

Concept Paper for Product Chain Management through the Green Lead Initiative and Integration into Projects for the Environmentally Sound Recovery of ULAB

1. Introduction

In May 2004, the Cambodian Government held a Workshop in Phnom Penh to consider the consequences of a study to establish an “Inventory of Used Lead Acid Batteries” In Cambodia. The Keynote Speech at the workshop was given by Dr. Thanavat Junchaya, from the UNEP/SBC Bangkok Regional Office. In the speech, Dr. Thanavat said that;

“Lead acid batteries are all around us and we couldn’t live the life we enjoy in the 21st century without them. When the French scientist, Gaston Plante, invented the lead acid battery in 1859, he could not have envisaged the critical role his creation would play today in transportation, communication, and electrical utilities, and as emergency backup systems. However, I don’t think he was aware of the dangers posed by lead either. We will not be able to live our life safely if we do not properly handle and dispose of used lead acid batteries. Improper disposal of lead acid batteries, such as being dumped in a landfill or an empty field can cause contamination of the environment and groundwater supply..... Lead is a highly toxic heavy metal.....Sulfuric acid is corrosive, it “eats away” or dissolves materials and living tissue by chemical action. Batteries improperly disposed of as regular trash pose a danger to refuse collectors who can come into contact with sulfuric acid.

In developed countries, proper handling and disposal of lead acid batteries are considered to be the environmental success story of our time. In the United States of America more than 97 percent of all battery lead is recycled. Compared to 55% of aluminum soft drink and beer cans, 45% of newspapers, 26% of glass bottles and 26% of tires, lead acid batteries topped the list of the most highly recycled consumer product. When a used battery is collected, it is sent to a licensed recycler where, under strict environmental regulations, the lead and plastic are reclaimed and sent to a battery manufacturer to be used to produce a new battery.

Unfortunately, the same thing cannot be said for the situation in many developing countries where environmental and workplace regulations are weak and/or not enforced. Poor practices such as discharging acid into waterways, dumping residual wastes outside properties is still common, even today. The lack of regulations and weak enforcement along with the high cost complying with the environmental and occupational health regulations for operating lead battery recycling facilities in industrialized countries caused a massive flow of lead battery waste trade to developing countries, particular in Asia during the 1990s.”

Thankfully, the widespread implementation of the regulations arising from the Basel Convention for the transboundary movement of hazardous waste has been largely responsible for reducing the shipment of used lead acid batteries from the developed to the developing world.

Nonetheless, the corrosive and heavy metal content of lead acid batteries does pose a potential risk to human health and the environment if they are not managed in an environmentally sound and safe manner. This is especially true when lead acid batteries reach the end of their useful life, but similar risks are applicable during battery manufacture and to a lesser extent during its use in whatever capacity that might be. Indeed, human health and environmental risks associated with lead acid batteries can be traced back through the life cycle to its primary source at one of many hundreds of lead mine-sites.

Human health and environmental risks associated with lead at the various stages of the life cycle are reasonably well documented and the European Risk Assessment currently being undertaken by the lead industry under the Chairmanship of the Dutch Government, will, by the end of the year, provide the most comprehensive and detailed assessment of the human health and environmental impacts to date.

Furthermore, what is also apparent, is that environmental and occupational health regulations, and increasing public awareness of the potential threats posed by lead acid batteries has lead the majority of major miners, smelters, battery manufacturers and recyclers to take very seriously the environmentally sound management of their treatment facilities and mine sites. However, whilst such close attention at individual sites to improved environmental and health performance is welcome, studies by the United Nations Conference on Trade and Development in the Philippines and the used lead acid battery project initiated by the Basel Secretariat in Central and South America and the Caribbean, have identified weak links in the lead acid battery life cycle, where sound management of all the risks associated with lead acid batteries is not always applied up and down the supply chain in a satisfactory manner.

Such weak links in the sound environmental management of lead acid batteries are not necessarily linked to a specific company. For example, when a motorists decides to sell a used battery directly to an unlicensed lead acid battery reconditioner who cares little for environmental abatement or safe working, for a few cents more than from a reputable battery retailer who would take the used battery and delivery it to a licensed smelter; then it is not easy to place sanctions on the customer, who is ostensibly to blame for the battery finding its way into the “wrong” hands.

In a similar way, a mine site could legitimately sell lead concentrate on the international market and be unaware of the circumstances under which the concentrate is treated and processed. The same logic would apply to refined lead bought through the London Metal Exchange (LME) and shipped from one of its global warehouses to a battery manufacturer.

In the first instance the company placing the refined lead on the LME has engaged a legitimate trade, but in doing so has no idea who will buy the lead “bundle”, where that lead will be used or how it will be processed. The lead acid battery market is huge and global and there are many players, most with excellent control mechanisms for environmental and occupational health management, but there are some with either dubious or suspect environmental credentials.

Green Lead proscribed procedures aim to “plug” the weak links in the lead acid battery life cycle in four ways:

- i. Firstly, by requiring lead miners, primary and secondary lead smelters and battery manufacturers to only sell or authorize their products to be sold to Green Lead Certified customers. In practice, this means that the miners will only sell their concentrate to certified Green Lead Smelters and in turn, the smelters will only sell the refined lead and leaded alloys to Green Lead Certified battery manufacturers.
- ii. Secondly the battery manufacturers will be required to sell their batteries to Green Lead Certified retailers that work in conjunction with national and/or local government agencies to provide financial incentives that are sufficiently high enough to ensure that customers return the used batteries to the retailer so that they can be sent to a licensed secondary smelter in the formal sector of the industry for environmentally sound recycling.
- iii. Thirdly, by persuading the major consumers of lead acid batteries, such as the leading motor manufacturers to only buy new batteries for their vehicles from Green Lead certified producers.
- iv. Finally, through community based education programs and improved labeling of lead acid batteries, guidance to consumers about the importance of behaving in an environmentally sound manner and returning the used lead acid battery to a retailer displaying the “Green Lead” logo, thereby ensuring that the battery will be recycled in a manner that is consistent with sound environmental practice and with proper regard for occupational and population health and safety.

