Hydro Aluminium Deeside

Environmental Permit No. BK3638IF

BAT Conclusions Review and Compliance Status

October 2016

Contents

Appendices

1. Introduction

1.1 This report details the response to a Regulation 60 Notice from Natural Resources Wales dated 27th July 2016. The Notice requires information regarding compliance to BAT conclusions for non-ferrous metal industries. It also requires information on certain requirements of the Energy Efficiency Directive and the Water Framework Directive, and information on contamination of soil and groundwater required by the Industrial Emissions Directive.

1.2 Section 2 of this report details an assessment of the BAT Conclusions and the compliance status for Hydro Aluminium Deeside Limited.

1.3 Sections 3 to 5 detail the response to the remainder of the Regulation 60 Notice.

1.4 Supporting information is included in the Appendices.

2. BAT Conclusions review and compliance status

Ref.	BAT 1, Environmental Management Systems
Status	Compliant
Details	An environmental management system is in place at Hydro Aluminium Deeside Limited (hereafter abbreviated to HADL). The system meets the requirements of ISO 14001:2004 and is certified by DNV, certificate no. 2005CC2-OSL-SYMI-8253. A copy of the current certificate is included at Appendix 1.

Ref.	BAT 2, Energy Management
Status	Generally compliant with some improvement potential
Details	HADL is currently implementing an energy management system to meet the requirements of ISO 50001:2011. The first certification assessment is due in December 2016 (date to be confirmed at the time of writing). The melting furnace is served by two pairs of regenerative gas fired burners that fire in diagonally opposite pairs. Each burner has a ball bed that serves as a heat reservoir. During the exhaust cycle, hot exhaust air is directed through the ball bed, warming the ceramic balls which then retain their heat. During the firing cycle, external air is drawn through the ball beds to preheat the air prior to combustion. The holding furnace has two non-regenerative gas burners that fire intermittently to maintain the metal in a molten state prior to transfer to the casting process. The heat treatment furnace (homogeniser) is equipped with recuperative burners. The design of the burners allows the use of hot exhaust to pre-heat the incoming combustion air and fuel gas to boost efficiency. There is no heat recovery system currently in place. HADL does not undertake any "pyrometallurgical" processes (i.e. the refining of ores using heat). Items 1.1.2 (d) to (g), (i), (j) and (m) are also not applicable to HADL operations. There are no carbonaceous or sulphur-containing materials used, although a certain amount of organic content will be present in the form of plastics, paints or oils present in certain post-consumed scrap types. These are kept to a minimum through scrap purchasing specifications and on-site inspections. Some incoming material is also processed using the on-site scrap sorting line, which also helps to remove contaminated material. The use of oxygen-enriched air in the Melting Furnace burners has been identified as a possible improvement in the future. Steam and hot water are not used in the production process. High efficiency motors and variable speed drives are used throughout the plant where appropriate. This includes the melting furnace combustion air and exhaust fans, combustion, exhaust and recirculation fans on the continuous homogeniser, cooling tower fans, and the exhaust fans on the bag plants. There are no further beneficial applications for VSD's at HADL. Furnace off-gas extraction and bag plant operation is linked to furnace

	operations. For example, when the furnace is in low fire mode, the bag plants are on low speed.

Ref.	BAT 3, Process Control
Status	Compliant
Details	There are in-house procedures for inspection and handling of incoming materials. Furnace fills are selected to meet customer specifications for the alloy being produced, but also to minimise emissions through limiting the input of painted scrap in each furnace charge. The charging machine is equipped with a scale and the weight of each charge is recorded by the furnace operators. An electronic production management system is in use ("APICS"), which enables the planning of furnace fills and tracks production from the furnace, through casting and heat treatment, to sawing and packaging of the finished product. Programmable logic controllers are in place, for example furnace plc's are linked to temperature and gas flow measurements on the melting and holding furnaces. A PID loop control is in place to maintain the furnace temperature set point and control gas consumption – if temperature increases, gas flow to the burners reduces (and vice versa). A process audit is completed each week day by the Maintenance Department, reviewing and investigating any process alarms such as temperature, pressure or flow rate. An external contractor undertakes condition monitoring every two months, covering fans, motors, drives, belts, bearings and gearboxes on all plant equipment.

Ref.	BAT 4, Maintenance of dust abatement systems
Status	Compliant
Details	The Maintenance module of proprietary management software SAP is in use at HADL. This incorporates scheduled tasks for bag plant maintenance, both in-house and via external contractors, e.g. monthly in-house checks on components such as fans and bearings, annual external checks on bag plant structures and bag condition.

