Our reference: EF13/5467
Contact: Brad Tanswell, 02 68 835 330

Mr Howard Reed
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: Elle Donnelley

Dear Mr Reed,

I refer to the Project Application, Environmental Assessment (EA) and accompanying information provided for the proposed Dubbo Zirconia Project (ref SSD 5221) received by the Environment Protection Authority (EPA) on 18 September 2013.

The EPA has reviewed the information in the EA and has determined that it is able to support the proposal subject to the proponent addressing the information requirements outlined below and in **Attachment A**. **Attachment A** also contains the EPA's assessment of the proposal, including justification for the proposed recommended conditions of approval provided at **Attachment B**.

Following its review of the information in the EA, the EPA notes additional information is required for the EPA to adequately assess impacts of the project on air, water, hazardous materials and miscellaneous matters. The additional information requirements are summarised below and are discussed in detail in **Attachment A**.

Air
Further information is required regarding measures to protect air amenity, including a revised Air Quality Impact Assessment.

Water
Further information/clarification is required regarding the proposed impacts upon and measures to protect surface water and groundwater from pollution.

Hazardous Materials
Clarification is required as to whether products to be produced by mining have been the subject of appropriate testing against the criteria in the Australian Dangerous Goods Code for classification as Dangerous Goods.

It should be noted adoption of the recommendations regarding the need for additional information are integral to the EPA's ongoing support for the proposal.

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The EPA recommends that the proponent be required to provide the additional information specified above and that the EPA is provided with a further opportunity to review this new information before the project proceeds to the determination stage.

It is also expected that the EPA will be given an opportunity to review the draft Director-General's Environmental Assessment report for this proposal prior to finalisation.

If the Department of Planning and Infrastructure (DoPI) determines the project application by granting consent, the EPA recommends that the conditions of approval provided at **Attachment B** are incorporated into the consent.

The EPA would also appreciate receiving a copy of the submissions received by DoPI (or a report summarising these submissions) in response to the exhibition of the Environmental Assessment. This is to assist the EPA to review the draft Director-General's Report and to recommend additional conditions of approval, if required.

The EPA notes that the proposal will require an environment protection licence pursuant to the *Protection of the Environment Operations Act 1997* to commence construction activities and to operate. The proponent will need to make a separate application to the EPA to obtain this licence once development project approval is granted.

If you have any questions, or wish to discuss this matter further please contact Samantha Wynn in the Dubbo EPA office by telephoning 02 6883 5330.

Yours sincerely,

18/11/13

BRAD TANSWELL
A/Head Far West Operations
Environment Protection Authority

Attachment A –Assessment and Justification
Attachment B – Recommended Conditions of Consent

ATTACHMENT A

Assessment of the Proposal and Request for Additional Information

AIR

The air quality assessment predicts exceedances of the EPA's impact assessment criteria for SO2, 10 minute and 1-hour averages. The exceedances are predicted at a single mine owned residence (receptor 1). The assessment does not provide details on the frequency of the predicted exceedances.

Recommendation:

1) **The proponent review and benchmark the proposed operations against best practice process design and emission control.**
2) **The proponent identify additional controls that can be implemented to ensure that there are no predicted exceedances at sensitive receptors surrounding the project site.**
3) **Following the assessment under point 2) the air quality assessment be revised to demonstrate that proposed emissions will not result in exceedances of EPA's impact assessment criteria.**
4) **The air quality assessment be revised to include a comparison of proposed emission concentrations, for all pollutants and emission points, against the requirements of *the Protection of the Environment Operations (Clean Air) Regulation 2010.***

If the proponent fulfils the requirements listed above, and the project is approved, the recommended Conditions of Approval in Attachment B should be applied to the project.

WATER

The current EIS has addressed the majority of issues raised in previous advice in regard to surface water management. Remaining issues can be addressed through the recommended conditions detailed in Attachment B, including:

- the potential for increased mobilisation of contaminants from leachate into groundwater;
- calculation of wave run-up in the LSRF;
- refinement of trigger values used to manage potential water quality and groundwater impacts; and
- more comprehensive initial monitoring of the quality of water collected in a dam that has the potential to discharge to waters.

Attachment B also includes other conditions relating more broadly to surface water and groundwater management and monitoring and includes further justification and information in relation to addressing the relevant outstanding issues.

If consent is granted by the Department of Planning and Infrastructure the EPA will be unable to issue a Scheduled Development or Scheduled Activity Licence until the issues summarised above and discussed in Attachment B are addressed.