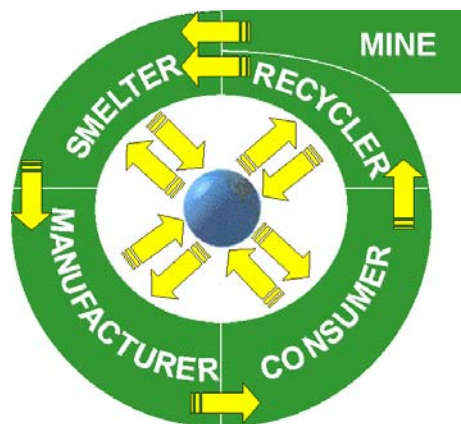


Figure 1 – Green Lead Logo

2. Product Chain Management

Product chain management is a consequence of Life Cycle Assessment, because when the product life cycle impacts are evaluated, it is increasingly apparent that the impacts are strongly influenced by the actions of the players in the product chain. Indeed, the concept of product chain management highlights the fact that environmental improvements in the product chain call for the stakeholders to co-operate with each other. In this respect, all the parties in a product chain depend on each other in the search for, and the implementation of, environmental improvements within the chain¹. This can be particularly evident in complex product chain that involves many tiers of suppliers or millions of customers as it is the case lead acid batteries. Environmental information from the different sectors is needed, making communication an essential feature for environmental improvements to be implemented and maintained.

Examples of the environmental benefits of product chain management are few and far between because the implementation of the concept is still in its early days, but interest has been growing for the following reasons:

- Product chain management provides a framework for sustainability rather than just sound environmental practice;
- Sustainability cannot be achieved through the good conduct of an individual company or sector, but can only be achieved through the collective actions of all the players in a product's life cycle;

3. Basic Components of Product Chain Management

Effective product chain management has three basic components:

- i. Downstream steering – that is, product stewardship

The integration of downstream issues, such as the ease and efficiency of recycling is dependent on upstream decisions such as battery design and the efficient collection of the used batteries by retailers. In addition, to the need for environmentally sound recycling and manufacturing and the prevention of adverse environmental impacts, there are the potential cost savings for the recyclers if battery components are well designed for easy manufacture and separation during the recycling process.

See figure 2, the Basic principles of Product Chain Management.

¹ World Commission on Environment and Development (WCED). *Our Common Future*. (Oxford: Oxford University Press, 1987). In J. Cramer. *Loc. cit.*

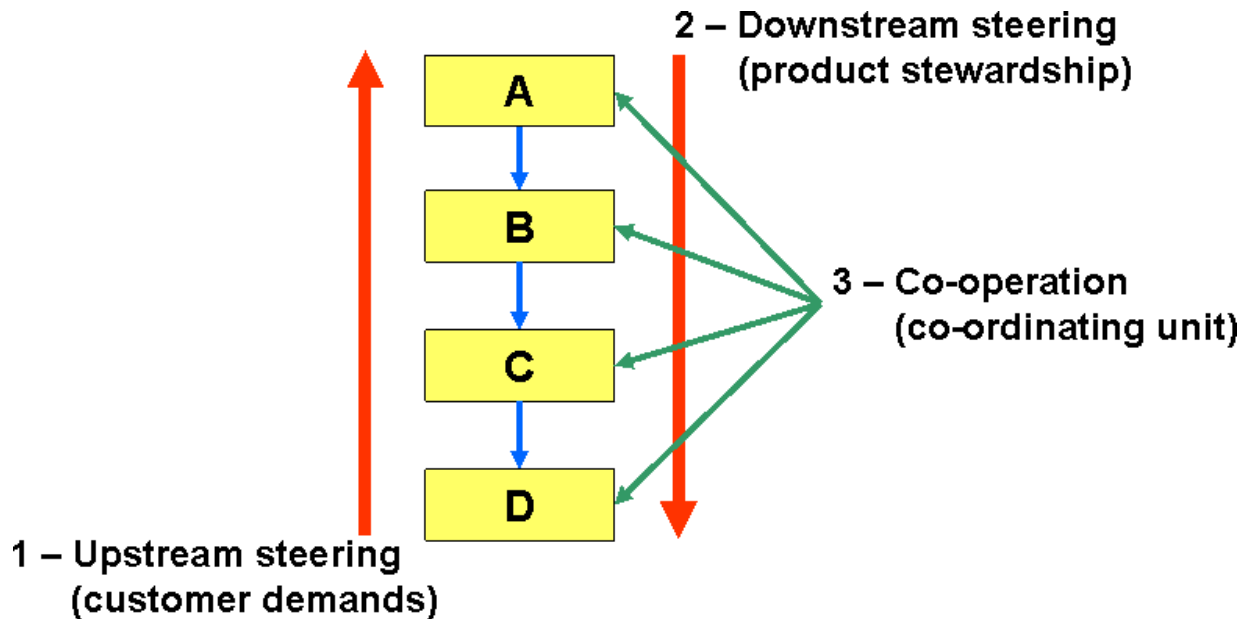


Fig. 2 - Basic principles of Product Chain Management²

- ii. Upstream steering – that is, placing demands on suppliers

The major buyers of lead acid batteries are the motor manufacturing companies and they already impose specific criteria on the battery manufacturers with regard to battery size, quality and current capacity. It would be an easy matter for the motor manufacturers to insist on the adoption of an environmental management system (EMS) that guarantees that the battery has been produced with due regard to the environment and the health of the workers on the assembly lines.

Supply chain management has long been a very useful management tool that has enabled companies to cut costs through competitive tending and working capital through “Just in Time” delivery mechanisms and so on. Today more and more companies are including environmental criteria in the specifications to their suppliers. Ford Motor Company, for example, has adopted ISO 14001 as the benchmark for suppliers as it increases out-sourcing of activities. Companies are increasingly using Life Cycle Assessment³ in their efforts to be seen as “green and clean” throughout the life of their product. This supply chain pressure will undoubtedly increase, not only horizontally across business sectors, but also vertically through product chains, affecting several layers of suppliers⁴.

² Based on a diagram from L. Linnanen, ‘Closing the loop: innovative environmental value chain management in the paper-based packaging industry’. *5th International Research conference of the Greening of Industry Network*. November 24-27, 1996. Kongreßhaus Stadthalle Heidelberg, Germany.

³ [Heiskanen, Eva.](#) (1999). Every product casts a shadow: but can we see it and can we act on it? *Environmental Science and Policy* 2: 61-74.

