Befesa Salt Slags Fugitive Emissions Review
Year Ending 2015
(Permit No. VP3030BX)

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1.0 Introduction

The following sections contain the results of the December 2015 Befesa Salt Slags, Whitchurch, Fugitive Emissions review.

The review considers fugitive emissions to air, land, , ground and surface water.

This review considered the BAT requirements as defined in the following document Bref BAT documents:

1. Reference Document on Best Available Techniques in the Non Ferrous Metals Industries - December 2001;

2. Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilisers - August 2007;

3. Large Volume Inorganic Chemicals - Solids and Others industry - August 2007;

4. The Befesa Salt Slags Odour Management Plan;

5. The site's previous annual Fugitive Emissions Review.

6. The Befesa Salt Slags Environmental permit.

The review lists in each section, the areas of possible fugitive emissions, the current controls and possible future controls / changes. The actions for any possible future controls / changes are listed in section 4, with the relevant time table. A review of the previous actions is listed in section 3.

Any new adopted fugitive emissions to air control measures will be included in the site's Odour Management Plan and if applicable the relevant site procedure. The site's Odour Management Plan is reviewed approximately every six months.

Any new adopted fugitive emissions to surface water, ground water or land, are included in the relevant site procedure, if applicable.

2.0 REVIEW OF FUGITIVE EMISSIONS

2.1 Fugitive Emissions Surveys

A comprehensive survey of the installation's fugitive emissions to air is undertaken every six months, as part of the site's Odour Management Plan, with any actions agreed coordinated by the HSQE department.

Fugitive emissions to land, ground and surface water are fully reviewed annually as part of the site's Fugitive Emissions Review in compliance with the site's Environmental Permit. The results of this survey are detailed in the following sections.

The various activities undertaken across the installation have been divided 8 into zones:

1. Zone A – Weighbridge – Receiving and despatch of materials
2. Zone B - Storage of salt slag, spent pot liner and drosses;
3. Zone C – Crushing / milling;
4. Zone D - Chemical Treatment and belt filter area.
5. Zone E - Bulk material storage (salt and oxides)
6. Zone F – Plant external to the main buildings;
7. Zone G - Maintenance and Engineering;
8. Zone H – Road ways, drainage and other external surfaces.

2.2 Zone (A) - Weighbridge Area – Receiving and Despatch of Materials

A1	**Raw material receipts (aluminium salt slags, spent pot liner and aluminium drosses).**
Fugitive emission to air, land, ground or surface water.	Potential for fugitive release of dust and odour from material delivery vehicles.
Controls in place	To minimise any possible dust releases, all loads are transported to the site in either covered bulk loads or sealed containers. To avoid any fugitive odour emissions, all salt slags, spent pot liners and drosses are only delivered dry. All customers store the relevant material in covered bays to prevent any water ingress. All deliveries of salt slags, spent pot liner and dross are only un-sheeted / containers opened, when the material is ready to be received into the relevant storage bay. Materials are only tipped inside covered building. Loads are not accepted on to site unless the material is as described, booked in and the relevant acceptance criteria met. Any spillages are cleaned up immediately as per the sites spillages control procedures. Road sweeper is contracted to clean all site roadways three times a week. Site inspections completed frequently by the management team to ensure roadways are clean, tidy and maintained correctly. All empty vehicles are requested to sheet up prior to leaving site to avoid fugitive dust.

	Emergency spill kit located at weighbridge.

A2 The sheeting, weighing and despatch of vehicles loaded with finished products (oxides, aluminium metallics, salt)	
Fugitives to air, land, ground or surface water	Potential for fugitive release of dust, steam and odour from vehicles.
Controls in place	All loads are sheeted prior to leaving the site, to minimise fugitive dust / odour. Aluminium metallic's are stored dry and undercover in designated areas and do not present a fugitive risk when loading. There is little risk of dust from the aluminium metallics due to the screening process during production. Oxide interim storage - Oxide is kept in this area for at least 48 hours to ensure that the material has had time to dry / cool, this ensures that any fugitive emission is minimised during loading. The oxide is loaded directly to trucks, with the trucks contained within the site roadway system. The site roadway system has a self-contained drainage system, with no connection to off-site drainage. Oxide is loaded into tipper wagons with moisture content around 20%. The interim oxide store has a roller shutter door which is only opened for material maovements. Oxides final product storage - Oxides are unloaded / loaded within a covered building and only when material is at the specified temperature, thus reducing the risk of fugitive emissions. Salt is loaded directly to trucks, with trucks contained within the site roadway system. The site roadway system has a self-contained drainage system, with no connection to off-site drainage. Salt has a moisture content of approximately 3% and presents little fugitive risk from dust.

