	Royalties	0.7
<b>Total Costs</b>	<b>46.9</b>	Other Government Charges	0.0
Net By-Product Credit	-14.8	Rehabilitation Charge	0.2
<b>Total C1 Costs</b>	<b>32.1</b>	<b>Total Cash Costs</b>	<b>19.6</b>

### Key economic and operating assumptions:

- Corporate tax rate of 33%;
- Royalty rate on ore produced 1.4%;
- Full exemption from VAT and customs duty has been assumed. The Mining Act allows for exemption from VAT for exploration goods and a majority of mining and processing capital goods and customs duty for exploration goods. Further exemptions are also possible under the Act for Promotion of Investment (2001). The DFS findings will be the basis for consultations with the government to clarify the extent of relief for the input costs to the project. The DFS shows that exemptions will be necessary to provide robust economic outcomes at low metal prices;
- Diesel fuel price based on local Algerian price currently available in the local market;
- Power price based on local quotes provided by the local power generation company;
- Long term metal price assumptions of US90c/lb for zinc and US80c/lb for lead;
- Treatment charges for zinc of US\$238/t and for lead US\$212/t.

### RESOURCES & RESERVES

The Tala Hamza deposit lies within volcanic and volcano-sedimentary rocks and occurs as a thick accumulation of Pb-Zn mineralisation of dimensions 800 m x 600 m and thickness up to 250 m. The most recent resource estimate was as at 19 November 2009 and has formed the basis of the DFS. This is summarised in Table 4. Reference should be made to Terramin's ASX release of 3 December 2009 for further details. The Measured, Indicated and Inferred Resource is inclusive of those Mineral Resources modified to produce the Ore Reserves (see Table 6).

**Table 4:** Mineral Resource at 2.5% ZnEq (ZnEq%=%Zn + 0.591\*%Pb) cut-off as at 19 Nov 2009

Category	Mt	Zn (%)	Pb (%)
Measured	30.6	5.74	1.59
Indicated	20.5	3.57	0.79
<b>Measured + Indicated</b>	<b>51.1</b>	<b>4.87</b>	<b>1.27</b>
Inferred	17.5	3.7	0.6
<b>Total</b>	<b>68.6</b>	<b>4.6</b>	<b>1.1</b>

The total tonnage available for mining by the block cave has been determined by the computer simulation tool, PCBC. This analysis uses all blocks in the model (whether classified as Measured, Indicated or Inferred). Because the derived tonnage contains some Inferred Resource, not all of it can be classified as Reserve. The total tonnage delivered to the processing plant is termed, in the DFS, "Material Mined".

The assumptions used to estimate the cut-off grade were the same as used by PCBC for the footprint analysis and production schedule. Estimates of costs were taken from the PFS and metal prices (Zn US\$0.80/lb and Pb US\$0.60/lb) and mineral processing recoveries (Zn 88% and Pb 68%) were as assumed by Terramin as at February 2010. The cut-off grade was estimated to be 2.5% ZnEq ( $\text{ZnEq\%} = \text{\%Zn} + 0.591 \times \text{\%Pb}$ ).

A total of 46.8 Mt of material is extracted from the cave. Material in the wedge zone between the footwall and the undercut level (see Fig 3), with a zinc equivalent of less than 2.5%, is classed as waste and is transported separately from the mine. The waste removal totals 6.9 Mt, leaving 39.9Mt delivered to the processing plant as Material Mined (see Table 5).

**Table 5:** Material extracted from Tala Hamza block cave

Category	Mt	Zn %	Pb %
<b><i>Material extracted from Cave</i></b>			
Measured Resource	24.96	6.02	1.72
Indicated Resource	7.26	4.02	1.13
Dilution (Meas, Ind, Inf / unclassified)	7.68	1.11	0.26
<b>Material Mined</b>	<b>39.90</b>	<b>4.71</b>	<b>1.33</b>
<b>Total waste separated</b>	<b>6.92</b>	<b>0.91</b>	<b>0.19</b>
<b><i>Total material extracted</i></b>	<b>46.83</b>		

Only that portion of the Material Mined that has drill confidence levels placing it in the Measured and Indicated Resource categories is permitted under JORC guidelines to be included as Ore Reserve. Further, only dilution material which has a drill confidence level of Measured or Indicated (whether it is in the Resource or not) is included in the Reserve. Out of the Material Mined, 1.8 Mt comprises dilution, categorised as Inferred or unclassified by drill confidence (note that all Inferred Resource within the cave is considered as dilution). Exclusion of this material gives a Probable Reserve of 38.1 Mt at 4.78% Zn and 1.36% Pb (see Table 6). A total of 95.5% of the Material Mined is classified as Probable Reserve.