⁴ Greener Purchasing - Opportunities and Innovations. Edited by Trevor Russel. 1998. p.178

Furthermore, increased public awareness of potential environmental threats posed by the indiscriminate disposal of used lead acid batteries has led to customers buying replacement batteries to demand information about recycling, and it will not be long before they require details of a battery's environmental credentials before a purchase is made. Such a discerning buying public will be welcome by the battery manufacturers and the recyclers because the better the understanding of the environmental threats, the more likely are the used batteries to be returned to properly managed collection centers in retail outlets and garages.

iii. Co-operation – that is, coordinating activities between stakeholders

Even in these days of global markets and multinational conglomerates, ensuring environmental performance throughout the whole product chain of a lead acid battery is beyond the ability of any one company, because there are so many players in the chain. It is under precisely these circumstances that a specific organization set up to support, promote and authenticate the process is the best way to ensure that there is a dynamic dialogue and full cooperation between the players up and down the product chain resulting in ongoing improvements in environmental performance. Hence the need for the Green Lead initiative, which would act as the umbrella organization defining not only environmental and health standards, but in terms of cooperation, the “rules of engagement”.

4. Maintaining Environmental Compliance through the “Corrective Action Model”

Lead acid batteries are a unique product because not only are they subject to the global trend towards environmental policies aimed at products generally, but the used batteries are also subject to policies and conventions applicable to hazardous waste. Hence the need to take a life cycle perspective when considering the management of all the environmental and health risks associated with the life of a lead acid battery.

The implementation of such a methodology requires a holistic approach, whereby all the stakeholders involved in the product's life cycle, as well as the risks and impacts are considered. In turn, this increased complexity calls for an integrated approach whereby all the players in a product chain are required to act in unison towards maintaining environmentally sound practices throughout the life cycle.

However, such co-operation runs counter to certain traditional business relationships. For example, a lead concentrate supplier will not only have to check the financial and credit status of a prospective customer, but also their environmental credibility. Any ongoing relationship will have to be open and each “partner” will have free access to the other party's site and operations to audit environmental performance. Such changes in business practices are inevitable if the lead industry is to demonstrate the environmentally sound management of lead acid batteries and accept a role and a responsibility within the framework of the whole life cycle.

To an extent this new approach has begun, as the forthcoming European Battery Directive places a legal 'extended producer' responsibility for recovering used batteries upon the battery manufacturers. However, the imposition of such a legal requirement on one key player in the life cycle of the lead acid battery will also have implications for the other players in the chain, particularly the retailers and vehicle repair shops who will be directed by their battery suppliers, that is the battery manufacturers, to ensure that a new battery is not sold without collecting a used battery in return. Furthermore, the transport companies that deliver new batteries to retailers will be instructed to collect pallets of used batteries when they deliver new supplies to the shops and garages. This is a good example of how legislation imposed on one of the main players in the product chain has implications on the other players.

Green Lead is not a law, but compliance with the requirements of environmentally sound management, the application of safe working conditions, and ensuring that suppliers and customers meet the same demands required by the Green Lead code calls for the co-ordination of the activities of the players throughout the product life cycle. This will be achieved through the use of common standards, procedures and independent audits.

Indeed, environmental auditing is a vital part of any organization's environmental management system (EMS). Audit findings generated from the use of internal and independent audits can be used as a basis to implement improvements, upgrade operations, or benchmark environmental management performance. Regular environmental auditing with quality feedback into an EMS is a key ingredient in a high quality environmental management program and will function best when an organization uses the findings from the audits to identify the "root causes" of any problems. Identifying and eliminating the root causes is the most effective means of making sure that the problem does not reoccur.

A typical audit process involves three basic steps and these are shown in the lilac shaded area of figure 3; namely, conducting the audit, identifying any problems and then fixing the deficiencies. However, if the audit process is expanded to include a root cause analysis to identify and correct root causes to noncompliance, and common causes of problems across an organization, then the corrective action taken as part of the EMS becomes long lasting and consequently more effective.

Expanding the audit process provides a far better means of sustaining environmental performance, maintaining good occupational health regimes and maintaining high standards of safety compliance. When and where problems are identified the root causes can be quickly found, any failures in the control systems or the management processes discovered and action taken to eliminate the problem and prevent future deviations or violations. In each case, it should be noted that the isolation of a problem and the identification a root cause that uncovers system or management failures is a successful use of the "Corrective Action Model". Apportioning blame to any one person or group should not be part of any Green Lead pro active continuous improvement process designed to promote honest and open debate and facilitate progress towards environmental excellence.

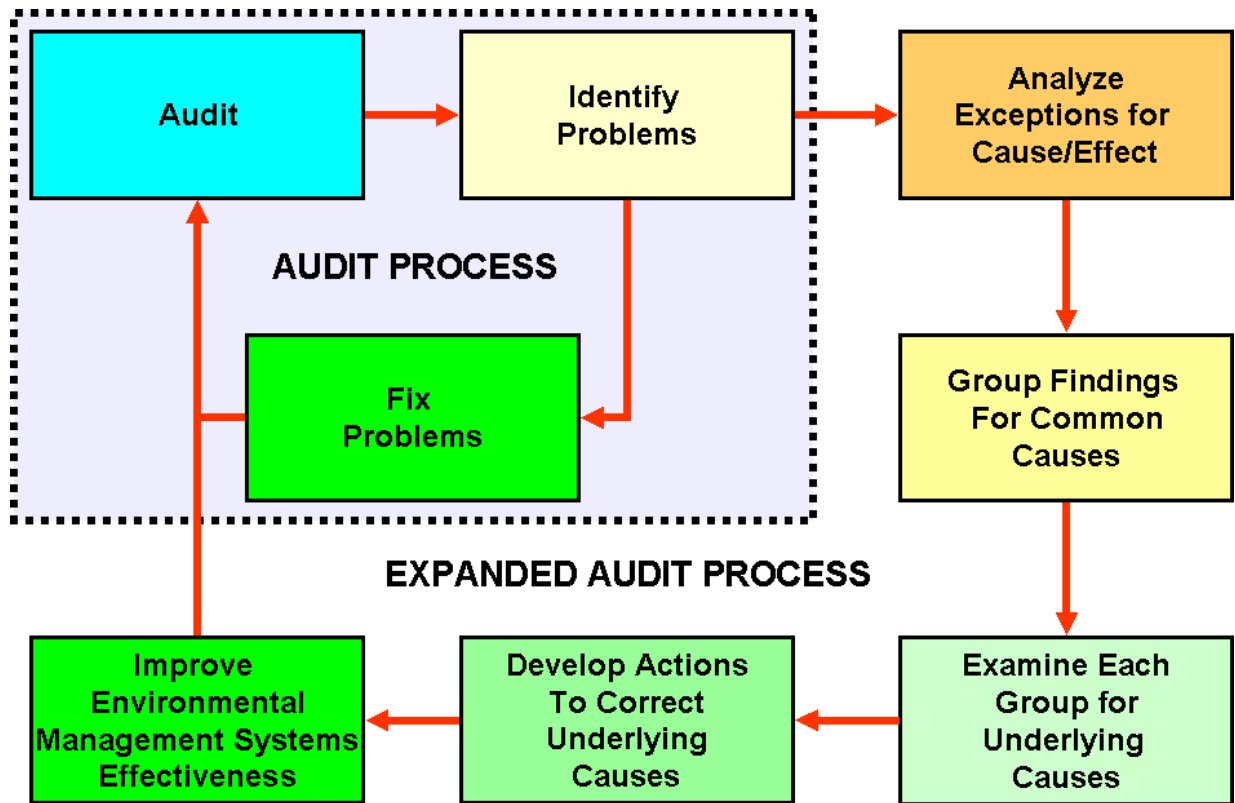


Fig. 3 – Corrective Action Model⁵

5. Core Requirements of Green Lead

There are three core ground rules fundamental to a Green Lead product stewardship scheme.