	Road sweeper is contracted to clean all site roadways three times a week. All drivers are required to use the designated wheel wash to remove dust and debris from vehicles prior to exiting the site. The site drainage system drains to an interceptor system, which is inspected regularly and cleaned as required. Splash wall installed at the wheel wash point to prevent fugitives to land. Concrete pathway and further concrete kerbing along the roadway installed to give further protection to the unmade ground adjacent the main site road from the weighbridge to the site vehicle entrance. Raised kerbs give further protection to unmade ground.

3.3 Zone B – Storage of Salt Slag, Spent Pot liner and Drosses

B1	**Movement of material to storage area, including size reduction of oversize fragments using mobile nibbler**
Fugitives to air, land, ground and surface water	During movement of materials to and from the storage areas, there is a risk of fugitive emission of dust. All material are dry and so there is little risk of fugitive odour emissions.
Controls in place	Unloading occurs inside the designated building area. Inspection of flooring and building fabric is undertaken within the existing internal audit programme, which includes checks on buildings, flooring and bunding. All building storage areas have roller shutter doors, which are only opened for vehicle movements. All storage areas are inspected as part of the site's house-keeping programme.

3.4 Zone C - Crushing of Dross, Salt Slag and Spent Pot Liner

C1 Transfer and crushing of drosses Salt slags and SPL Cuts	
Fugitives to air, land, ground and surface water	Potential for fugitive emission of dust to internal atmosphere from transfer of material from tipper truck to feed hoppers. Potential for fugitive emissions of dust to internal atmosphere from transport of material on conveyor to crushing mill. All materials are dry and so present little fugitive odour risk.
Controls in place	All points where dust may be generated are served with LEV extraction. This includes the charging points for feed hoppers, the crushing mills and post-crushing screens. Dust arising from crushing are screened cut and fed via enclosed chain drag and bucket lift to two 50 tonne hoppers, served by LEV extraction. The hoppers provide the feed to the adjacent chemical plant Potential for release of substances to land, ground or surface water are minimised due to the fact that activities take place on concreted, bunded areas, with raised kerbing and that the storage and crushing areas have no drainage system The crushing area has roller shutter doors on each side, which are only opened for vehicle movements, ensuring that fugitive dusts are minimised. The site roadways have no connection to off-site drainage and only drain to the main site interceptor.

	Monthly internal extraction checks are completed to ensure efficiency. Road sweeper three times a week as a minimum

C2 Operation of bag filter plant		
Fugitives to air, land, ground and surface water	See Section F1.	
Controls in place		

C3 Storage of milled material	
Fugitives to air, land, ground and surface water	Potential emission of dust through open doorway of crushing area. All materials are dry and so present little fugitive odour risk.
Controls in place	Aluminium metallics arising from crushing are collected in 1 tonne big backs, with the fill point served by LEV extraction. Salt slag dust is transferred in a covered system to two extracted 50 tonne hoppers Maintenance of building fabric via site audit programme and action log reporting Potential for release of substances to land, ground or surface water are minimised due to the fact that activities take place on concreted, bunded areas, with raised kerbing and that the storage and crushing areas have no drainage system The crushing area has roller shutter doors on each side, which are only opened for vehicle movements, ensuring that fugitive dusts are minimised. Regular inspections as per internal audit programme.

3.5 Zone D, Chemical Plant and Belt Filter area.

D1 Operation of dissoluter and decanter	
Fugitives to air, land, ground and surface water	Potential emission of fugitive odours from plant equipment. Little risk of fugitive emission to land, ground or surface water.
Controls in place	Dissoluters and decanters are served by sulphuric acid LEV scrubber. LEV and plant are subject to preventative maintenance. LEV flows checked monthly to ensure efficiency. 2 hourly monitoring of sulphuric acid scubbers, with continuous pH monitoring. MCERTS external emission checks to ensure scrubber efficiency. Chemical plant and belt filter fugitive odour levels checked daily. Chemical plant and belt filter plant fully bunded, with sealed plant drainage system. All gas scrubbers have duty and stand by pump systems. Plant sump area fully extracted. Sealed pumps installed.

