COMMERCIAL IN CONFIDENCE

Covalent Lithium Pty Ltd

Secondary Refinery Outputs Management Strategy

September 2020

Table of contents

Table index

Figure index

1. Introduction

1.1 Background

Covalent Lithium Pty Ltd (Covalent) is proposing to establish a Lithium Refinery within the Kwinana Industrial Area (KIA), Western Australia (WA). The refinery will process spodumene ore concentrate, sourced from the Covalent Mt Holland Lithium Project, located approximately 105 km south-southeast of Southern Cross in the Shire of Yilgarn, to produce battery grade Lithium Hydroxide Monohydrate (hereafter referred to as LiOH).

The lithium extracted from the ore will then be sold, while the remaining refinery output materials will require appropriate management.

1.2 Purpose of this report

The refinery will process approximately 397,800 tonne per annum (tpa) of spodumene ore concentrate (containing 5.5% lithium expressed as Li_2O on dry basis) via pyrometallurgical and hydrometallurgical unit operations. The process will also produce sodium sulphate anhydrous (referred hereafter as SSA), de-lithiated beta spodumene (referred to hereafter as DBS) and mixed salts material (referred hereafter as MSM), as secondary outputs.

This Secondary Refinery Outputs Management Strategy presents measures proposed by Covalent to manage material generated at the refinery. This strategy builds on preferred options identified through a multi-criteria assessment (MCA) developed by GHD, comparing secondary output management scenarios and highlighting preferred strategic options. This strategy also outlines how the operation of the refinery and management of outputs is consistent with the WA waste hierarchy.

1.3 Scope and limitations

This report: has been prepared by GHD for Covalent Lithium Pty Ltd and may only be used and relied on by Covalent Lithium Pty Ltd for the purpose agreed between GHD and Covalent Lithium Pty Ltd as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Covalent Lithium Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.4 this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Covalent Lithium Pty Ltd and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with

such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Assumptions

This Secondary Refinery Outputs Management Strategy is based on the following assumptions:

- The information provided by Covalent is accurate, representative and current.
- Dewatering of the DBS using a filter press is included in the refining process, and that dewatering will be sufficient to enable road transportation and placement in a tailings storage facility.
- Where commercial agreements are included in the assessment of options, that these agreements will be successfully completed by Covalent.

2. Environment values

2.1 Waste management principles

The principle of waste minimisation, through avoidance, reuse, recycling and recovery, is fundamental to resource use efficiency and working towards a sustainable, low-waste and circular economy.

2.1.1 Legislative requirements

The current legislative framework for regulation and management of Western Australia's waste consists of the following Acts and associated regulations:

- *Environmental Protection Act 1986* (EP Act)
- Environmental Protection Regulations 1987 (EP Regulations)
- *Waste Avoidance and Resource Recovery Act 2007* (WARR Act)
- *Waste Avoidance and Resource Recovery Levy Act 2007* (WARR Levy Act)
- Waste Avoidance and Resource Recovery Levy Regulations 2008 (WARR Levy Regulations)

2.1.2 Definition of Waste

Both the EP Act and WARR Act define *waste* as to include matter:

a) whether liquid, solid, gaseous or radioactive and whether useful or useless, which is discharged into the environment; or

b) prescribed to be waste.

2.1.3 Waste levy

The WARR Levy Act and WARR Levy Regulations 2008 impose a levy on waste disposed of to landfill in the Perth metropolitan region and on waste generated and collected in the metropolitan region and disposed of to landfill at certain categories of landfill outside of the metropolitan region. The relevant categories of landfill are premises specified in categories 63, 64 or 65 of Schedule 1 to the EP Regulations.

Therefore, waste generated in the Perth metropolitan area that is disposed of to a category 63, 64 or 65 landfill incurs a waste levy liability, currently set at $70 per tonne. A key driver for the waste levy is minimising the requirement for expansion of landfills within the Perth metropolitan area.

2.1.4 Valuing waste as a resource

An issues paper released by the Department of Water and Environmental Regulation (DWER) in June 2019, on valuing waste as a resource, sought to inform development of a legislative framework for waste derived materials, supporting the objectives of the Waste Avoidance and Resource Recovery Strategy 2030. A key objective of the WA Waste Strategy includes the state becoming a sustainable, low-waste and circular economy.