- i. Firstly the whole process must be open, honest and transparent. All relevant information, data and audit reports must be made available in the public domain for inspection.
- ii. Secondly to guarantee the credibility of Green Lead Certification there must be independent third party verification. In the case of Green Lead, the Working Group would like NGO's such as the World Wildlife Fund to be involved in the development of the scheme and of suitable standards, audit and certification procedures.
- iii. Finally, Green Lead requires commitment, collaboration and cooperation between the lead industry, governments, NGOs and community groups throughout the product chain. It is essential therefore, that from the outset, a Green Lead program is a multi-stakeholder joint venture.

⁵ US EPA - Protocol for Conducting Environmental Compliance Audits under EPCRA and CERCLA

6. Components of Green Lead

i. Environment, Occupational Health and Safety

Environmental, health and safety performance standards for “Green Lead” will reflect international best practice, including the World Wildlife Fund’s Certification of facilities for mine sites; the Basel Technical Guidelines for the Environmentally Sound Management (ESM) of ULAB; the environmental management systems advocated under ISO 14001 and guidelines outlined for the Occupational Safety, Health Assurance System (OHSAS) 18001 for safety and health management systems.

ii. Lead Exposure Levels

Wherever possible, common criteria, such as lead in blood levels, lead in air threshold values and effluent discharge limits will be in line with the recommendations of the latest scientific assessment contained in the European Lead Risk Assessment due to be published in its final form by Dutch Government at the end of 2004. The criteria specified will be applied across all the sectors in the cycle, as will international protocols such as the procedures applicable to the transboundary movement of ULAB contained in the Basel Convention.

iii. Social Responsibility

However, it should be noted that compliance with lead in blood levels through employment discrimination is not an acceptable control mechanism under the Green Lead program and companies will be required to demonstrate a social responsibility towards the industry’s workers and local communities. The criteria for this component of Green Lead Certification in respect of workers rights and social development will be in line with the International Labour Organization’s (ILO) 1998 Declaration on the Fundamental Principles and Rights at Work. Companies will be expected to comply with the terms of the Declaration and provide not only medical surveillance, but intervention, direction and guidance to employees to ensure that safe and healthy working practices are followed at all times.

iv. Site Remediation Planning

A number of companies applying for Green Lead certification may have facilities with legacy issues resulting from past practices. Indeed, it is anticipated that certain operations currently regarded as part of the “informal sector” will apply for Green Lead Certification when they improve their environmental performance in order to demonstrate their “formal sector” credentials. Initial assessment steps in the Green Lead audit procedure will identify and quantify any remediation issues and if a Remedial Site Management Program is required, it will be set up through consultation with local Communities, government agencies and be in place ready for implementation at the appropriate time. The timing will vary and in some cases there may be a need to implement the plan immediately and in other cases, as and when the plant or mine closes.

7. Green Lead Audit and Certification

Environmental, Occupational Health and Safety Management Systems based on these standards will be subject to site inspection and audit for Green Lead certification.

There will be two types of audit, internal and external.

The internal audit is designed to be used as a control tool to maintain GL compliance and should be conducted on a monthly basis by trained employees. The first month in the audit cycle the target will be one division or department within the organization and the following month one customer or supplier up or down the product chain. In this way, in any six month period the whole organization and the immediate contacts in the product chain are audited. The internal audits should be conducted in line with the “Corrective Action Model” using an open and non judgmental approach to obtaining information and making reports on matters of non compliance.

In the “run up” to an independent Green Lead Certification Audit, the widespread use of internal audits will be essential to making any changes necessary to meet with the Green Lead Standards.

The external audits will be conducted by an independent and accredited Green Lead Auditor, or in cases where specialist knowledge is required an audit team, who will visit and inspect sites applying or eligible for Green Lead Certification. The criteria used to assess the environmental, health and safety compliance of the operation, community relations and social responsibility will be based on the components listed above in paragraph (iv) and depending on the nature of the operation, will include an examination or inspection of the:

- ✓ Company’s environmental, health, safety, reporting, public relations and training policies
- ✓ Risk assessments on all sectors of the operation
- ✓ Implementation of safe working practices and accident investigation
- ✓ Use of control and mitigation measures for any fugitive emissions, discharges or legacy problems
- ✓ Systems used to identify and manage environmental and health impacts
- ✓ Levels of compliance with prevailing national and international environmental, health and safety legislation, employment laws, waste conventions and emission regulations
- ✓ Emergency response measures, disaster plans and evacuation procedures
- ✓ Operation of effective environmental and safety monitoring programs
- ✓ Application of occupational health surveillance regimes
- ✓ Chain of custody interactions to improve environmental performance
- ✓ Continuous improvement initiatives and employee development programs
- ✓ Community relations and public engagement agenda
- ✓ Open reporting, reporting structures and disclosure procedures

Organizations with certification for ISO 14001 or OHSAS 18001 or equivalent will be exempt from certain sections of the Green Lead Audit where those sections are already covered by the ISO 14001 or OHSAS 18001, but the internal and external dynamics of the lead acid battery life cycle will be thoroughly checked for the degrees of intervention used with the immediate links in the custody chain.

Prior to the first Green Lead Audit for Certification, it would be prudent to have an initial and less formal preliminary inspection by one of the accredited auditors to identify any obvious areas of non compliance. In this way the organization can be advised of their prospects of Certification and where there are areas of concern, the Auditor can objectively advise the company of the course of action required to meet the criteria pass the Certification Audit. The Auditor will also be in a position to discuss and agree with the organization's representatives an appropriate timetable to enable any necessary improvements to be made and set a date for the final certification audit.

It is anticipated it will be necessary to conduct a re-certification audit every two years, albeit a second and subsequent audits should not take as long as the first Certification Audit.

