

Assessment Report 2 – Battery Manufacturing Plant

Basel Convention – Project for the Determination of a Regional Strategy for the Environmentally Sound Recovery of Used Lead Acid Batteries (ULAB) in Central America, Colombia, Venezuela and the Caribbean

Green Lead™ Product Stewardship Project for the Environmentally Sound Management of Lead Acid Batteries throughout the Product Life Cycle

Pilot Scheme Assessment of Environmentally Sound Management at a Battery Manufacturing Plant

1. Introduction

The Determination of a Regional Strategy for the Environmentally Sound Recovery of Used Lead Acid Batteries (ULAB) in Central America, Colombia, Venezuela and the Caribbean, sponsored by funds the Secretariat of the Basel Convention, and the Green Lead Projects are separate and distinct ventures. The Basel ULAB Project is focused solely on recycling ULAB, whereas the Green Lead Project is a Product Stewardship Program that embraces the whole Life Cycle of the Lead Acid Battery from mining through manufacture, use and recycling in the determination of Environmentally Sound Management (ESM).

The Basel ULAB Project has identified a need for a uniform method of classifying ULAB recycling operations to ensure that under the regulations for the Transboundary Movement of Hazardous Waste, countries that export ULAB can assured that recycling facilities in the country of import are environmentally sound. At present, there is no formalized system for the classification of recycling plants, although there are a number of factors that can be used as a guide, such as Government licensing and ISO 14001 Certification. However, investigations undertaken in the Central American and Caribbean region during the Basel ULAB Project has shown that none of the Government licensing arrangements or independent certification schemes for the determination of ESM include all the requirements set out in the Basel Technical Guidelines for the Environmentally Sound Recovery of ULAB.

The Green Lead Project seeks to retain lead acid batteries in a closed loop of well managed environmentally responsible stages in the life cycle. To this end the Green Lead Project needs to certify those operations in the life cycle as environmentally sound so that all the players in the life cycle pass the batteries through Green Lead Certified links in the Product Chain.

Both projects recognize that ESM means more than just ensuring that atmospheric emissions, effluent discharges and waste residues are controlled to national and international standards. The Sound Management of lead products also requires control of pathways to biological exposure at the workplace and in the population. Safe working conditions throughout the production and recovery processes are also a vital factor. It is also becoming increasingly important to educate the users of Lead Acid Batteries (LAB) in the proper use of the products, particularly as more LAB are being used innocuously in security and emergency systems and as power sources for computer networks.

It is clear that there is a high degree of overlap between the two projects in the area of ESM Certification. Consequently, the Secretariat of the Basel Convention and the Green Lead Work Group has agreed to work together on the preparation of a formalized process for the independent assessment and certification of ULAB recycling facilities.

The Standards used as the “Benchmark” by the Basel ULAB Project are the criteria set out in the Basel Technical Guidelines. The Green Lead Project has been establishing a series of Protocols for “Best Practice” in the Industry. Whilst the Green Lead Protocols are still subject to revision they already contain all the factors set out in the Basel Technical Guidelines and so the two approaches to ESM are entirely compatible.

Both projects recognize the value of Government Licensing arrangements and existing schemes for the determination of ESM such as ISO 14001. Neither of the two Projects is seeking to add another administrative burden to either Government Agencies in the control of Transboundary movements of hazardous waste, or industry in their quest for proof of ESM. In this respect, it is envisaged that any Certification Scheme will make provision for exemptions for those factors audited under ISO 14001 or any other recognized certification process. The inclusion of such a provision will reduce considerably the time and resources required for the an ESM Certification Audit, but the implementation of such provisions will require an initial Assessment of ESM at any facility under consideration for Certification.

Such an Assessment Process will primarily seek to identify those factors of ESM in compliance with either the Basel Technical Guidelines or the Green Lead Protocols and those factors in need of a full Audit to determine the level of ESM. For the Assessment Process to work effectively it needs to be simple to administer and objective in the classification of compliance. Ideally, the Assessment Process should be designed so that it can also be used internally by an organization wishing to determine its level of

ESM prior to any formal application for ESM Certification. In this way, organizations can identify their own shortcomings and take action to remedy the situation before they commit resources to a full audit.