HAZARDOUS MATERIALS

Appendix 11 of the EIS provides Material Safety Data Sheets (MSDS) for the substances to be produced by the mine. None of the substances are classified as dangerous goods. The MSDS for Zirconium Dioxide indicates the product is of minimum flammability however it also indicates it *liberates extremely flammable gas* and is *spontaneously flammable*. In addition, values for toxicity and ecological information all show *data not available*. Similarly, values for ecological information for Ferroniobium, Heavy Rare Earth Chloride Solution and Light Rare Earth Chloride Solution all show *data not available*.

Clarification is required as to whether the product has been the subject of appropriate testing against the criteria in the Australian Dangerous Goods Code for classification as class 4 or class 9 Dangerous Goods. This may have bearing on how Dangerous Goods are handled, managed and transported to ensure compliance with the Australian Dangerous Goods Code.

Additional information should also be provided to identify if any products meet the classification of UN 3077 of an *Environmentally Hazardous Substance*.

MISCELLANEOUS

Environment Protection Licensing
Page ES-10 of the EA notes that that mining and processing will occur concurrently towards the end of the establishment stage to allow for plant commissioning. The proponent should be advised that Scheduled Activities (such as mining and processing) cannot lawfully be undertaken unless an Environment Protection License permitting Scheduled Activities has been issued by the EPA.

Scale of Mining
Table 2.4 p. 2-44 indicates that the project will have an annual extraction of up to 1.6 million tonne p.a. (year 11); generating 75,000 tonne of product for a 20 year period. This is contradictory to information provided on page ES-4 which specified a maximum rate of extraction of 1 Mt p.a.

Clarification is required as to the maximum rate of extraction and that impacts have been assessed accordingly.

Appendix 6 – page A6-13 notes that borrow areas will be established on the site to provide soil for the embankment fill. Some soil will have to be taken from an *external borrow area.* External borrow areas do not appear to have been shown or discussed in the EA.

Clarification is required as to whether impacts at *external borrow area/s* have been assessed and relevant assessments and management measures documented in the EA.

ATTACHMENT B

Recommended Conditions of Consent

AIR

Stack design

All emission points at the site must be designed and constructed to achieve the minimum stack height listed in the project Environmental Impact Statement:

> *Dubbo Zirconia Project Environmental Impact Statement Development Application SSD 5251, September 2013*

All emission points must be designed to be TM-1 compliant, as defined in the *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW, 2006* (or its later version).

Odour

No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.

Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

General Dust Conditions

The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

Activities occurring in or on the premises must be carried out in a manner that will minimise the generation, or emission of dust from the premises.

Air Quality Management Plan

For all emission sources (point and fugitive) at the site the proponent must prepare an air quality management plan that includes, but is not limited to:

- Benchmark site operations against best management practice and emission control;
- Benchmark site operations against regulatory emission limit(s), as set out in the *Protection of the Environment Operations (Clean Air) Regulation, 2010;*
- Key performance indicator(s);
- Monitoring method(s);
- Location, frequency and duration of monitoring;
- Record keeping;
- Response mechanisms; and
- Compliance reporting.

The air quality management plan must be submitted to the Environment Protection Authority (EPA) in conjunction with the application for an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* for the project.

The air quality management plan must be implemented prior to the commencement of any dust generating activities at the site.

Requirement to monitor weather

The licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

Point(s) 1

Parameter	Units of measure	Frequency	Averaging Period	Sampling Method
Rainfall	mm/hour	continuous	1 hour	AM-4
Sigma theta	degrees	continuous	10 minute	AM-2 and AM-4
Siting				AM-1
Temperature at 2 metres	kelvin	continuous	10 minute	AM-4
Temperature at 10 metres	kelvin	continuous	10 minute	AM-4
Total solar radiation	watts per square metre	continuous	10 minute	AM-4
Wind Direction at 10 metres	degrees	continuous	10 minute	AM-2 and AM-4
Wind Speed at 10 metres	metres per second	continuous	10 minute	AM-2 and AM-4

Monitoring of all parameters listed in Column 1 must commence prior to earth moving activities being undertaken at the site.

WATER

Discharge criteria

The Proponent must ensure that all surface water discharges from the site comply with:

(a) Section 120 of the POEO Act;

(b) a maximum of 50 milligrams per litre of suspended solids in any discharge of water from sediment basins, and any other discharge limits (both volume and quality) that may be specified by licensing instruments issued under environment protection legislation administered by the EPA.