Whilst it is outside the scope of this concept paper to go into the details of the certification requirements for steam pressure boilers and liquid oxygen storage silos, the use of trained personnel to set up grinding wheels and so on through all the operations in every sector within the lead acid battery's life cycle, three points should be of particular note:

- Firstly, while certain audit criteria, such as lead in blood standards, may be generic, for matters concerning issues such as safety, there will be different audit check lists for mine sites, battery manufacturers, retailers, garages, used battery collection depots, used battery transporters and secondary lead smelters.
- Secondly, Green Lead Certification criteria go beyond legislative requirements in two key areas, namely Community and Stakeholder Relations, and Product Chain Interaction. Organizations will be expected to demonstrate an ongoing improvement in public relations through community outreach programs that deal with complaints, educational matters, such as the promotion of recycling, and a pro active media agenda.
- Finally, a Green Lead audit is not just about passing a series of tests; it is very much about the assessment of the ongoing process of continuous improvement. This is likely to be in association with other initiatives, which although not part of the Green Lead criteria, are aimed at more sustainable operations. For example, secondary lead producer's energy consumption is dependent on a number of factors including, the smelting process, the climate, the feedstock and the burner systems. Safety requirements for all the equipment used in the smelting process is proscribed in national legislation, and combustion emissions such CO₂ are now being tightened as a result of the implementation of commitments made by the Kyoto Treaty.

Nonetheless, just meeting these legal obligations is not, in itself a measure of continuous improvement. In the case of the secondary smelter mentioned above the auditors will be interested in plans for improved energy efficiency. Such plans have enormous scope, but may include the use of furnace combustion waste heat to dry battery paste, the introduction of oxygen enrichment to gas burners, the use of holding kettles for furnace bullion instead of block casting and re-melting and so on. Of course, such improvements are not only environmentally desirable, but will also reduce smelting costs thereby making efficient energy use a winner for everybody.

Two examples of what are likely to be typical Green Lead Audit Summary Report sheets can be viewed in appendices [1](#) and [2](#).

The comprehensive summary sheets are divided into two distinct sections to reflect the manner of the audit. That is, the audit will check and record the degree of compliance with statutory requirements and separately note the compliance with the organization's own policies, which should reflect the requirements of the Green Lead standards.

It should also be noted that the summary sheets provide a framework for continuous improvement, so that, where there is an identified non-compliance, the auditors will be expected to make a recommendation to correct the deviation, albeit this may be the result of discussions with the local management. Furthermore, to ensure commitment to the prescribed task, a person in the organization will be nominated to implement any recommendations and they will have to be done by an agreed date, which is recorded in the final column. The action point will then be the subject of ongoing internal auditing as outlined above.

8. Green Lead Standards

The Green Lead standards for lead acid batteries will be consistent with the ISEAL Code of Good Practice for Setting Social and Environmental Standards. Furthermore, they will embrace the best industry practices from the mining sector, through primary smelting, battery manufacture, used battery collection and secondary smelting for environmental management, occupational health and safety. In this way, the vast majority of the standards for Green Lead certification will already be familiar to organizations with Environmental Management Systems (EMS), Occupational Health Programs (OHP) and Safety Management Systems (SMS).

However, at this stage in the development of the Green Lead initiative, virtually all of the standards are still in a draft format. Consequently, this concept paper will focus on the implementation and use of one of the draft generic standards as a model for all the others. The draft standard selected for discussion is for "Biological Monitoring and Medical Surveillance". (See [Appendix 3](#))

The Biological Monitoring and Medical Surveillance standard is in keeping with the spirit of the Green Lead philosophy, that is, the standard sets out the basis for the frequency of sampling and the lead in blood limits for medical removal, but it also provides ground-rules and guidance for the management of occupational lead exposure.

Statutory requirements for biological monitoring and medical surveillance typically set out the frequency of testing and the lead in blood levels that trigger suspension, but do not require employers to carry out an investigation to establish the reason or reasons for any elevation in personal lead in blood levels. Neither does a suspension place any obligation on the employee to assist in an enquiry into his or her rise in lead in blood levels.

The Green Lead Biological Monitoring and Medical Surveillance standard also sets out the principles to protect workers from punitive actions, such as dismissal or a sudden drop in earnings following medical removal. In this respect, it is however, balanced and provides a time limit for the protection of earnings during medical removal and a procedure for a final removal of a worker from exposed areas. Certain countries have laws that provide for longer periods of earnings protection than the period stated in the Green Lead standard, but others have none at all. For those countries with legislation that goes beyond the terms outlined in the standard, then the national legislative requirements will prevail. However, for many countries the Green Lead procedure will be welcome by the workers and certainly endorsed by the International Labour Organization.

While some employers in the developing world may be concerned about protecting worker's earnings, virtually all cases of occupational blood lead elevation, are primarily found to be due to causes which can be readily dealt with. These include a lack of good personal hygiene practices, such as a lack of the correct respiratory equipment or wearing respirators incorrectly; exposure levels higher than necessary due to operators' ignorance of the correct control mechanisms; or ignorance of the correct operating procedures; or poor design or maintenance of the control systems. In fact, contrary to what smelter owners in the developing world might think, there is every reason to make good any deficiency in a person's understanding of good hygiene practice and to provide face mask, which is relatively inexpensive, in order to ensure a quick return to normal duties for any suspended workers.

The Green Lead Biological Monitoring and Medical Surveillance standard requires lead in blood sampling at a minimum of every six months for exposed workers, but the Green Lead Standard encourages the continual use of good practices in personal hygiene, the correct use of emission control systems and sound environmental practices to keep occupational exposure under control. The bi-annual blood test for employees is then just a means of confirming good supervision of the operation and the operating personnel.

However, in the event that a lead in blood value is above the level for suspension, then the guidelines contained within the Standard provide a framework for a thorough investigation into the matter with every prospect that the cause or causes will be found quickly and the reasons for the elevated lead in blood level eliminated.

Green Lead is about Product Chain management, and the standards for Green Lead Certification are about the application of management principles to the control of occupational lead exposure through the Biological Monitoring and Medical Surveillance Program, but the same management principles will be applied to the Environmental Management System (EMS) and safety through the Green Lead Standards⁶.

9. Green Lead Hierarchy

Maintaining the value and credibility of Green Lead Certification is of paramount importance to all those involved in the initiative. Consequently, governance is a major concern and will be built upon the principles of participation, democracy and equity. In this respect Green Lead will use the methodology adopted by ISEAL as the basis for determining the structure and hierarchy for Green Lead.