D2 Operation of reactor vessels	
Fugitives to air, land, ground and surface water	Potential for fugitive odour emissions. Little risk of fugitive emission to land, ground or surface water.
Controls in place	Reactors and auxiliary equipment are served by extraction linked to two in-series acid scrubbers. Reactors vent flammable gases to a flare system, which has a pre-flare acid scrubber to ensure any odour risk is removed. SCADA (Supervisory Control And Data Acquisition) system provides continuous real-time monitoring of reaction conditions, including reactor temperature and pressure, flowrate, and pump operation. PM system includes checks on reactors and associated plant. Reactors are pressure-tested with nitrogen twice per year during planned shutdown periods, to ensure that a sealed system is intact. Scrubbers and plant are subject to preventative maintenance. Scrubber flows checked to ensure efficiency. 2 hourly monitoring of sulphuric acid scubbers, with continuous pH monitoring. MCERTS external emission checks to ensure scrubber efficiency. Chemical plant and belt filter plant fully bunded, with sealed plant drainage system.

	All gas scrubbers have duty and stand by pump systems. Plant sump area fully extracted. Sealed pumps installed.

D3 Belt filter operation	
Fugitives to air, land, ground and surface water	Potential for fugitive odour emissions. All oxides are filter wet and so present little risk of fugitive dust emission.
Controls in place	Wet slurry from chemical plant is filtered by the application of a vacuum below the filter belt. Liquid is collected in a sump below the belt filter and transferred via sealed pipeline to the brine storage tanks 2TA03 and 2TA04. The sump is a sealed bund. The belt filter is extracted to plant LEV sulphuric acid system via an extraction hood. Planned maintenance of belt filter (pumps, pipework, belts, rollers, etc). LEV system is checked regularly for flow rate and condition. Roller shutter doors are fitted on the belt filter area. Wet oxide is filtered to a delivery belt directly to the extracted interim storage area. Interim oxide storage area is fitted with roller shutter doors and fully extracted to sulphuric acid scrubber. Regular inspections as per internal audit programme. High level alarms fitted on tanks.

D4 Transfer of materials via pipeline (e.g. brine solution, steam)	
Fugitives to air. Land, ground and surface water	Little potential for fugitive releases.
Controls in place	SCADA system will provide alarms in response to certain conditions arising (e.g. high or low pressure situations). Brine tanks and pipework are cleaned and leak-tested at summer shut-down. PM system incorporates checks on transfer lines. Regular inspections as per internal audit programme.

D5 Operation of gas scrubbers (including gas scrubbing area)		
Fugitives to air, land , ground and surface water	See section F3.	
Controls in place		

3.6 Zone E, Bulk Materials Storage Areas (salt and aluminium oxide)

E1 Bulk storage of salt	
Fugitives to air, land, ground and surface water	Little risk of fugitive emission from salt.
Controls in place	Stored in concrete-floored, covered building, with no drainage system. Controls on quantity stored reviewed daily. Regular inspections as per internal audit programme.

E2 Bulk interim storage of aluminium oxide	
Fugitives to air, land, ground and surface water	Potential fugitive odour emission.
Controls in place	Installation of a stand-alone LEV sulphuric acid scrubber system. Automatic roller door installed, which is only opened for material movements. Fully bunded area. Internal walls to prevent material from being spilled on to the roadways. Raised walled kerb edge screening to protect adjacent unmade ground. Regular inspections as per internal audit programme.

3.7 Zone F, External Plant

F1 Operation of bag filter units	
Fugitives to air, land, ground and surface water	Potential for fugitive dust emissions. Little risk of fugitive odour.
Controls in place	Extracted dust from crushing is transferred internally to holding tanks in Chemical Plant via sealed screw feed. Equipment is maintained as part of the PM system. Anivi reverse jet bag filters are subject to weekly inspection checks. Regular dye tests on filter bags to ensure fugitive dust emission is minimised from failed filter bags. Daily plant inspections include visual checks for leaks dust. MCERTS bag filter unit efficiency checks. All external plant is sited on concrete hardstanding, within a self-contained site drainage system. Hardstanding is subject to regular inspection via the "Site Roadways and Public Areas" internal audit, undertaken twice-yearly.