Ref.	BAT 5, Collection and treatment of diffuse emissions to air and water
Status	Compliant
Details	The furnaces are equipped with an extraction system that is interlinked to furnace operations. The scrap sorter is equipped with a vibrating table to separate fines and dust from the material prior to hand-sorting operations. The table is enclosed in a sound-proofed booth. Separate drainage systems are in place for sewerage (directed off-site to a sewage treatment works), storm water and process water. Yard areas are served by oil-water separators, which are subject to regular inspection and emptying.

Ref.	BAT 6, Action plan on diffuse dust emissions to air
Status	Improvement potential
Details	Diffuse dust emissions arise from the tipping of loose scrap metal into storage bays, the collection and movement of scrap metal, hand-sorting of scrap, and tipping of dross bins into skips. Techniques and best practices are in place to avoid or reduce diffuse emissions, e.g. internal storage and handling of scrap, pressing and cooling of dross, scrap sorter fines extraction. Condition 3.2.2 of the current permit states that a fugitive emissions management plan is required, "if notified by the Agency that the activities are giving rise to pollution." No such notification has been received, and a formal fugitive emissions management plan is not in place.

Ref.	BAT 7, Diffuse emissions from the storage of raw materials
Status	Compliant
Details	Potentially dust-forming materials are stored in sealed containers or sealed packaging, for example hydrated lime, used to treat furnace emissions in the bag plants, is stored in a silo. Bone ash and calcium carbonate (used as a sealant and release agent in furnace spouts, launders and dross bins) are delivered in sealed sacks and bulk bags. Scrap is tipped and stored internally where possible. Clean process scrap and primary metal are stored outside but do not present a risk of generating diffuse emission to air or water. The use of water sprays is not feasible on safety grounds, as dry materials are required to minimise explosion risk when charged into the furnace. Liquids stored on-site include vehicle fuel (gas oil), waste oil, engine and hydraulic oils and water treatment chemicals (sodium hypochlorite, sulphuric acid and scale/corrosion inhibitor). All oils are stored in a covered store over a sealed bund. The bund has a containment capacity of 4950 litres – enough for 110% of the combined volume of the diesel and waste oil tanks (3850 l). The bulk oil tanks are of plastic double-skinned construction and are equipped with electronic level monitors. Surface drainage adjacent to the oil stores is routed via a three chamber oil-water separator, which is subject to routine checking and emptying by a specialist contractor. Limited stocks of oil (unopened drums) are stored in a separate building on bunded pallets. Water treatment chemicals are stored in separate bunded tanks sited on concrete hardstanding. All deliveries of fuel, oils and chemicals are supervised by on-site personnel. Housekeeping routines are in place to maintain the cleanliness of yard areas and minimise fugitive emissions to surface drainage, including sweeping of yard areas and daily brushing of key areas such as the dross storage shed. There is no external bulk storage of materials in uncontained mounds or heaps. Loose shredded scrap may be stored in one of five external bays, constructed to contain the material on three sides. If there is an excess of clean process scrap received from customers, an external area surfaced in compacted stones is used for storage prior to bringing it in to the factory building. Swarf from saw operations is compacted on-site into briquettes and stored internally prior to being re-used in production. The application of saw blade lubricant during the cutting process is carefully controlled and monitored.

Ref.	BAT 8, Diffuse emissions from the handling and transport of raw materials
Status	Compliant
Details	The scrap sorter is equipped with a "shaker table" filter system that removes metallic fines and dust from scrap deposited through a loading chute by a wheeled load shovel vehicle. The collected dust and fines are deposited into sealed bulk bags prior to collection or processing off-site. Conveyor one, which transports scrap from the chute to the shaker table, is enclosed by the shaker table booth. The remaining four conveyors are not separately covered but are wholly within the production building. Housekeeping routines ensure daily brushing-up of the scrap sorter area. The majority of scrap materials are stored internally. Collection and transfer to the furnace is by way of wheeled load shovel vehicles, with transport distances kept to a minimum (50 metres to the charging machine from the external bays, or 90 metres from the furthest internal storage bays). There is one elevated conveyor that deposits sorted material into storage bays below it. This is fully enclosed within the production building and material at this point has been treated for dust removal in the shaker table booth. The height of this conveyor is set to allow sufficient clearance between the belt and the scrap material stored in the bay below. For the wheeled load shovels used to transport loose scrap, buckets are either level with or slightly higher than the loading area of the charging machine when placing material on the charger. The casting pit cooling water system runs in pipelines situated in a covered trench as it crosses the factory floor area. The trench covers are designed to protect the pipeline from damage and are removable to allow access for maintenance.