It is appropriate to set water quality triggers (and any associated licence limits in sediment basins) at levels that protect aquatic ecosystems, and other environmental values, consistent with ANZECC (2000). Current salinity trigger values appear to be based on general area-wide values including values from offsite/upstream areas that may be affected by dry land salinity. The hydrogeological investigation for dry land salinity, however, found that the Project site had no moderately to highly saline areas. Based on the monitoring data presented in the EIS, there appears to be sub-catchments on the site that have lower surface water salinity levels compared to other sub-catchments on-site or upstream.

At present there is no salinity data provided for the Reuse Dam/SW9 sub-catchment on which to base appropriate trigger values or licence limits for salinity in these sub-catchments.

Salinity and salinity species trigger values should be refined to reflect the source sub-catchment so that significant changes in salinity due to mining operations can be detected in each sub-catchment. For example, sites SW1/SW1b and SW2 recorded low salinity levels (95/330 and 200 µS/cm respectively). This indicates that a lower salinity trigger value would be appropriate in these sub-catchments. It is noted that SW3 has moderately elevated salinity (1970 µS/cm) compared to other sub-catchment on the project site.

No surface water data are presented for SW12, SW13 or SW14 in order to asses suitable trigger values prior to operation of the mine.

No surface water data are presented for SW8 downstream of the mine site; however, this site may be affected by elevated salinity levels in the wider catchment. Therefore the higher salinity trigger values may be appropriate for monitoring changes due to mining operations. SW5, SW7 on Wambangalang Creek have elevated salinity levels, however there is no data for SW6 which is on a separate sub-catchment.

The proponent must establish water quality trigger values appropriate to the monitoring location, including:

- ***(a) refine the salinity and salinity species trigger values for surface water monitoring based on the source sub-catchment so that significant changes in salinity due to mining operations can be detected in each sub-catchment. Trigger values for determining change should be based on detectable change away from the range of salinity values that are present in a sub-catchment prior to mining commencing. Site specific trigger values should be developed in accordance with ANZECC (2000) methodology, eg. using appropriate reference sites and monitoring as defined in the ANZECC guidelines.***
- ***(b) at all relevant monitoring locations, more clearly define the trigger values for "salinity species" currently described in the monitoring program.***
- ***(c) describe any proposed flocculant to be used in sediment basin(s) that discharge to the environment and demonstrate that flocculants selected have low toxicity (LC50 >100mg/L).***

The Proponent must prepare and implement a Water Management Plan for the project to the satisfaction of the EPA. This plan must:

- ***(a) be prepared in consultation with EPA and by a suitably qualified and experienced person(s)***
- ***(b) be submitted to the EPA's Regional Manager for approval prior to the commencement of activities***
- ***(c) address construction, operation and post closure monitoring, management and response arrangements***
- ***(d) include:***
  - ***a Site Water Balance***
  - ***a Water Reuse Management Plan***
  - ***an Erosion and Sediment Control Plan***
  - ***a Residue Storage Facility Management Plan;***
  - ***a Surface Water Monitoring Program***
  - ***a Groundwater Monitoring Program***
  - ***a Surface and Ground Water Response Plan to respond to issues identified by the Surface and Groundwater monitoring programs.***

There is conflicting information provided in the EA regarding separation of clean, dirty and contaminated water and associated management approaches. All plans must be reviewed to ensure adequate separation of clean, dirty and contaminated water.

The Site Water Balance must include, as a minimum:

- ***(a) how any water removed from the Liquid Residue Storage Facility or water management structures to return to the design freeboard will be managed.***

The Water Reuse Management Plan must include, as a minimum, the following components:

(a) Water Reuse Management Procedures that ensures salinity, sodicity and bicarbonate levels in water used on-site is fit-for-purpose and managed to prevent:

- ***cumulative impacts on soil and vegetative condition***
- ***impacts on water quality in receiving waters.***

The Residue Storage Facility Management Plan must include, as a minimum:

(a) final design of the solid residue storage;

(b) final design of the liquid residue storage facility, including:

a. detailed analysis and calculations demonstrating how the freeboard would be maintained to accommodate rainfall and runoff up to the design rainfall event, including the additional height required to account for wave run-up under windy conditions

b. detailed analysis and calculations regarding the depth of additional freeboard required for the lowest liquid residue storage facility

c. operational procedures to maintain the freeboard to accommodate rainfall and runoff up to the design rainfall event

d. a contingency plan for emergency release of water where extreme rainfall and/or flooding could threaten the integrity of the structure.