The current phase of the Basel ULAB Project requires an Assessment for ESM of a Recycling facility and a Battery Manufacturing Plant. The Green Lead Pilot Scheme is currently working on the Assessment of ESM at a number of plants around the world.

The Assessment Forms cover the eight factors deemed essential to the determination of ESM and were initially developed to assist with the ULAB inventory requirements of the Basel ULAB Project in 2001, further honed in 2003 and 2004 in Cambodia for another Basel ULAB Inventory and again modified by the Green Lead Work Group in 2005 for use in the Green Lead Pilot Scheme.

The Assessment Process is designed to obtain information and data relevant to ESM in the following eight factors:

- i. Process or Production Unit(s)
- ii. Environmental Status
- iii. Occupational Lead Exposure
- iv. Safety
- v. Suppliers and Customers
- vi. ULAB Recycling Plants
- vii. Community Issues - Awareness and Attitudes
- viii. Product Use – Domestic/Industrial

It must be emphasized that this exercise is to test of the Assessment Process and the Assessment Forms to ascertain their suitability as a useful first step in the Certification procedure, and it is not a formal assessment of the manufacturing operation.

2. The Assessment Process – Battery Manufacturing Plant

The Assessment of the Battery Manufacturing Plant was undertaken in January 2006.

Thanks must be given to the Management of the Battery Manufacturing Plant for the Assessment Process to be conducted in as authentic a situation as possible.

The Assessment Process was conducted in three stages:

- The first stage was an interview of approximately 45 minutes with the manager responsible for the specific area of ESM being assessed.
- The second stage was a tour of the Battery Manufacturing Plant to check that information relevant to ESM given during the interviews was consistent with operating practices.
- The third stage was to review the Assessment Forms and make any amendments required to clarify ambiguities in the questions and data requirements, and to add questions where additional information was deemed to be necessary to complete the Assessment.

To make the Assessment exercise as realistic as possible any areas of non-compliance identified during the interviews or the plant tour are shown in bold **Red** text on the Assessment Forms; as they would be for an actual Assessment. This provides a quick reference point for the Company and the Assessors, when reviewing the assessment and deciding on the recommendations for action to correct any non-compliance. All the elements of each factor in compliance are recorded as black text.

The forms amended during the Assessment of the Recycling Plant were used for this second Assessment. For clarity, the amended text is shown in **Blue**.

The respective managers and employees of the Battery Manufacturing Plant interviewed were as follows:

Production Manager

Engineering Manager

Safety and Environmental Superintendent

Environmental Engineer

Human Resources Manager

Personal Assistant

Plant Operator and local resident

3. Results of the Assessment Exercise.

The Assessment Forms provided a very quick insight into the extent of ESM at the Battery Manufacturing Plant.

It was very straightforward to record those elements of ESM in compliance with the Basel Technical Guidelines and the Green Lead Protocols.

Elements of non-compliance with the Basel Technical Guidelines and the Green Lead Protocols were easily identified and the reasons, wherever possible, recorded on the forms.

The Safety and Environmental Superintendent confirmed that the Risk Assessment requirements of ISO 9001 and 9002 would be completed in about three months, and at that time he would expect to meet all the requirements of the Safety Assessment and any subsequent Audit.

The questions in the Assessment process that revealed areas of non-compliance were:

- Occupational Lead Exposure

In the absence of a national blood testing laboratory, the Company monitors workers levels of lead exposure using ZPP analysis of urine samples. This method of monitoring employee's lead exposure is now discredited and lead in blood analysis is the only surveillance procedure recognized by the Basel Technical Guidelines, the CDC, OSHA and the Green Lead Protocols.

- Safety

There were no written procedures or formal training requirements for the use of Abrasive Wheels and Power Tools on site.

