

<b>Worsley Alumina Pty Ltd</b>	<b>Scope Of Work</b>	
<b>U034413 Chute Modifications</b>	Version	
	Deployed	

<b>Job No.</b>	
<b>BCS No.</b>	
<b>Work order No.</b>	30964824

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## 1 Approval

	Name	Signature	Date
Engineer	Alex Park	Original Signed	5 <sup>th</sup> May 2009
Lead Engineer (if \$>30k)			
Engineering Superintendent (if \$>200k)			

**Copies To:** Maintenance Planner, Work Order, File

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## 2 Confidentiality

The information contained herein is the confidential property of Worsley Alumina Pty Ltd and may not be used for any purpose other than the Worsley project detailed here-in. It may not be disclosed to any other person without the prior authorisation of Worsley Alumina Pty Ltd. Any such disclosure shall be limited to the purposes of performing your obligations to Worsley Alumina Pty Ltd. Such disclosure shall be made only to parties who have been informed of, and who have agreed to abide by, your obligation of secrecy. All copies or extracts are to be treated in the same manner and must (unless otherwise agreed) be returned to Worsley Alumina Pty Ltd on request.

## 3 General Conditions

The Coordinator shall provide suitable safe access to the Work as required, and remove all such temporary access provisions on completion of the work. All site work shall be carried out in accordance with WAPL's General Standard Safety Regulations.

All Electrical work must be carried out or directly supervised by WA licensed Electrical Tradespersons. Tradesperson Licence numbers must be submitted to the Coordinator and the Site Registered Electrical Supervisor before they commence work.

The Contractor must NOT commence on-site work until the Contractor has met with the Coordinator, the on-site work schedule has been agreed upon **and the Contractor has entered the proposed work details into the WAPL Area Mines Record Book.**

The Workgroup shall take all precautions necessary to protect workers, plant and equipment against injury or damage. The Workgroup shall ensure that all equipment is in a safe operating condition prior to use. Attention shall be paid to correct tagging of portable hand-held electrical equipment and extension leads.

The Workgroup must take all reasonable steps to minimise downtime associated with any tie-ins. This includes prefabrication and site checking of dimensions prior to installation.

The Workgroup shall advise the Coordinator in writing of any errors, interference or omissions and shall not commence affected parts of the Work until corrections to the Scope of Work have been agreed with the Coordinator.

All work performed and all materials furnished under this Scope of Work shall comply with applicable statutory requirements of Federal, State and Local Authorities, and shall conform to the requirements of this Scope of Work, the latest revision of the Worsley Standard Specifications listed, and with the latest revision of Standards and Codes referenced herein.

At the completion of the work, the Workgroup shall supply a copy of ALL Scope of Work drawings marked-up with red ink and signed off to "as-built" status and stamped accordingly. A partial set of marked-up drawings is NOT acceptable.

In completing the works, the Workgroup shall:

Reinstate any insulation damaged or affected by the works.

Make good any handrails, grid mesh and surface treatment damaged by the Works.

Clean up and remove any excess material from the works and transport to a point nominated by the Coordinator.

The Workgroup is to ensure that all work areas used by the Workgroups are kept clean, clear and safe – **especially inside EDCs where a daily clean up is mandatory.**

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## 4 Material and Service Supply

### 4.1 WAPL

WAPL shall supply:

Coordinator, appropriate schedules for planning, isolations, a safe working environment and access to all safety provisions deemed necessary.

### 4.2 Workgroup

Unless it is otherwise provided for in the Contract, the Workgroup shall supply at its own cost and expense all materials, labour, equipment and everything else necessary for the due and proper completion of the Contract. This includes all supervision, Manufacturers Data Report/Close out report, labour, equipment and any other items required to complete the works in a safe and timely manner as described in this Scope of Work, unless specified as owner supplied items.

## 5 Scope of Work

### Location

Facility 034, Classifier Diverter Chute U034413

### Summary

1. Fabricate diverter chute as per marked up drawing D-034-M-30002 Rev 0.
2. Pins and pivot bracket to be fabricated and machined as per marked up drawings D-034-M-30002 Rev 0 and D-034-M-30004 Rev 0;
3. Diverter chute is to be lined with UHMWPE (Ultra high molecular weight polyethylene);
4. Remove existing diverter chute U034413;
5. Install newly fabricated chute, machined pins and pivot bracket;

### 5.1 Description of Work

#### 5.1.1 Structural

##### 5.1.1.1 Preparation

1. Train 4 Classifier system is to be offline and isolated.
2. Existing ceramic lined diverter chute and splitter box shall be waterjetted along with all attached pivot brackets and supports to remove scale build-up to enable easier removal (refer to photos 001 to and including 005 below).

#### 5.1.2 Mechanical

##### 5.1.2.1 Chute Fabrication

1. A new diverter chute is to be fabricated as per attached marked up drawing D-034-M-30002.
2. A new pivot bracket is to be fabricated and machined as per attached marked up drawing D-034-M-30004 Rev 0, item 4.
3. A new pivot bracket is to be fabricated and machined as per attached marked up drawing D-034-M-30004 Rev 0, item 5.

**Note:**

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5.1.2.2 Lining Installation

1. UHMWPE liners are required to be installed to all 4 sides of the diverter chute extending upwards from the square to round transition in the bottom section of the chute (refer to attached marked up drawing D-034-M-30002 Rev 0 and photos 001 to 004 below).

**Note:**

- The liners shall be bolted and must have a suitable seal around the bolt holes to prevent leakage of product.
- Edges may be square cut and suitable expansion gaps provided.
- Gaps between the UHMWPE liners and the existing ceramic lining will have to be made good.