Ref.	BAT 9, Diffuse emissions from metal production
Status	Compliant
Details	All incoming loads of scrap metal are inspected for contaminants at several stages – on arrival at the site, during tipping of the material, and during collection and charging of the material. This is to ensure that the material meets the specification agreed with the supplier, and to ensure hazardous items such as sealed containers are not charged into the furnace. The melting and holding furnaces are equipped with extraction hoods that are linked to the door mechanism so that fugitive releases to internal air are minimised when the furnace door opens. With the door closed, the extraction system operates to pull off-gases from inside the furnace through to the bag plants for abatement prior to release. There are three bag filtration plants for treatment of furnace emissions. The filter socks are coated with a mixture of hydrated lime and minsorb (a proprietary clay-type mineral with a high surface area for adsorption of pollutants such as dioxins and furans) for increased removal of pollutants.

Ref.	BAT 10, Monitoring of emissions to air
Status	Compliant for parameters applicable to secondary aluminium production.
Details	A continuous emissions monitor is in use for dust emissions (PCME DT780, accredited to the MCerts standard). Extractive sampling of dust to BS EN 13284 is also undertaken once per year for calibration purposes. Monitoring of mercury is not applicable to HADL operations (see under BAT 11, below). Sulphur dioxide emitted from the bag plant stacks is monitored twice per year to BS EN 14791. BAT Conclusion 10 requires monitoring of SO_2 once a year but only for primary aluminium production (BAT 60 and 69). Oxides of nitrogen are monitored twice per year to BS EN 14792. BAT Conclusion 13 regarding NOx emissions applies to pyrometallurgical processes, i.e. the refining of ores using heat – these are not undertaken at HADL. VOC is currently measured twice a year using BS EN 12619. PCDD & PCDF are monitored twice per year using BS EN 1948. Fluorides as HF are monitored twice a year to ISO 15713. Chlorides as HCl are monitored twice a year to BS EN 1911. Monitoring of chlorine (as Cl_2, BAT Conclusion 84) is not applicable as HADL does not operate a refining process using chemicals that contain chlorine.

Ref.	BAT 11, Mercury emissions
Status	Not applicable
Details	This BAT Conclusion applies to pyrometallurgical processes, i.e. the refining of ores using heat – these are not undertaken at HADL. The quality of incoming scrap materials is strictly controlled in order to ensure product specifications are met, and furnace off-gases are treated with a mineral adsorbent prior to release to the atmosphere.

Ref.	BAT 12, Sulphur dioxide emissions
Status	Not applicable (only applicable to plants producing copper, lead, primary zinc, silver, nickel and/or molybdenum)
Details	Furnace off-gases are not high in SO_2 content. Monitoring results average 2.5 mg/m^3 from 2009 to 2015. The bag plant abatement system is dosed with hydrated lime powder to assist in the removal of acidic gases such as SO_2.

Ref.	BAT 13, NO_x emissions
Status	Not applicable
Details	This BAT Conclusion applies to pyrometallurgical processes, which are not undertaken at HADL. However, low-NO_x burners are in use in the melting furnace, holding furnace and continuous homogeniser.

Ref.	BAT 14, Waste water prevention and reduction
Status	Compliant
Details	A closed loop cooling system is in place for the casting process, and water usage and discharge is monitored. Collection and use of stormwater has previously been investigated and was found not to be viable in terms of costs and gaining approval for capital expenditure, and also in terms of practical issues regarding infrastructure, chemical use and legionella risk.

Ref.	BAT 15, Segregation of wastewater streams
Status	Compliant
Details	Separate drainage systems are in place for foul sewerage, process drainage (spent cooling water from casting), and stormwater. These are colour coded red, yellow and blue on-site.

Ref.	BAT 16, Sampling and monitoring of emissions to water
Status	Compliant
Details	Sampling of discharge to water occurs each time the casting pit is emptied, which occurs two to three times per year. Aluminium and total suspended solids are included as parameters to be analysed in the samples taken. Analysis is performed off-site by a UKAS-accredited laboratory.