- 8. Community Issues - Awareness and Attitudes

Only one person was interviewed in this category, but the views expressed were understood to be typical of the situation in the country. The issues highlighted as non-compliant relate to information about the hazards of lead exposure in the general population. Such information has traditionally been made available by Government sources, but today, companies are expected to be pro active and in the absence of any action by Government, lead producers should ensure that the communities living close to the plant and users of lead products are made aware of the hazards of lead exposure and improper disposal of ULAB.

The Plant inspection confirmed that all the information given by the Managers during the course of the interviews was correct.

4. Conclusions

- The Assessment Process was relatively quick and straightforward to apply.
- The modified Assessment Forms cover every aspect of the Basel Technical Guidelines and the Green Lead Protocols.
- The layout of the forms provides adequate space to record information, data and summaries of findings.
- The use of bold **Red** text serves to highlight the areas of non compliance at a glance.
- Managers interviewed during the Assessment Process were not hugely inconvenienced and as this was the second session for them, they were better prepared and the interviews were concluded in about 40 minutes.

- ISO 9001 and ISO 9002 Certification will provide exemption from the Safety Audit as will ISO 14001 Certification from the Environmental Audit.
- Where ISO 9001, 9002 and 14001 Certifications are used for audit exemption, a record must be made of the appropriate Certification number and renewal date.
- Use of the Assessment Forms will clearly identify those factors that can be exempt from a full Certification Audit.
- All the Managers who participated in the two assessments are now sufficiently aware of the requirements of the Assessment Process that they could conduct objective “in house” Assessments of ESM in their respective areas of expertise.
- Internal Assessments would be useful and cost effective in situations where a Company is considering an application for Certification, but is unsure about its overall performance.
- None of the areas of non-compliance were a surprise to the Company, but it has to be noted that it was not the Company’s environmental performance that was tested. The fact is; the Battery Manufacturing Plant provided an excellent testing ground for the Assessment Process.
- Use of the Assessment forms to ask questions about plant performance generates a healthy and non confrontational dialogue with the Plant Managers.

5. Recommendations

- The Assessment of any LAB Manufacturing Plant should not be deemed to be in full compliance without visiting the main suppliers of lead and lead alloys to inspect and assess their ESM. It is also important to visit a representative sample of retail outlets to ensure that the Company’s Safety and Environmental information is being followed correctly in the handling, sale, LAB servicing and collection of ULAB.
- The Steering Committees of both Projects should consider Fast Tracking the Certification any Company for ESM if the Company demonstrates Full Compliance with the Basel Technical Guidelines and the Green Lead Protocols at the Assessment Stage.

Brian Wilson
ILMC

August 21, 2006



No. 2

Green Lead Site Assessment Form

This Form is designed to provide information to assist in the assessment of Pilot Scheme suitability.

1.0 General Information

Company Name	confidential
Location	confidential
Date	27 January 2006
Name of lead recycling plant/business/home	confidential
Name of interviewee(s)/host(s)	confidential
Position of interviewee/host in the Company	Production Manager
Company Address	confidential
Phone number	confidential
Facsimile number	confidential
Internet Web Site	confidential
E-mail address of main contact person	confidential
Name of Interviewer(s)	Brian Wilson
Operational area (m ² /ha)	30,000 m ²
Does the operation have ESM Certification such as ISO 14001 or equivalent National Award?	No, but the Company is preparing for ISO 9002 Audit.
Is there a Safety Award such as OHSAS 18001 or equivalent or participation in the MCEP?	No, but risk assessments are being undertaken as part of ISO 9002 Certification