Although the WA Waste Strategy is primarily focused on wastes generated in the municipal, commercial and construction sectors, a key guiding principle is that all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.

2.2 Waste Management Strategies

A waste hierarchy that ranks waste management options in order of their general environmental desirability is set out in the Western Australian Waste Avoidance and Resource Recovery Strategy 2030 (Waste Authority, 2019), developed to support the Western Australian Waste Avoidance and Resource Recovery Act 2007 (WARR Act). The key objectives of the waste hierarchy are described in order of preference below, and shown in Figure 1.

2.2.1 Avoidance

Waste avoidance is considered the most desirable outcome in the waste hierarchy. Waste avoidance can be achieved by optimising processes, substituting inputs which generate waste or improving operation of equipment.

2.2.2 Recovery

Where appropriate, wastes can be repurposed or reused as alternative products. This prevents excessive reliance on landfills and reduces requirements for consumption of new raw materials. Recovery can be in the form of reuse, reprocessing, recycling or energy recovery.

2.2.3 Disposal

Disposal to landfill should be avoided where possible. Where wastes are unable to be avoided or reused/recycled, disposal methods causing least harm to the environment will be favoured.

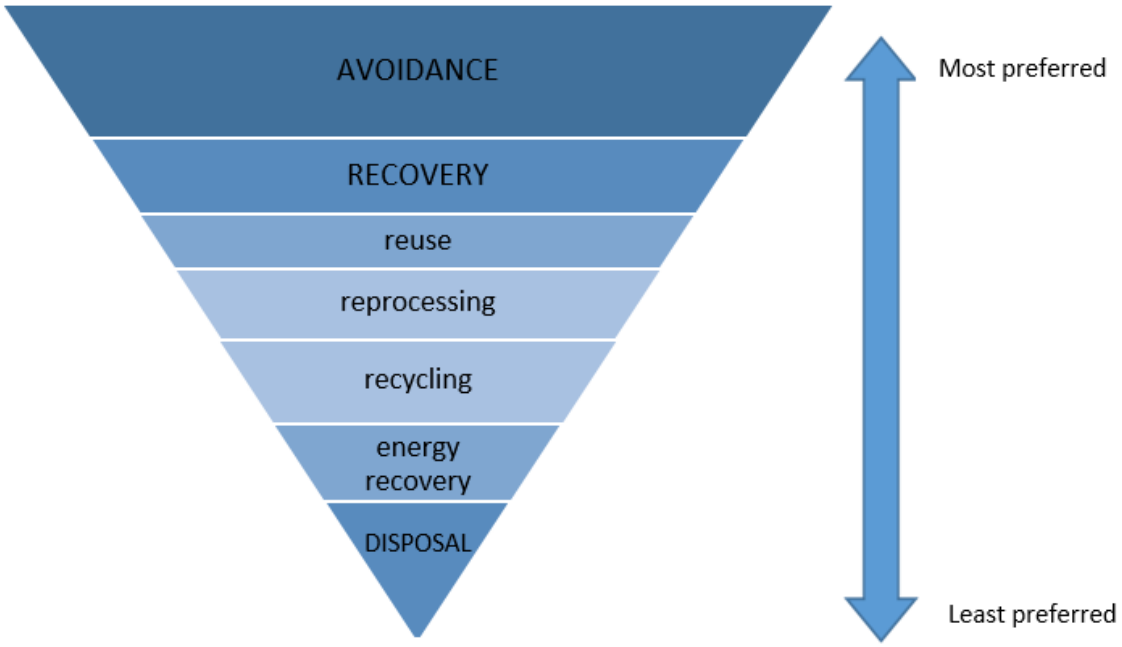

Figure 1 The waste hierarchy

3. Management of secondary refinery outputs

3.1 Management objectives

Covalent's underlying management objective is to minimise the generation of secondary outputs that are unavoidably generated from its refining operations. Covalent is committed to managing these materials in accordance with the waste hierarchy, seeking to establish a beneficial reuse market for end products where possible.

Covalent is also committed to avoiding the requirement for any potentially reusable material to be disposed of within the Swan Coastal Plain.