Ref.	BAT 17, Treatment of wastewater
Status	Improvement potential
Details	There is currently no treatment of process effluent (spent cooling water from the casting process). Techniques have been considered in the past, including filtration and flocculation, but have not been implemented due to difficulties regarding the discontinuous nature of the discharge and the generally low levels of substances in the effluent (e.g. dissolved aluminium, suspended solids, petroleum hydrocarbons). Such treatment would also give rise to additional waste generation and disposal requirements, e.g. of filter cakes or liquid concentrates. In 2017 it is planned to consider the use of reverse osmosis to treat and re-use casting pit cooling water. The BAT-associated emission levels for emissions to water from the production of copper, lead, tin, zinc, cadmium, precious metals, nickel, cobalt and ferro-alloys are not applicable to HADL operations.

Ref.	BAT 18, Noise reduction
Status	Compliant
Details	A Noise Reduction Plan forms part of the current permit requirements and efforts are ongoing to eliminate and reduce noise from site operations. A raised earth bank topped with a wooden panel fence forms part of the noise amelioration measures, and is situated between the factory buildings and the site boundary that faces the nearest residential properties. Scrap sorting and

	sawing operations are enclosed in soundproofed structures. Additional noise reduction measures implemented include: • Installation of an automated laydown station for receiving and transporting extrusion ingot logs once removed from the casting pit. • Use of a soft-start crane and anti-twist device to reduce chiming of logs during transit from the casting pit to the laydown station. • Automatic transfer of logs to the saw. • Use of "white noise" reversing alarms on site vehicles.

Ref.	BAT 19, Odour reduction
Status	Compliant
Details	Activities at HADL do not give rise to odour emissions, and odorous materials are not used on-site.

Ref.	BAT 74, Increasing the yield from raw materials
Status	Compliant
Details	Furnace inputs comprise primary aluminium ingot, alloying ingredients such as magnesium, manganese and copper, extrusion process scrap returned from customers, clean factory arisings and post-consumed scrap. The end product needs to meet customer specifications, with stringent limits on metals e.g. 0.2% iron, 0.02% zinc. All materials are purchased to strict specifications in order to maximise yield and minimise product quality issues. Secondary materials are inspected on arrival following in-house procedures. Much of the control on incoming materials is achieved through purchasing from reliable suppliers who employ techniques such as shredding, magnetic separation of ferrous materials, and eddy current separation. The on-site scrap sorting line incorporates a rotating drum magnet to remove ferrous material not previously rejected by the hand sorting process.

Ref.	BAT 75, Energy efficiency
Status	Improvement potential: recirculation of combustion gases
Details	Metal is charged to the melting furnace in batches, with materials collected from various storage locations and placed on the container of the charging machine by load shovel or forklift truck. There is no continuous feed of materials and no "pre-charge" position that would enable the furnace charge to be pre-heated. The melting furnace is equipped with two pairs of cross-firing regenerative burners, however combustion gases are not recirculated through the burners. There is no supply of liquid metal to the site. This is not feasible give the distance to the nearest primary smelter (the Rio Tinto-operated smelter in Lochaber, Scotland).

Ref.	BAT 76, Removal of oil and organic compounds from swarf
Status	Compliant
Details	Swarf from sawing operations is extracted to a briquetting machine that compresses the swarf to produce small blocks (150mm long x 62mm deep x 67mm high, weighing 1.25 kg each). These are recycled internally in the melting process. The swarf is not treated by centrifugation or drying, however the swarf produced is essentially dry and free of excess oil.

Ref.	BAT 77, Diffuse emissions from pre-treatment of scrap
Status	Compliant
Details	The scrap sorter is equipped with a "shaker table" filter system that removes metallic fines and dust from scrap deposited through a loading chute by a wheeled load shovel vehicle. The collected dust and fines are deposited into sealed bulk bags prior to collection or processing off-site. Conveyor one, which transports scrap from the chute to the shaker table, is enclosed by the shaker table booth. The remaining four conveyors are not separately covered but are wholly within the production building. Housekeeping routines ensure daily brushing-up of the scrap sorter area.

Ref.	BAT 78, Diffuse emissions from charging and discharging of melting furnaces
Status	Compliant
Details	The melting and holding furnaces are equipped with extraction hoods above their doors. The furnace extraction system continues to pull air to the bag plants when the spout is open. The furnace doors are designed to form an effective seal when closed, to maintain positive pressure during the melt cycle, to improve energy efficiency and to reduce diffuse emissions. The charging machine container is designed to be slightly smaller than the furnace opening. When metal is being pushed into the furnace, the charging container fills the furnace opening and fugitive emissions from the open door are captured by the extraction hood that sits over the furnace door.