With the widespread anticipated participation of the lead industry in the developing world it is very important for Green Lead to be a “lean” not for profit organization with low overheads. With this in mind, the multi-stakeholder hierarchy will only have three layers and a secretariat consisting of one part time secretary. (see Fig. 4)

The highest body in the Green Lead organization will be the eight members of the elected Governing Body and this will comprise of three representatives from the Lead Industry, one of which must be from the developing world; two representatives from environmental NGOs; two representatives from intergovernmental bodies and one representative from academia. Such a make up ensures that the lead industry does not have a majority vote; that any split vote will result in a tie and so lead to a consensus viewpoint on any issues. The Executive Director and the Treasurer will be elected from within the Governing Body and no other official positions will be created.

The Governing Body will be responsible for establishing and setting out the framework for the development and maintenance of Green Lead standards, Green Lead Auditor Accreditation, Green Lead Audit Certification procedures, and Green Lead Training Materials for use in Seminars and Workshops.

Reporting to the Governing Body will be three working groups, the Standards, Audit and Steering Committees, whose functions will be to improve the Green Lead concept within their own remits, that is, standards, auditing and external development.

⁶ It is anticipated that the Green Lead Standards Manual will be ready for publication at the London Workshop in April 2005.

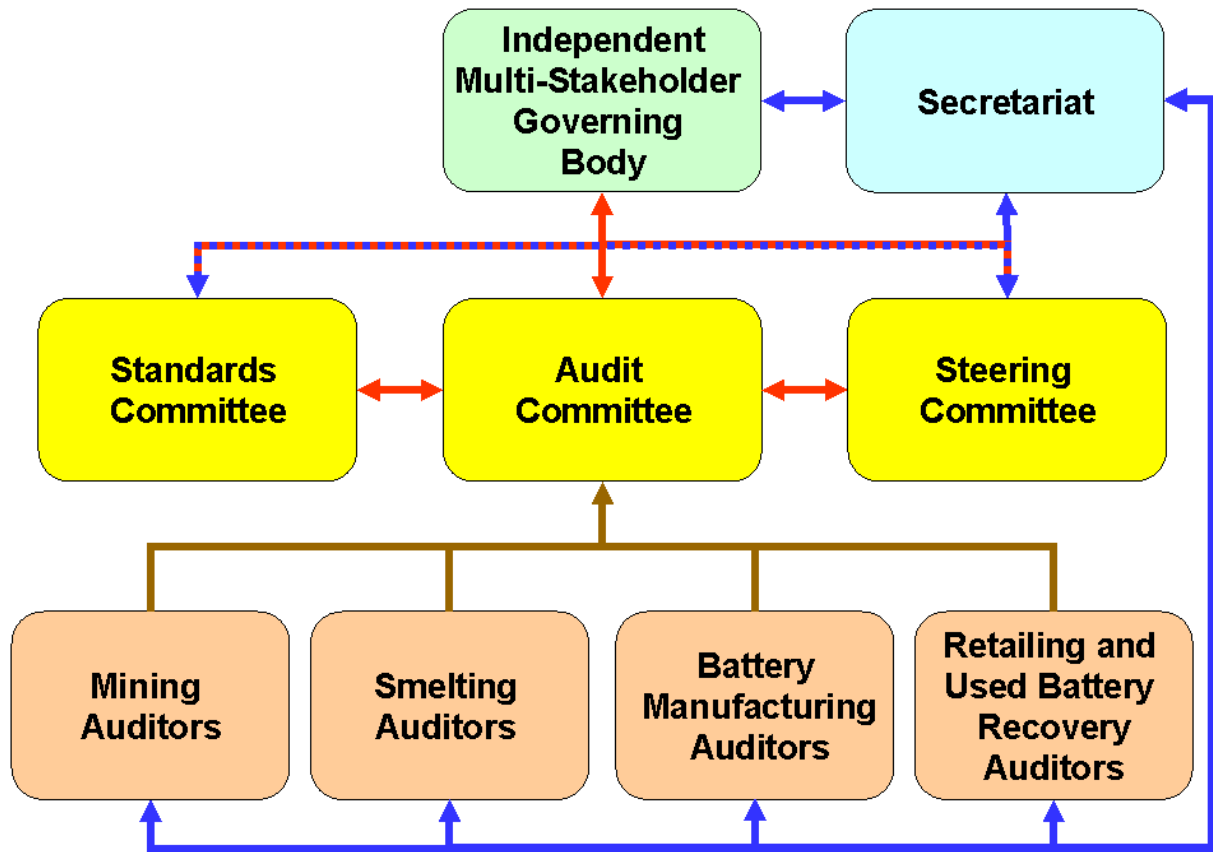


Fig. 4 – The Green Lead Organization

Membership of the three Committees is by election of the Green Lead membership and is unpaid. The three committees will liaise with each other and maintain good interaction with the Governing Body.

The accredited Audit Team will consist of specialist in the fields of mining, primary and secondary smelting, battery manufacturing, battery retailing and used lead acid battery collection and transportation. Day to day work assignments will be undertaken by the Secretariat and all reports will be sent to the Secretariat for distribution, but the auditor will also be required to bring to the attention of the audit committee members any issues of special interest or matters requiring their attention directly.

The GL Secretariat will be responsible for maintaining records of Green Lead Certified members, receiving applications for Green Lead Certification, organizing Green Lead audits and any training sessions, collecting and disseminating audit reports, preparing Green Lead Internet bulletins and updating the web site, preparing the annual reports, collecting any membership fees and updating the Green Lead Standards Manual. All correspondence will be electronic and administration will be kept to a minimum to keep overheads as low as possible.

10. Combining the Green Lead Standard with the SBC ULAB Projects

10.1 The SBC ULAB Study in Central and South America and the Caribbean

In May 2001 the Secretariat of the Basel Convention held a Workshop in Port of Spain, Trinidad, to launch a study into the Environmentally Sound Management of Used Lead Acid Batteries (ULAB) in Central and South America, and the Caribbean.

The countries participating directly in the study are Mexico, El Salvador, Costa Rica, Panama, Colombia, Venezuela, Trinidad and Tobago, St Lucia and the Dominican Republic. It was always envisaged, however, that the study would devise an environmental “blue print” for the region and that the study would eventually include other interested countries such as Guatemala, Belize, Honduras, Nicaragua, Ecuador, Brazil, Dominica, Cuba and Jamaica.