2.0 Process or Production Unit(s)

No.	Type of Process – Mining/Smelting/Manufacturing/Recycling	Manufacturing
1	Lead bearing materials Processed	Lead and lead alloy ingots
2	Annual quantity of leaded materials	~ 10,000 metric tons ULAB
3	Procedures for leaded material delivery/collection	By FLT from the adjacent Smelter
4	Facilities for the reception of leaded materials	warehouse
5	Procedures for sorting primary/scrap materials	Lead ingots are color and bar coded
6	Mechanical or manual material handling	Mechanical and manual handling
7	Battery component manufacturing/separation process	Battery manufacturing process, including oxide production
8	Separate component storage/transport system	Segregated in the warehouse
9	Material smelting/melting/refining processes	Lead melting pots/small kettles
10	Type and number of Furnace(s)/Kettles	Barton Process for oxide and 8 x 0.5 to 2 MT kettles for the casting machines
11	Furnace/kettle charging system	manual
12	Furnace/kettle combustion conditions	Waste oil / air burners
13	Furnace/kettle hygiene regime	Ventilation Hoods to Atmosphere
14	Type of Baghouse ventilation systems	Polyester Baghouse filtration system for the oxide production
15	Furnace lead and slag/dross removal regimes	manual
16	Dross/slag treatment, storage and disposal regime	Casting drosses are stored in bins and returned to the Recycling plant
17	What are the internal/external Recycling processes for drosses and by-products?	Casting drosses, fume and spillage are returned to the Recycling plant
18	By-products segregation and storage	Drosses are stored in open bins; baghouse fume in closed bins
19	What are the by-product treatment processes?	Recycling
20	What are the Bullion/Ingot casting/battery production line procedures?	Automatic, semi-automatic and manual
21	Where are the lead raw materials sourced?	confidential

3.0 Environmental Status

1	Chemical composition of the discard/waste materials	Lead, lead alloys and lead oxide
2	Atmospheric discharge limits for leaded processes	50 mg/m ³ Pb
3	Mean atmospheric discharge results for leaded processes	0.13 – 0.35 mg/m ³
4	Surface water treatments prior to discharge of site effluents	Surface water from roofs is passed through a separator prior to discharge
5	How is waste battery acid treated?	Neutralized at the WTP & then used for process water. Residue to Furnace
6	How is the waste liquid effluent discharged?	The waste liquid effluent is not discharged to the environment
7	Standards for the discharge of leaded effluent?	Government Standard , but N/A as no leaded effluent is discharged
8	Is there a common drainage system?	No. Process and surface water drains are segregated
9	How are solid and liquid waste materials stored?	Discard solid waste is contained. Liquid waste is stored in glass fiber tanks
10	12 month wind speed and direction profile	Company does not have this data
11	Storage area ventilation system	Warehouse is a closed system. Formation area is open ventilation
12	Face velocities for extraction/ventilation units	No suitable instruments to measure face velocities
13	Baghouse maintenance regimes	Daily collection of fume. Monthly and bi-monthly maintenance of filter systems
14	Chemical composition of the baghouse fume (dust)	
15	Disposal/treatment methods for the baghouse fume (dust)	Re-circulated with the lead oxide paste
16	How close is the general population to the plant?	A few houses 100 m from the plant, and then a village 600 m away
17	Who is responsible for environmental management on the site?	Management Team under the guidance of the Environment Officer
18	Have any complaints been raised by adjacent communities in the past 12 months?	No