Ref.	BAT 79, Reducing emissions from skimming and dross treatment
Status	Compliant
Details	Skimmings are collected in purpose-designed bins and transported to a proprietary dross press machine. A hydraulic ram then compresses the dross, which both reduces exothermic "thermiting" of the dross and helps to recover any free liquid metal present. Emissions from the dross press are ducted to the bag plants. Pressed dross is stored in designated skips in an undercover storage area.

Ref.	BAT 80, Reducing dust and metal emissions from swarf drying; removal of oil and organic compounds from swarf; crushing, milling and dry separation of non-metallic constituents and metals other than aluminium; and from storage, handling and transport in secondary aluminium production.
Status	Improvement potential
Details	There are no crushing or milling activities undertaken on-site. Manual sorting of scrap is preceded by dust removal and collection of dust and metallic fines in sealed bulk bags. All post-consumed scrap materials are stored either internally or in one of five external scrap storage bays. Three bag plants are used as abatement for furnace emissions during the charging, melting and pouring phases. Dust arising from scrap sorting, storage, handling and transport operations is not extracted via abatement plant, is not subject to permit conditions or emission limits, and consequently has not been measured or monitored. With such a large open storage area it is difficult to see how this would be achieved.

Ref.	BAT 81, Reduction of dust and metal emissions to air from furnace operations BAT 82, Reduction of dust and metal emissions to air from remelting
Status	Compliant
Details	Three bag filtration plants are in use for the treatment of furnace emissions during the charging, melting and pouring phases. The filter socks are coated with a mixture of hydrated lime and minsorb (a proprietary clay-type mineral with a high surface area for adsorption of pollutants such as dioxins and furans) for increased removal of pollutants. The current permit includes two limits for dust: 10 mg/m^3 daily average and $5mg/m^3$ monthly average. Reported emissions are generally <1 mg/m^3. Under normal operating conditions and considering the abatement plant in use, the BAT AEL of 5 mg/m^3 is achievable. Alarms and process checks are in place to ensure that action is taken in the event of equipment failure, e.g. rupture of a filter bag. The bags are also subject to annual condition monitoring by external contractor. To avoid possible breaches of the 5 mg/m^3 BAT AEL during furnace start-up it is proposed that "normal operations" are defined as when the furnace roof temperature is greater than or equal to 900°C, as measured by the in-situ thermocouple.

Ref.	BAT 83, Reducing emissions to air of organic compounds and PCDD/F
Status	Compliant
Details	Furnace charge materials are carefully selected so as to minimise emissions of organic compounds, dioxins and furans. This includes limiting the quantity of painted scrap in any one melt cycle. Purchasing specifications and on-site inspections also serve to limit the amount of contaminants such as oils and plastics present in the scrap received. Abatement plant includes the addition of a proprietary clay-type mineral that removes organic pollutants through adsorption. Current permit limits are in line with the BAT AELs for VOC (20 mg/m^3) and PCDD/F (0.1 ng/m^3).

Ref.	BAT 84, Reducing emissions to air of HCl, Cl_2 and HF
Status	Compliant
Details	Furnace fills are carefully controlled so as to minimise the content of potentially contaminated materials such as painted or oily scrap in each melt cycle. The bag plant system incorporates lime injection to treat the outgoing gases. Chlorine is not added to the process at any point. The BAT AEL for chlorine is not applicable as no refining process is carried out. The BAT AELs for HCl and HF are in-line with current emission limit values: 10 mg/m^3 for HCl and 1 mg/m^3 for HF.

Ref.	BAT 85, Reuse and recycling of process residues
Status	Compliant
Details	Reuse of dust and recycling of salt slag are not applicable to HADL operations as no salt or fluxing agents are used in the process. Dross and skimmings are treated in a hydraulic press to recover free liquid metal which is re-used on-site. The resulting pressed dross lump is sent offsite for recovery of the remaining aluminium.

Ref.	BAT 86, Reducing salt slag production
Status	Not applicable
Details	No salt slag is generated from HADL operations as no salt or fluxing agents are used in the process.

3. Energy Efficiency Directive

3.1 The Energy Efficiency Directive includes a requirement to consider cogeneration or district heating to use waste heat from combustion plant with thermal input greater than 20 megawatts.

3.2 There are no compliance requirements relating to the BAT conclusions that would result in the substantial refurbishment or installation of new combustion plant with an aggregate thermal input of greater than 20MWth and generating more than 100kWth of waste heat.