The Erosion and Sediment Control Plan must include, as a minimum:

(a) describe how soil erosion and sediment pollution will be managed following the guidelines and recommendations in Volume 1 of Managing Urban Stormwater: Soils and Construction (the Blue Book) during the construction/commencement stages;

(b) provide plan drawings showing the locations for best management practices for the site during all construction/commencement stages

(c) include written text detailing the installation, monitoring and maintenance requirements for each of the recommended best management practices for erosion and sediment control

(d) include drawings of any engineering structures such as sediment basins and clean water diversion structures, including design standards and management regimes to return the erosion and sediment control system to design capacity following rainfall events

(e) design calculations and sizing for all clean water diversion bunds and sediment basins on site

(f) consideration of the potential for increasing the size of sediment basins to maximise water reuse and reduce the reliance on 'make-up' water

(g) a commitment to construct and maintain unsealed roads consistent with 'Managing Urban Stormwater – Soils and Construction Volume 2C Unsealed Roads'

(h) a commitment to install and manage erosion and sediment control measures during construction of the water and gas pipelines consistent with 'Managing Urban Stormwater – Soils and Construction – Volume 2A Installation of Services'.

(i) include management provisions for any disturbance of soils affected by organochlorine pesticides associated with the former grain storages to minimise their potential for mobilisation into sediment basins during construction or operation.

Surface water monitoring

The reuse dam receives water from the haul roads, processing plant area, and rail container laydown area. Haul roads could potentially receive spillage from trucks that contains pollutants from the mining operation. The monitoring program only proposes pH, EC, TSS and visible oils for this dam.

Initial monitoring should be extended to include a larger suite of indicators. In addition to initial characterisation, periodic sampling of a full suite of indictors is recommended to identify the potential for risks that may emerge over time.

The Surface Water Monitoring Program must include, as a minimum, the following components.

(a) baseline monitoring of salinity and salinity species at SW12, SW13 or SW14 in order to asses suitable trigger values prior to operation of the mine

(b) ***initial monitoring of salinity in sediment basins 1, 2 and 3 and the Reuse Dam as a basis for revising trigger values and potential need for licence limits for salinity.***
(c) ***initial monitoring of the water quality collected in, and potentially discharged from, the Reuse Dam for a full suite of relevant indicators that are included for surface water assessment and additional indicators relevant to the elements being mined, e.g. based on the list of indicators used for TCLP testing, including zirconium, hafnium, niobium, tantalum, and yttrium.***
(d) ***a program for ongoing monitoring in sediment basins 1, 2 and 3 and the reuse dam of a reduced set of indicators based on initial monitoring and any indicator with elevated levels identified in the initial monitoring program of the full suite of indicators***
(e) ***trigger values for action and associated actions or mitigation measures if trigger values are exceeded.***

Groundwater monitoring
The proposed groundwater monitoring commitments are reasonable including the development of a Groundwater Management and Mitigation Plan. Proposed consent conditions include the development of a Water Management Plan (that includes groundwater management and monitoring) to be implemented to the satisfaction of the EPA.

The recommended analytical suite for quarterly groundwater monitoring is adequate. Where triggers for these analytes are exceeded it is recommended that the Water Management Plan consider additional monitoring of indicators associated with the site including target rare earth elements and chemicals used in the mining process.

The Groundwater Monitoring Plan must include:
(a) ***the objectives of groundwater monitoring***
(b) ***the types, depths and locations of monitoring clearly justified and mapped***
(c) ***baseline monitoring of water levels and water quality***
(d) ***in addition to the analytical suite for quarterly groundwater monitoring recommended in the EIS, initial baseline monitoring of indicators relevant to the elements being mined, e.g. based on the list of indicators used for TCLP testing, including zirconium, niobium, and yttrium***
(e) ***monitoring to detect any potential leaching to groundwater from ore material or waste material in the open cut void, waste rock emplacement, ROM pad, liquid residue storage facility, solid residue storage facility, salt encapsulation cells, based on the analytical suite for quarterly groundwater monitoring recommended in the EIS specialist groundwater report***
(f) ***monitoring of potential shallow groundwater pathways to detect any pollutants losses from the site via groundwater to surface waters or offsite aquifers***
(g) ***trigger values for action and associated actions or mitigation measures if triggers are exceeded including the triggering of monitoring a wider suite of indicators including the elements being targeted in mining.***

Tables 8 and 9 include "NE" entries that refer to no criteria existing. It is recommended that the surface and groundwater management plans take into account interim trigger values provided in Volume 2 of ANZECC (2000) or other Australian or international literature to establish levels that indicate potential risk or trigger management action. Relevant trigger values should be developed in consultation with the EPA.