The studies readily identify two distinct industrial sectors in the Region, that is, the “formal” and “informal” sectors. Examination of these two sectors showed that the “formal” sector comprises of licensed and regulated businesses, and the “informal” sector is made up from a multitude of shops and garages, some registered, some not, but all earning a living by whatever means including legitimate as well as environmentally unfriendly activities.

Those companies in the formal sector are structured with a developed customer and resource base while those in the informal sector rely on opportunities and good fortune. This means that the formal sector collect ULAB through an established network of retailers and suppliers, whereas the informal sector tend to be “scavengers” relying on whatever can be found wherever that might be.

Two of the main secondary lead smelters in the region are subsidiaries of fully integrated companies, in that, other divisions in the group are battery manufactures and rely on the smelting division to provide the refined lead for battery manufacture.

The informal sector do not have a main customer base, but are somewhat fragmented in their activities, sometimes making fishing weights from lead recovered from ULAB and on other occasions selling the lead bullion to the battery manufactures.

In essence the formal sector comprises of organizations that are focused on recycling ULAB and are almost exclusively part of large corporations or dealerships with international partners or trading links that require environmentally sound management as a key business principle.

The informal sector, however, is a mixture of some battery retailers that send the majority of ULAB collected to a licensed recycler while also engaging in battery reconditioning in small backroom workshops causing acid and lead contamination of the sanitation system; and others who produce lead bullion by melting and smelting ULAB without any control mechanisms in the most environmentally unacceptable way.

To date the study has shown that there are many ways that ULAB are collected and they are to be found in garages and repair shops, and where new and reconditioned batteries are offered for sale. In the Caribbean islands there is a thriving second-hand auto trade and thousands of used Japanese cars are imported into the region every year to be broken up for spares. Many of these vehicles have a used lead acid battery, which have been imported as a component of the vehicle and once offloaded the ULAB is removed from the vehicle and shipped to Venezuela for recycling.

Finally, there are people throughout the Region in local communities, sometimes in groups, that scavenge for discarded materials that can be reused or recycled. They will scour waste dumps, strip abandoned vehicles and wrecks and even collect LAB that have been used for standby power in domestic houses. The destination of many of these ULAB is uncertain.

It was also evident from the studies that local ULAB collection facilities are not necessarily easy to manage. ULAB were often stored on open ground, at the rear or the side of a retail shop, adjacent to a garage or even a house. Occasionally ULAB were seen to be stored in the street outside a repair shop. Such storage practices are most unsatisfactory as acid can leak uncontrollably and children can “play” with the batteries.

Action being undertaken by government agencies and industry in the Region will make improvements to the way that ULAB are collected and stored. However, it was always realized from the outset by all the participants in the study that there will be some countries in the Region without adequate facilities to recycle the ULAB and other countries with a thriving secondary lead industry with capacity to take the ULAB from those countries or island states without recycling capacity.

The Basel Convention provides the ideal set of rules for the export of ULAB from one country to be recycled in an environmentally sound manner in another country. These rules are known as the Regulations for the Transboundary Movement of Hazardous Waste.

The Basel Convention for the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted unanimously in 1989 by the 116 states participating in the Conference of Plenipotentiaries. UNEP convened the conference in Basel, Switzerland. The Final Act of the Basel Conference was signed by 105 states and the European Economic Community (EEC) and it entered into force on May 5, 1992.

Used Lead Acid Batteries destined for disposal are classified as a Hazardous Waste under the Basel Convention and are therefore subject to the regulations for Transboundary Movement if they are exported from one country to another for recycling. The regulations have been designed to ensure that hazardous waste recovery is undertaken in the destination country in an environmentally sound manner.

A country wishing to export ULAB under the terms of the Basel Convention can do so only if there does not exist a more environmentally sound alternative within the country, and even then, the export must be in accordance with the provisions of the Convention. This means that the country wishing to export the ULAB for recycling must ensure that the company engaged to recycle the ULAB in the country of import will do so in an environmentally sound manner and that the export procedures follow the principle of Prior Informed Consent (PIC). PIC, means that the country of export has to inform the competent authority of the country of import of the intended transboundary movement of the ULAB, and assure the authorities that the ULAB shipment will not be exported until the necessary approval from the country of import has been received.

After receiving the notification of the intended transboundary movement of ULAB, the country of import should reply in accordance with the notification procedure under PIC. Countries that receive notification of the intended transboundary movement of ULAB do not have to authorize the import if they believe that, for example:

- i. The ULAB will not be recycled in an environmentally sound manner (Art. 4, para. 2 e).
- ii. The ULAB will not be packaged, labeled, and transported in a way that conforms with recognized standards, such as those set out in the Basel Technical Guidelines
- iii. There is an environmentally sound ULAB recycler in the country of origin.
- iv. The country applying to export the ULAB is not a Party to the Basel Convention and has neither entered into a bilateral, multilateral, nor regional agreement for the export of ULAB.
- v. It is illegal to import ULAB in the country destined to receive the ULAB.
- vi. The person or persons designated to arrange and oversee the export and import of the ULAB are not suitably qualified or experienced to do so.
- vii. The necessary or required mandatory insurance bond is inadequate

From an administrative point of view, whilst the PIC procedure can look somewhat bureaucratic, it is essential that the mechanism for the transboundary movement of ULAB adequately provides the necessary checks and balances to ensure that the ULAB are exported and recycled in an environmentally sound manner and that there is a written audit trail to track the sequence of events should a problem arise with a particular package.

However, it is not always an easy matter for environmental law enforcement officers in the country of export to determine whether the ULAB will be recycled in an environmentally sound manner in the country of import unless:

- They have visited the recycler and checked the environmental credibility of the process personally
- The plant has an internationally recognized certificate for ESM
- There exists an independent report of the operation confirming ESM

Similarly, it is very difficult to check that packaging for transit confirms with the Basel Technical Guidelines unless the inspectors have absolute faith in the exporter or they have witnessed the packing themselves.

Most of the major recyclers in the developed world have obtained ISO 14001 Certification for Sound Environmental Management and very often such certification is required by battery manufacturers as standard for any supply contract. Whilst ISO 14001 certification is very desirable and always a welcome measure of environmental commitment there are inherent problems with the use of ISO 14001 as the sole means of determining environmental credibility. Firstly, ISO 14001 is primarily a means of assessing environmental management systems and all the participants in the SBC study in Central and South America and the Caribbean, and indeed any of the other recent studies in Cambodia and the Philippines are well aware that it is very important when assessing an organization to take into consideration employment practices to ensure for example, that children are not being exploited; that workers are not exposed to unsafe working practices; and that locally sourced ULAB are handled, stored and delivered to the recycling plant in a manner consistent with the Basel Technical Guidelines. Furthermore, the ISO certification procedure is expensive and demands resources to not only procure all the documentation for the risk assessments and training records, but also to maintain the ongoing audit trails required for re-certification. Indeed, certain recycling plants in the developing world have openly stated that whilst ISO Certification is a goal for the organization, it is too expensive at the present time.