4. Water Framework Directive

4.1 Spent cooling water from casting operations is currently discharged to surface water. Emissions are periodic in nature, linked to when the casting pit is emptied of cooling water. This occurs 2-3 times per year under normal operating conditions. Each discharge is sampled and analysed for the following parameters:

- Biological oxygen demand
- Chemical oxygen demand
- Suspended solids
- Ammoniacal nitrogen
- Dissolved aluminium
- Total petrol hydrocarbons
- pH

4.2 There are no permit limits in place for the hazardous pollutants listed in the Regulation 60 Notice (cadmium, mercury, nickel, lead, benzene, PAH).

4.3 Guidance on surface water pollution risk assessment was consulted (https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit), including data on environmental quality standards for specific pollutants for freshwaters and priority hazardous substances, priority substances and other pollutants for freshwaters.

4.4 The only listed parameter applicable to HADL operations is pH, with an operational EQS of 6-9 (95th percentile). This corresponds with the current permit ELV, with all samples in compliance with the limit.

5. Industrial Emissions Directive Article 3(18)

5.1 Part 7 of the Regulation 60 Notice requires details on a risk assessment that considers the possibility of soil and groundwater contamination with "relevant hazardous substances," as defined in Article 3(18) of the Industrial Emissions Directive.

5.2 According to article 3(18), "hazardous substances" means substances or mixtures as defined in Article 3 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures.

5.3 Article 3 of the CLP Regulation states that "a substance or a mixture fulfilling the criteria relating to physical hazards, health hazards or environmental hazards, laid down in Parts 2 to 5 of Annex I is hazardous and shall be classified in relation to the respective hazard classes provided for in that Annex."

5.4 There are twelve substances used on-site that are classed as hazardous to the environment. These comprise oils, lubricants and vehicle fuel (6), floor coatings (2), cleaning agents (2), release agent (1) and spray glue (1). The storage and use of all such substances is carefully controlled. Oils, lubricants and fuel are stored either in a covered, bunded compound or internally on bunded pallets. All other materials are stored in designated areas within either the main factory building or the separate maintenance stores building.

5.5 The "Application Site Report" (ASR) submitted as part of the IPPC Application in August 2001 details a risk assessment on possible soil and groundwater contamination at the site. This concluded that certain substances may be present in the soil from historical uses. From twelve trial pits, the only contaminants that exceeded their respective screening levels were zinc (trial pits 2 and 6) and lead (trial pit 6). These results are associated with historic operations. All other contaminants were below their respective screening criteria. Groundwater analysis showed low levels of some heavy metals, but no detection of organic substances.

5.6 The report concludes that near-surface contamination with heavy metals does not appear to present unacceptable levels of risk to human receptors. Groundwater concentration of arsenic, copper, mercury, zinc and sulphate exceeded the relevant EQS's at one sampling location. However, given the distance from Redwither Brook of about 100 metres, the absence of continuous groundwater, and the low permeability strata, the risk posed by the site to surface waters in considered to be low. Groundwater concentrations at the other sampled location close to Redwither Brook were all within the relevant criteria.

5.7 The ASR pre-dates the "template" approach later adopted for permit applications (e.g. as detailed in guidance note H5 on Site Condition Reports). There is no overall conclusion regarding the likelihood of contamination from permitted activities. However, considering the information in the original ASR it is reasonable to conclude that current activities do not present a risk of causing contamination of soil or groundwater. Site activities have not changed in terms of the types of materials handled or produced, and control measures continue to be maintained for any substances on-site that are hazardous to the environment.

APPENDICES

APPENDIX 1 – ISO 14001 certificate

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 2005CC2-OSL-SYMI-8253

This is to certify that the Management System of

Hydro Aluminium Deeside Ltd

at

Bridge Road, Wrexham Industrial Estate, Wrexham LL13 9PS, United Kingdom

has been found to conform to the Environmental Management System Standard(s):

ISO 14001:2004

This Certificate is valid for the following product or service ranges:

Development, sales, production and delivery of aluminium extrusion ingot, local management and support.

Initial Certification date:
1999.07.29

This Certificate is valid until:
2016.12.21

The audit has been performed under the supervision of
Jørgen E. Breivik
Lead Auditor

NORWEGIAN ACCREDITATION
MSYS 002

Place and date:
Høvik, 2013.12.17

for the Accredited Unit:
DET NORSKE VERITAS CERTIFICATION AS, NORWAY

Siri Bakke
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

ACCREDITED UNIT: DET NORSKE VERITAS CERTIFICATION AS, VERITASVEIEN 1, 1322, HØVIK, NORWAY, TEL: +47 6757 9900, WWW.DNVBA.NO