3.2 Description of outputs to be generated

The refinery will process approximately 397,800 tpa of spodumene ore concentrate (containing 5.5% lithium expressed as Li_2O on dry basis) via pryometallurgical and hydrometallurgical unit operations. The total remaining projected solid refinery outputs is approximately 590,939 tpa, with a breakdown of projected secondary refinery outputs as shown in Table 3-1.

Table 3-1 Refinery components and outputs

Breakdown of refining outputs	Projected quantities Wet basis (tpa)	Projected quantities Dry basis (tpa)
Primary product		
Lithium hydroxide monohydrate (LiOH)	45,892	45,892
Secondary refinery outputs		
Sodium sulphate anhydrous (SSA)	116,531	116,531
De-lithiated Beta Spodumene (DBS)1	503,997	380,551
Mixed salts material (MSM)	10,742	59,479
Total refining outputs (excluding primary product)	**631,270**	**506,561**

3.3 Secondary refining outputs management options

The two key secondary outputs of refining to be generated by the Kwinana refinery are DBS and SSA.

In accordance with the intent of the waste hierarchy, an extensive assessment was undertaken to determine potential reuse options for these materials. The assessment identified potential reuse options for both the DBS and SSA. In the instance of SSA, a commercial use has been identified and the material can be sold in the short term. However, at this stage further work will be required in order to demonstrate that the DBS can be reused. On this basis, short term management strategies have also been developed for the DBS.

The following sections provide an overview of the long and short term management options for the DBS and SSA.

[1] Including Polishing Filter Material (PFM) of 7,324 tpa (wet basis) or 4,394 tpa (dry basis). The overall moisture content of the combined DBS, and PFM will be approximately 24%.

3.3.1 DBS long term management option

Several potential long term options for the management of DBS have been identified. Research into the recovery of potential beneficial reuse resources, is currently being considered. Options which align with recovery, specifically reuse or reprocessing, in the waste hierarchy, are preferred over disposal. These options are outlined below.

1. Application as a substitute for Grade 1 fly ash, ultrafine Pozzolans or a binder for construction material blends for the Australian market[2]. Material characterisation tests are being progressed (using experienced specialists to enable certification) to determine whether the material is suitable for this particular use. Testing includes chemical composition, fineness, moisture content, loss on ignition, relative water requirement and strength index, sulphuric anhydride content, chloride ion content and autoclave expansion of hydraulic cement.
2. Application in construction materials as a fine aggregate supplement for the WA market, for example as a basic raw material for infrastructure projects, such as sub-base material under roads. Use of material would be subject to appropriate risk assessment and further definition of infrastructure projects.
3. Use as innovative industrial products, with various research projects running in parallel, including Future Battery Industries CRC, Local and International University studies. Research is currently being conducted through Future Battery Industries CRC to determine beneficial uses of DS. Research being conducted includes the potential to extract commercial grade zeolites, geopolymers or soil ameliorants for use from the DBS.
4. Higher value applications explored overseas.

Based on the work identified so far Covalent are relatively optimistic that a long-term management option(s) can be identified and that the material can be demonstrated to be appropriate for that use. However, if no commercially viable beneficial reuse product derived from the DBS is identified, the short term option would need to either be extended or an appropriate additional long term option developed. It is anticipated that this would likely be subject to regulatory approval and could potentially require referral under Part IV, s 38 of the EP Act.

3.3.2 DBS short term management options

A multi criteria assessment was undertaken to short-list management options for the DBS. Assessment criteria included transport logistics, operational and establishment costs, project life costs, operations constraints, establishment lead time, long term capacity and approval considerations. Based on these criteria, options were evaluated and rated. The options have been selected to be consistent with the waste hierarchy where possible, and also to avoid disposal of waste on the Swan Coastal Plain.

Short term options have been identified to manage the DBS while preferable options are developed. Where short term options are available which satisfy the recovery qualification in the hierarchy they will be utilised; however where further investigations and research are required to develop a market for the material, short term options have focused on storage until those uses can be identified.

The preferred primary short term option for managing the DBS is back-loading to the Mt Holland mine site for placement in a tailings storage facility (TSF). The Mt Holland TSF has initial capacity for approximately five years' tailings production, based on proposed refining quantities.