Siting of the liquid residue storage facility
The specialist groundwater reported indicated further assessment was needed on the footprint of the LRSF to assess whether siting of the facility could avoid areas of alluvial sands or basalt (due to potential high fracture permeability of igneous rocks, where that are present, groundwater flow rates can be greater than 200m/year).

Prior to construction of the LRSF, further assessment should be conducted on the footprint of the LRSF to assess whether siting of the facility could avoid areas of alluvial sands or basalt.

If consent is granted by the Department of Planning and Infrastructure the EPA will be unable to issue a Scheduled Development or Scheduled Activity Licence until the issues summarised above are addressed.

NOISE

The EPA has provided recommended conditions of approval for sensitive receivers predicted to have noise impacts up to and including the project-specific noise levels (PSNL). For any other receivers predicted to receive noise levels above the PSNL, Department of Planning and Infrastructure is best positioned to weigh the social and economic benefits of the proposal against potential adverse noise impacts and to determine if a higher noise limit is justified. If a higher noise limit is accepted by Department of Planning and Infrastructure following this assessment and consent is granted EPA will include these limits in a licence, up to 5 dB above the PSNL.

Limit Conditions

L6.1 Noise generated at the premises must not exceed the noise limits in the table below. The location numbers are taken from Table 201 of the report *Dubbo Zirconia Project – Noise and Vibration Impact Assessment* prepared by EMGA Mitchell McLennan dated August 2013.

Location	NOISE LIMITS dB(A)			
	Day	Evening	Night	
	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ minute)}$	$L_{A1\ (1\ minute)}$
R4, R6, R7, R8A, R8B, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28A, R28B, R30A, R30B, R31A, R31B, R32, R35A, R35B, R36, R38, R40, R42, R43, R46, R61	35	35	35	45
R11 (Toongi Hall and Tennis Court)	40	40	40	N/A
R13 (Environmental Education Centre)	35	35	35	N/A
Any other residential receiver	35	35	35	45

NOTE: Noise limits have not been provided for sensitive receivers with predicted impacts above the project specific noise level.

L6.2 For the purpose of condition L6.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L6.3 The noise limits set out in condition L6.1 apply under all meteorological conditions except for the following:

a) Wind speeds greater than 3 metres/second at 10 metres above ground level.
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

L6.4 For the purposes of condition L6.3:

a) Data recorded by a meteorological station installed on site must be used to determine meteorological conditions; and
b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L6.5 To determine compliance:

a) with the $L_{eq(15\ minute)}$ noise limits in condition L6.1, the noise measurement equipment must be located:

- approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
- within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
- within approximately 50 metres of the boundary of a National Park or a Nature Reserve.

b) with the $L_{A1(1\ minute)}$ noise limits in condition L6.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.

c) with the noise limits in condition L6.1, the noise measurement equipment must be located:

- at the most affected point at a location where there is no dwelling at the location; or
- at the most affected point within an area at a location prescribed by conditions L6.5(a) or L6.5(b).

L6.6 A non-compliance of condition L6.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- at a location other than an area prescribed by conditions L6.5(a) and L6.5(b); and/or
- at a point other than the most affected point at a location.

L6.7 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

M8 Requirement to Monitor Noise

M8.1 *To assess compliance with Condition L6.1, attended noise monitoring must be undertaken in accordance with Conditions L6.5 and:*

a) at each one of the locations listed in Condition L6.1;
b) occur annually in a reporting period;

c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:

- 1.5 hours during the day;
- 30 minutes during the evening; and
- 1 hour during the night.

d) occur for three consecutive operating days.

Reporting Conditions

R4 Noise Monitoring Report

A noise compliance assessment report must be submitted to the EPA within 30 days of the completion of the yearly monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:

a) an assessment of compliance with noise limits presented in Condition L6.1; and
b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits contained in Condition L6.1.

Additions to Definition of Terms of the licence

- NSW Industrial Noise Policy - the document entitled "New South Wales Industrial Noise Policy published by the Environment Protection Authority in January 2000."

- Noise - sound pressure levels' for the purposes of conditions L6.1 to L6.7.