4.0 Occupational Lead Exposure

1	Number of employees	240
2	Age and service profiles	Not available
3	Labor turnover rates	Not available
4	Hours of work	4 rota x 12 hour continuous shiftwork for the oxide plant, casting and formation. 2 x 8 day shifts for LAB
5	What are the changing facilities prior to and after work?	Segregated clean and work clothes change room, toilets and showers
6	What is the washing and changing regime at the end of work?	All work clothes collected for laundry. Employees shower before leaving work.
7	Are personnel issued with special protective or works clothing?	Overalls, socks, boots, gloves (various), hard hat, goggles/face mask, respirator
8	How often is the works clothing washed?	At the end of every shift or when necessary during a shift
9	Is process clothing washed at the site?	Purpose built laundry room – Effluent drains to WTP
10	Are respirators issued and worn by employees in exposed areas?	Neoprene respirators with dust filters
11	Are eating and process areas segregated?	Separate air conditioned canteen
12	Are the eating areas free of lead dust?	Canteen regularly tested by taking swabs
13	Do employees wash their hands and face prior to eating?	Yes – There are wash basins at the exit of the plant
14	What is the range and mean lead in blood levels for employees (preferably by department)	No blood lead surveillance program¹
15	What is the lead in blood trend?	No blood lead surveillance program¹
16	Is there a hygiene surveillance program?	Yes. Urine samples for ZPP analysis
17	Is there a respirator policy?	Yes
18	Is there a hygiene policy?	Yes
19	Do workers understand the health risks associated with lead?	Yes – All employees attend induction training and plant familiarization
20	Who is responsible for occupational health at the Site?	Management Team guided by the Medical Officer (MO) and Nurse
21	Does the plant have a dedicated health clinic and Occupational Nurse?	Yes – Full time MO & Occupational Nurse, & part time Pediatric Nurse

¹ Due to start Spring 2006

5.0 Safety

1	Is there a written and published Safety Policy?	Yes
2	Is there an emergency and disaster plan?	Yes
3	Is there a regular Safety Inspection and Audit?	Yes
4	Have risk assessments been carried out for each operation?	Yes as part of the ISO 9002 requirements
5	Does every employee undergo a Safety Training Induction?	Yes
6	Is there a record of every accident on site?	Yes
7	Is every accident investigated?	Yes
8	Is there a multi-stakeholder Safety Committee?	Yes. Managers, workers and Safety personnel
9	Are there special procedures for the following?	-----
	9a - Confined Space Entry	Yes
	9b - Lockout/Tagout	Yes
	9c - Working at heights	Yes
	9d - Materials Handling	Yes
	9e - Mobile Equipment	Yes
	9f - Hazardous materials/Explosives	Yes
	9g - Ladders and Scaffolding	Yes
	9h – Abrasive Wheels and Power Tools	No
	9i – Welding (of any material)	Yes
10	Who is responsible for the Implementation and Evaluation of the Safety Program?	Safety and Environmental Manager
11	It is mandatory to wear PPE if the Safety Risk Assessment deems it necessary?	Yes
12	Are pedestrian walkways segregated and clearly marked from roadways and operating areas?	Yes
13	Do emergency exits display direction signs?	Yes
14	Is there a Permit to Work System for maintenance ?	Yes

6.0 Suppliers and Customers

1	What companies are the main suppliers of leaded materials to the site?	confidential
2	What are the annual quantities of purchased leaded raw materials (ULAB for recyclers)?	~ 10,000 MT ULAB
3	What are the main outlets for the finished products from the site?	Main Automotive Battery Distributors in the Region
4	How are the finished products transported from the Site?	Shrink wrapped, Palletized and by truck
5	Does a company representative visit the premises of suppliers of leaded materials to the site?	Every day (very easy to do as the plants are adjacent)
6	Does a company representative visit the premises of the customers of the leaded products?	At least one Customer every day sometimes more than one
7	Does the company provide health, safety and environmental information to its customers about its products?	There is an Company leaflet for suppliers and retailers with health, safety and environmental information
8	Does the Company provide its Customers with information about environmentally safe disposal at the end of its product's life?	There is information available from the Retailer and printed on the LAB
9	Can Customers contact the Company to ask about the use and disposal of its leaded products?	There are contact numbers on the LAB and the Company Web Site
10	Does the Company impose any environmental standards of performance on its suppliers of leaded materials?	Internal standards are the same for the Recycling and LAB manufacturing plants
11	What National and/or International Protocols are applied to the transport of new and/or used lead acid batteries?	Domestic Transport Laws for new LAB