[2] This application is further supported by the efforts to develop AS 3582.4 standard for Supplementary Cementitious Materials – Pozzolans (through key partnership with Australian Pozzolan Association).

Laboratory testing of representative samples of refinery tailings has identified the moisture flow point and transportable moisture limit. The DBS will be dewatered at the Kwinana refinery to reduce the moisture content to an appropriate level, below the transportable moisture limit.

3.3.3 Alternative options

In addition to the preferred short term management option Covalent has identified that robust fall back options are required. In the event that initial storage capacity at the Mt Holland mine site is insufficient to accommodate DBS, while beneficial use options are still being developed, a number of alternative options have been identified to supplement storage capacity at Mt Holland and enable optimal management arrangements to be established.

Bushpig and Razorback in-pit storage

In addition to development of a TSF at Mt Holland, it has been estimated that the nearby Bushpig and Razorback pits have a combined DBS storage capacity of approximately four and a half (4.5) years based on scheduled production ramp up, or around three and a half (3.5) years at full production. The pits are located on tenure held by one of the Covalent joint venture partners.

An assessment will be required to progress the possibility of using these pits for in-pit storage of DBS including sterilization drilling and conceptual design. Although this is not currently a preferred option, the potential to use the Bushpig and Razorback pits for DBS storage has been considered as an alternative option, to provide sufficient time to develop optimised long-term reuse, commercial sale and/or storage arrangements.

3.3.4 Sodium sulphate anhydrous (SSA)

Established markets already exist for SSA in powdered detergents, textiles and glass industries. Covalent is exploring options for sale of SSA and anticipates that there will be no need for long term storage or disposal of this refinery product from Kwinana. It is noted that neutralisation to pH 6 - 8 may be required for this value-adding pathway. The conditioned product would be transported to ship-loading facilities at Kwinana for export to overseas customers.

Covalent intends to undertake research and development into conversion of sodium sulphates into other more marketable and higher value products such as sodium hydroxide, sulphuric acid, and ammonium sulphate. Although the process aspects of these options are subject to commercial evaluation, it is envisaged that the long term fall back option for managing this refinery product will be sale as a bulk product to commercial offtakers who will themselves use the SSA as a manufacturing or process input.

3.3.5 Summary of secondary outputs management strategy

The proposed management pathways for the key refining secondary outputs are described below and summarised in Figure 2.