2. Once the liners have been installed then 20mm thick ceramic type lining is to be applied to the square to round transition in the bottom section of the chute (refer to attached marked up drawing D-034-M-30002 Rev 0 and photos 001 and 004 below).

**Note:**

- Edge of 20mm thick ceramic type lining is to have a 4:1 taper up to the 10mm UHMWPE liners.
- 20mm thick ceramic type lining is to be trowelled smooth to reduce product build-up.

10mm thick UHMWPE liners are required on all 4 sides of the bottom diverter chute extending from the square to round transition in the bottom section of the chute

20mm ceramic type lining to be applied from inside of bottom discharge nozzle up to UHMWPE lining



Photo 001 – Top of view of similar adjacent chute U034313

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5.1.2.3 Lining Installation continued



Photo 002 – End view of similar adjacent chute U034313 showing lining around cut-out



Photo 003 – Side view of similar adjacent U034313 chute showing attachment of pivot bracket

Close up of UHMWPE lining with c/sunk hex head bolts

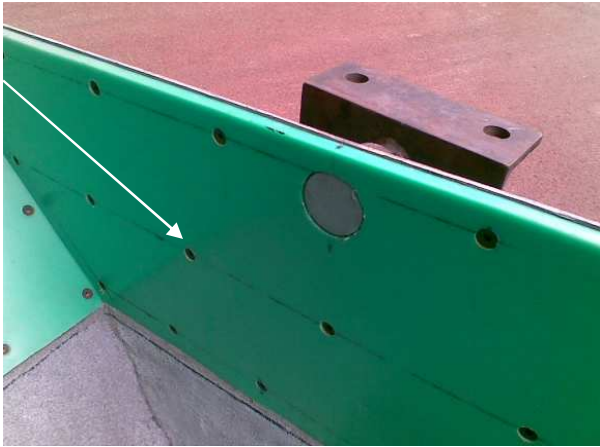


Photo 004 – Internal close up of similar adjacent chute U034313

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5.1.2.4 Trial Fit-up

- The new diverter chute and 2 off pivot pins shall be trial fit in the workshop to ensure that there is sufficient freedom of movement between the bushes and pins to enable smooth operation.

**Note:**

- Over time mud and scale will tend to build-up around the brackets and this may close up clearances and this needs to be taken into account.

5.1.2.5 Existing chute removal

- The 2 off splitter box discharge pipes attached to the bottom of the splitter box are to be unbolted and removed.

**Note:** Care is to be taken because the discharge lines may be ceramic lined.

- The splitter box is to be temporarily supported to allow removal of the splitter box supports and eventual removal of the splitter box (refer to photo 005 below).



Photo 005 – Splitter box supports

- Remove the existing splitter box.

**Note:** Care is to be taken because the splitter box is ceramic lined and is to be re-used.

- The existing diverter chute is to be temporarily supported to enable removal of the pivot bracket and actuating cylinder on the eastern side (refer to photo 006 below).



Photo 006 – Pivot bracket on east side of diverter chute

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5.1.2.6 Existing chute removal continued

5. Remove the pivot bracket from the western side of the chute (refer to photo 007 below).

Bracket to be unbolted to enable removal of diverter chute



Photo 007 – Triangular pivot bracket on west side of diverter chute

6. Remove the existing diverter chute.

**Note:** Care is to be taken because the existing diverter chute is ceramic lined.

5.1.2.7 Installation

1. The new modified diverter chute and new pivot brackets are to be installed into the train 4 classifier chute U034413.

**Note:**

- The new modified diverter chute and new pivot brackets are to be installed in the reverse order to the removal of the existing chute.

2. The existing splitter box, supports and discharge lines to be bolted back in position.

**Note:**

- Care is to be taken when reinstalling the splitter box and diverter chute as they are ceramic lined.

- All new Grade 8.8 bolts, nuts and washers are to be used to secure the splitter box, diverter chute and supports.

3. All structural installation and bolting shall be in accordance with S-001-S-002 Rev 8.

4. The 2 off additional flexible grease lines installed adjacent to chute U034413 after U034313 chute was replaced shall be connected to the grease nipples on the new pivot brackets on the eastern and western sides of the chute.

5. Both grease points on the pivot brackets on the western and eastern sides of the diverter chute are to be charged with Alvania RL2 grease until grease is forced out from between each pin and bushing.

6. The existing actuating cylinder is to be bolted back in position attached and aligned to the new diverter chute.

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5.1.3 Electrical

5.1.3.1

Nil Required

5.1.4 Piping

5.1.4.1

Nil Required

5.1.5 Civil

5.1.5.1

Nil Required

5.2 Testing and Commissioning

5.2.1.1

Prior to bringing the classifier back online the diverter chute actuating cylinder is to be exercised to confirm that the chute is operating freely.

## 6 Standards and Specifications

### 6.1 Reference Specifications

Document Number	Document Title
	S-001-S-002 - Worsley Alumina: Structural Steel
112819	S-001-W-001 - Worsley Alumina: Welding Standard
AS1554	Australian Standard: Structural Steel Welding

### 6.2 Contract Documentation

Drawing Reference	Rev	Drawing Title
D-034-M-30002	0	034 Bauxite Residue Filtration, Diverter Chutes U034212 & U034413, Diverter Chute Details Sheet 2 of 5
D-034-M-30004	0	034 Bauxite Residue Filtration, Diverter Chutes U034313 & U034413, Diverter Chute Details Sheet 4 of 5