**Table 6:** Material extracted from Tala Hamza block cave

Category	Mt	Zn %	Pb %
Measured Resource	24.96	6.02	1.72
Indicated Resource	7.26	4.02	1.13
Dilution of measured and indicated confidence but outside resource shape	5.87	0.46	0.07
Dilution from Inferred Resource or unclassified	1.8	3.22	0.87
<b>Total Material Mined</b>	<b>39.9</b>	<b>4.71</b>	<b>1.33</b>
<b>Probable Ore Reserve (Material Mined less Dilution from inferred or unclassified)</b>	<b>38.1</b>	<b>4.78</b>	<b>1.36</b>

The Ore Reserve is all classified as Probable. This classification is applied despite the majority of the underlying resource being classified as Measured. This reduction in confidence category conforms to standard industry practice in relation to the categorisation of block cave reserves. Because of the many assumptions applied in the PCBC modelling approach and the fact that they cannot be tested until the mine is in production, coupled with uncertainties in the geotechnical model below the footprint, this category is considered appropriate.

This revised Probable Ore Reserve represents a significant increase over the previous Probable Ore Reserve estimate of 24.1Mt @ 5.89%Zn, 1.67%Pb (reported on 8 April 2009). The 58% tonnage increase is a result of the considerably expanded Measured and Indicated Resource and the change from sub level cave to block cave mining method.

The total Material Mined estimated by PCBC optimises the ore extraction from the known resource under the assumptions used in the DFS. Additional material in the Indicated and Inferred categories could be added to the Material Mined should there be an increase in metal prices and hence a lower cut off grade. Additional drilling would however be required to increase confidence in the Inferred material. Further, the deposit is not closed off to the east and south, allowing the potential expansion of the footprint in this direction to increase the tonnes and the life of the Mine.

The majority of the remaining Inferred and Indicated Resources lie to the edge of the current cave design. The shape of the footwall causes an increasing thickness in the wedge of waste that needs to be caved to reach the mineralisation on the current footprint, making it uneconomic to mine at this time. Exploitation of this material with additional portions of footprint adjacent to the main cave at a higher elevation may become viable in the future if there are changes in the metal price or other project economics.

During the life of the operation the shut off grade that determines when a drawpoint is closed down may vary due to fluctuations in metal prices, or other economic inputs. This may allow more material to be recovered from the existing footprint. During the development phase and on an ongoing basis during production, cut off grades and project economics will be continually reassessed to ensure maximum value is achieved.

## DEVELOPMENT TIMETABLE

The development timetable determined for the DFS was based on using conventional mining techniques for all the underground development along with development rates of 150 metres per month in the declines. Terramin believes that there is scope to significantly reduce development time by increasing the advance rates through efficient techniques, or through non explosive technology such as road headers.

## PROJECT FINANCING

Terramin has already had discussions with several banks regarding financing of the project. Previous discussions with a local Algerian bank after the conclusion of the PFS indicated that it was prepared to finance the project. The indicative terms offered by the Algerian bank included financing up to 70% of the projected capital cost for a term of up to 15 years. The bank also indicated it will co-fund the capital with WMZ, allowing WMZ shareholder contributions to be spread over the whole development process. These discussions will resume after the completion of the review of the DFS by our partners. Once the decision to mine is taken by WMZ our partners are required to fund their share of the development costs on a prorata basis.

Based on current spot prices, it is anticipated that Terramin's Angas Zinc Mine will generate approximately \$100 million of cash flow over the period from 2012 to 2014, a period closely aligned with the peak capital requirements for the Tala Hamza project. Most analysts forecast higher zinc prices in this period and, if so, Angas revenues could underpin Tala Hamza capital requirements.

*The information in this report that relates to Exploration Results and Mineral Resources is based on information compiled by Mr Robert Singer. The information that relates to Ore Reserves is based on information compiled by Dr David Allison. Mr Singer is a Member of The Australasian Institute of Mining and Metallurgy and Dr Allison is a Member of the Institute on Materials, Minerals and Mining. Mr Singer is Chief Geologist of Terramin Australia and Dr Allison is Senior Mining Engineer at Golder Associates (UK) Ltd. Both have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Singer and Dr Allison consent to the inclusion in the report of the matters based on his information in the form and context in which it appear.*