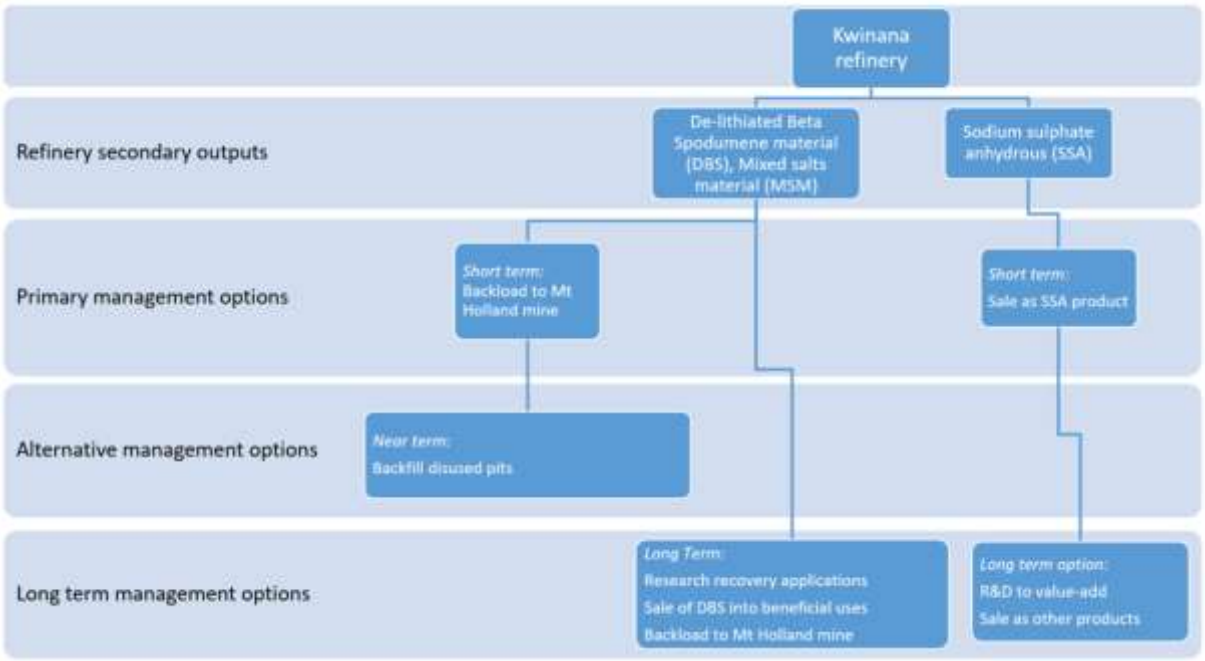

Figure 2 Summary of proposed management options

De-lithiated Beta Spodumene (DBS)

Covalent is investigating potential options for beneficial use of the leached spodumene material and commercial offtake potential and sale opportunities are currently being evaluated. However, until this research is complete, and a viable market is found for the product, Covalent proposes to place the material in an approved TSF.

3.3.6 Other secondary outputs

Polishing filter materials

Polishing filter materials (PFM) would be blended with the DBS and the resulting material will be suitable for transport and management as a solid material. The blended DBS would be placed in the TSF, noting that PFM would represent less than 5% wt of the total combined DBS (484,077 tpa).

If the DBS is directed to beneficial reuse, and inclusion of PFM would otherwise preclude this option, the PFM would be transported to an appropriately licensed landfill. There may also be scope for securing a beneficial reuse of the PFM, as this material is expected to contain useful levels of magnesium and calcium.

Mixed salts material

Mixed salts material (MSM) will be separately transported back to the minesite and placed in a specific area of the non-structural zone of the TSF at the minesite.

Returned MSM will be contained within the non-structural zone, above the historic Earl Grey tailings, and MSM placement will result in a rising salt column of approximately 45 m x 45 m dimensions. This provides a specific area of consistent physical properties so that the salts are

not spread throughout the TSF. This containment strategy is consistent with construction of "waste fingers" containment areas (of hazardous by-products from processing) on slurry tailings dams.

The following was considered when designing and locating the MSM containment zone:

- Placement of MSM will be located over the existing Earl Grey tailings. If migration were to occur, this will work to neutralise the Earl Grey tailings.
- MSM will be positioned outside the expected pond area resulting from a 1:100, 72 hr design storm to reduce the risk of dissolution if ponds were to develop on the TSF surface.
- Bunding will be incorporated in design of the MSM containment zone to direct surface water run-off around the containment zone.
- Maintenance of a low point in the containment zone will allow pumping of incident surface water ponding on the MSM.
- DBS placed adjacent to the surrounding MSM containment zone are to be relatively dry to limit moisture exposure.

3.4 Secondary product management protocols

Where possible, Covalent will pursue recovery options and evaluate market opportunities for secondary products from the Kwinana refinery.

Covalent has committed to ensuring that secondary products and non-process wastes/residues from the Kwinana refinery that cannot be recycled or beneficially reused, and therefore require landfill disposal, will be directed to appropriately licensed facilities located away from the Swan Coastal Plain.

3.5 Achieving Targets

3.5.1 Waste monitoring

Covalent will monitor secondary product and non-process waste/residue generation and management activities throughout the project in order to continually improve environmental outcomes. Activities monitored will include:

- Secondary product and non-process waste/residue quantities generated (compare with predicted quantities)
- Transport and logistics
- Potential environmental impact

Tracking

Where required, transport will be tracked and recorded according to conditions stipulated in the Environmental Protection (Controlled Waste) Regulations 2004. This will include the completion of Waste Transport Certificates and all required information including type and amount of waste, company name, and elected disposal plan. Certificates will be retained and provided to the operations management team and the appropriate authority.

Incident reporting and investigation

Any incidents relating to secondary product and waste management will be reported in accordance with Covalent's incident reporting policy and procedures, and in compliance with relevant regulatory approvals.

GHD

Level 10
999 Hay Street
Perth WA 6000
T: 61 8 6222 8222 F: 61 8 9463 6012 E: permail@ghd.com

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