F2	Operation of boiler and compressor plant (including fuel and chemical stores)
Fugitives to air, land, ground and surface water	Potential fugitive release from fuels stored.
Controls in place	Low volatility substances are used and stored (kerosene and gas oil) Propane is stored in appropriate, sealed vessel. Kerosene and gas oil (red diesel) are stored in steel tanks, stored within a concrete bund. Kerosene pipeline runs within a concrete trench with marked inspection points. The condition and contents of the tanks, bund and pipeline are subject to daily inspection and recorded on the check sheet. Fuel delivery and spill response procedures are in place. Emergency spill kit is located externally to the compressor house, adjacent to the kerosene tank bund. Scale/corrosion inhibitor chemicals are stored externally on concrete hardstanding, within proprietary plastic bunded containers. All storage vessels are situated within the self-contained site drainage system. All fuel lines inspected on daily engineering check lists.

F3 Operation of acid scrubber units (including chemicals storage)	
Fugitives to air, land, ground and surface water	Potential for fugitive dour or liquid release.
Controls in place	Continuously pH monitoring on all scrubber recorded on site SCADA system. The gas treatment plant is subject to checks within the PM system and further maintenance using the Action Log / EWR system. Scrubbers checked each day for ppm emission. All scrubber plant is situated within a concrete bund. Two-hourly checks on the Chemical Plant include visual checks on operation of the scrubber plant. Bund and pipework are subject to annual testing and inspection in accordance with the Bund and Pipeline Inspection Procedure. The gas treatment plant sits within a secondary moat that is pumped to the recycled water tank (for use in the Chemical Plant. MCERTS scrubber efficiency monitoring. All storage tanks sit within a concrete bund.

F4 Operation of cooling towers (including chemicals storage)	
Fugitives to air, land, ground and surface water	Little potential risk of fugitive emissions.
Controls in place	Water treatment chemicals (e.g. sodium hypochlorite) are stored on hardstanding within proprietary plastic bunded containers. Cooling towers sit within the sit drainage system, which has no connection to off-site drainage.

3.8 Zone G, Maintenance and Engineering

Activities undertaken:

G1 Use and storage of lubricants and oils (including wastes)	
Fugitives to air, land, ground and surface water	Potential fugitive emission risk during maintenance activities.
Controls in place	Substances stored and used are of low volatility and are stored indoors in closed or lidded containers, with the exception of waste oils, which are stored in sealed drums under a roofed structure, which is bunded. Permit to work system in place to ensure relevant controls in place to prevent fugitive emission. Spill kit and spill response procedure in place. Equipment decontamination takes place within secure / bunded areas to prevent risk of fugitive emission.

3.9 Zone H, Site Roadways, Surfacing and Drainage

H1	Use of roadways, surfacing and drainage for transport and storage of materials
Fugitives to air, land, ground and surface water	Potential of fugitive release to air and land..
Controls in place	Road sweeper contracted to clean all site internal roads three times per week as a minimum. Wagon drivers are required to clean vehicle wheels using the designated wheel wash prior to leaving the site. Self-contained site drainage with no connection to off-site drainage, which feeds to site interceptor. Site interceptor inspected regularly and cleaned as required. Raised manways on open land areas. Raised kerbs / kerbing to prevent release to land. Spill kits available. Roadways and all surfacing inspected regularly for condition and repaired as necessary.

3.0 Review of previous actions:

Zone-Specific Improvements		
C	Further roller door operations on B-line exit doorway.	**Complete**
C	Install roller door on entrance doorway to storage areas.	**Complete**
D	Looking at Ph. curves on scrubbing units to ensure PPM limits are maintained throughout the scrubbing medium cycle before discharge.	**Complete**

4.0 Additional actions identified for review.

Zone	Potential improvements	
D	Replace corroded cladding in chemical plant.	**Review / replace 2016**
All	Upgrade of site CCTV for operationally and compliance monitoring.	**Review / upgrade 2016**
D	Bubbler water over flow system.	**Review / modify 2016**
A	Review the feasibility of a loading tunnel for the interim oxide storage area.	**Review 2016**
A	Review the interim oxide storage bay extraction pipework and extraction points.	**Review / modify 2016**
A	Review the interim oxide store LEV capacity.	**Review 2016**
D	Review the chemical plant LEV system and capacity.	**Review 2016**

D	Install extended LEV extraction hood in belt filter area.		**Install 2016**
D	Install a scrubber pH alarm to the site scada system		**Install 2016**