7.0 ULAB Recycling Plants

1	Are any ULAB recycled from imported sources?	N/A
2	What are the annual quantities of ULAB recycled?	N/A
3	Are used batteries collected at the retail outlets?	N/A
4	What happens to ULAB collected at retail outlets?	N/A
5	How are ULAB stored at the retail outlets?	N/A
6	How are ULAB collected at retail outlets transported to recyclers?	N/A
7	Are ULAB drained of acid prior to transportation?	N/A
8	Are ULAB reconditioned?	N/A
9	Where are used batteries reconditioned?	N/A
10	Number of used battery collection centers or retailers or service centers collecting ULAB	N/A
11	How are ULAB stored in the collection centers, retailers or service centers?	N/A
12	How is spillage contained in collection centers?	N/A
13	What are the transport arrangements from the retailers or collection/service centers to the recycler?	N/A
14	Are ULAB recycled in the country they are collected?	N/A
15	Are any used batteries exported for recycling?	N/A
16	Where are used batteries exported for recycling?	N/A
17	What are the regulations for the export of ULAB?	N/A
18	What special precautions are taken for the trans-boundary shipment ULAB?	N/A
19	Is the battery electrolyte drained prior to trans-boundary shipment?	N/A
20	What happens to ULAB that are not collected for recycling?	N/A

8.0 Community Issues - Awareness and Attitudes

1	What do you know about lead contamination from ULAB?	Certain lead compounds can cause problems
2	Have you ever attended a health awareness class about lead?	No external classes
3	Do you know the effects of lead exposure on the: <ul style="list-style-type: none"> • Environment; atmosphere, water, soil, eco systems? • Population – Adults and Children? 	Yes to both questions and if not managed properly there will be environmental and health problems
4	How often do you come into contact with Lead Acid Batteries?	Only the automotive battery
5	What do you do with your used ULAB and why?	Return it to the retailer
6	What do you think should be done with a used ULAB?	Never throw them away, always recycle the ULAB
7	In your opinion, how should the problem of lead contamination from ULAB be solved?	Not to throw away them, and always take them to an appropriate place
8	What incentives encourage you to return a used battery to a collection center/battery retailer?	A cash deposit or discount and then nobody will throw UALB away
9	Do you know of any lead contamination awareness programs performed by any Governmental Institutions?	No
10	Has any information provided been effective in encouraging you to dispose of your ULAB in an environmentally sound manner?	No
11	How do you think waste disposal programs could be improved?	To work with the retailers so that ULAB are collected correctly
12	Are you aware of any incentive programs for returning used batteries for recycling? (ACL)	Yes, because the person interviewed had bought a battery on a deposit refund scheme
13	Do you have any comments or suggestions for the Lead Industry or Government Environmental Agencies that would help promote a sustainable environmentally sound and socio-economically acceptable solution to the recycling of ULAB?	No
14	Do you live close to either, a Lead Mine, Lead Smelter, ULAB Recycling Plant, ULAB collection center or a battery retailer.	Yes about 600 m away

9.0 Product Use – Domestic/Industrial (For Surveys by random sampling only)

1	Are there lead acid batteries in the home, including UPS units?	UPS for the PC
2	If so, how many?	1
3	What are lead acid batteries used for in the home? <ul style="list-style-type: none"> • TV • Lighting • Refrigeration • Computers (UPS) • Other uses 	Computer
4	What type of lead acid batteries are used in the home: <ul style="list-style-type: none"> • 12 volt car batteries • 12 volt truck batteries • Deep cycle batteries • Other batteries 	12 volt car battery and UPS
5	Were the lead acid batteries bought as new from a registered supplier?	Yes
6	What is/are the make or brand of the battery/batteries	not known
7	Are the batteries reconditioned?	No
8	How are the batteries recharged?	By the vehicle and by the grid supply
9	How long do the batteries last?	Not known
10	Are you aware of the health hazards that lead contamination and exposure can bring?	Some
11	What do you do with ULAB?	Return them to the retailer
12	Are the ULAB collected or do you have to take them to a collector?	Take the ULAB to the retailer
13	Who collects ULAB?	N/A
14	Are the ULAB recycled?	Hope so – Think so