Nevertheless, without an internationally recognized standard for environmentally sound management the export of ULAB from one country to another for recycling may be delayed, suspended or denied by the country of export if the regulators cannot be certain, short of personal inspections, that the ULAB will be shipped and recovered in an environmentally sound manner.

The ULAB study in Central and South America and the Caribbean did permit expert assessment of secondary lead plants and some of the collection, packaging and transport operations in Mexico, El Salvador, the Dominican Republic, Venezuela and Trinidad. As a result of these assessments three secondary lead plants, namely two in Venezuela and one in El Salvador were deemed to be environmentally sound and the ULAB collection and transport networks in Mexico and Trinidad were confirmed as environmentally sound and safe operations. The managers at one of the secondary plants in Venezuela were keen to ascertain the changes required to the operation to bring the lead content of the furnace residue into compliance with government regulations, but at the time of the inspection were not paying sufficient attention to the way that ULAB processed at the plant were collected, stored and delivered, that is, the upstream interest in the product cycle was absent. Similarly, it was only after the second visit to the plant in El Salvador that proper attention was paid to the way that ULAB are collected and transported to the site for recovery. The identification of these shortcomings in the management procedures is, of course, one of the major reasons for the study and the improvements resulting from the visit reports confirm that study is delivering results leading to improved environmental performance.

It has to be borne in mind that, persuading the managers at secondary lead smelters, particularly in the developing world, to permit a full inspection of their operations is not always an easy matter. First encounters between any team inspecting a plant and the managers are, not surprisingly, tense affairs, until trust and understanding is established between both parties. In a genuine effort to build trust the initial inspections were undertaken in a thorough, but relaxed manner. That is, every area of the operations was inspected, but the team did not carry clip boards or note pads, or appear to work to an audit pattern. There is no doubt that this approach did give the plant managers the feeling that they were not being subjected to a critical review of the operations and there quickly developed a constructive rapport between the parties. All the plant visits were followed up with full reports on the environmental performance of the operations and recommendations to correct any deficiencies in ESM, and to the credit of the local Government Environmental Agencies, their officers also revisited the plants to ascertain if the feedback from the visit reports was helpful and to determine whether the recommendations made in the reports were being implemented.

Nevertheless, while the plant visits and inspections identified those operations that are environmentally sound and provided a framework to raise the performance of the other plants, there is no certificate or stamp of approval that can be used by countries in the region to ascertain whether an operation is environmentally sound for the purpose of authorizing a transboundary movement of ULAB. The Basel Secretariat have already identified the need to put in place a form of formalized certification procedure that can be used to confirm a plant's environmental credibility and be used to authorize the transboundary movement of ULAB in the full knowledge that the ULAB will be recycled in a safe and environmentally sound manner.

In addition to the need to formalize any secondary lead plant certification, the Basel Secretariat have also identified an urgent need to raise the level of awareness across all the industrial sectors and government agencies in the region of the safe and environmentally sound procedures that should be adopted for the collection, storage and transport of ULAB for domestic recycling and transboundary movement. In this respect the SBC have already prepared an excellent training manual covering the following seven key issues:

- Assessment of the management of ULAB at the national level
- Set up of an ESM Collection, Storage, Transportation and Shipping Scheme.
- Control Strategies and Policies for the Recycling of ULAB in the Formal Sector
- Control strategies and policies for the recycling of ULAB in the informal sector
- Communication and Information
- Strategies for the remediation of lead contaminated soils
- The transboundary movement of ULAB under the Basel Convention

These training guides provide virtually all the information that the lead industry in the Region needs to raise the standards of safety and environmental performance and indicates the direction that should be taken in the public arena to reduce the flow of ULAB to the informal sector and at the same time, raise collection levels in formal sector. Governments in the Region will also have the necessary guidelines to conduct thorough inventories of LAB sales, consumption and recovery trends, set up seminars for customs officers in the administration of the transboundary movement regulations and produce plans to ensure that ULAB do not pollute or endanger people's health.

There is no doubt that at the end of the SBC study, the region will be managing new and used lead acid batteries in a manner that is not only environmentally sound, but will do so in a way that will serve as a model for other regions of the world.

10.2 Integrating Green Lead into the SBC Study

There are three key questions to consider about the introduction of Green Lead Certification into the current SBC study:

- Will Green Lead add value to the SBC study?
- What does Green Lead bring to the SBC study that is not already in place or planned for the next phase?
- How will Green Lead be introduced and integrated into the next phase of the SBC study?

In answer to the first two questions, Green Lead Standards not only embrace the regulations for ULAB contained in the Basel Convention and the procedures outlined in the Basel Technical Guidelines, but sets them out with the following additional components in a format that provides an easy to use audit framework that can be used internally to regularly monitor compliance, and externally to certify whether an operation is environmentally sound in every respect, including those directly linked in the product chain:

- Product Chain Management
- Site remediation and legacy issues
- Safety and Emergency procedures
- Occupational Health
- Employment Practices
- Environmental and safety reporting (CSR)
- Training and Development
- Community Outreach Programs
- Communications and Awareness

Furthermore, the standards are being written in a form that not only sets the benchmarks, but incorporates problem solving guidelines that will help to identify the causes of any deviations from the standards, as already shown in the example for Biological Monitoring and Medical Surveillance contained in [Appendix 3](#). This format will be very helpful to organizations conducting internal compliance monitoring because it will enable them to take positive action to correct deviations in the minimum amount of time and in the vast majority of cases without recourse to external assistance.

One of the most important factors that Green Lead Certification brings to the study is the requirement for organizations to positively interact with their immediate contacts upstream and downstream in the product life cycle in a way that not only monitors the product movement between the contacts, but identifies potential improvement opportunities. As far as the retail sector is concerned, the required interaction in the product life cycle would mean that they would have to be pro active in their approach towards recovering any used batteries when they sell new replacement batteries.

As far as sustainability is concerned, and this section applies really only to mine sites, smelters and battery manufacturers; Green Lead certification requires organizations to have in place plans to decommission the sites and remove any contamination associated with either current or past operations.

Employment practices in the developing world have, on many occasions, been the cause of concern to the ILO and the World Health Organization (WHO). Of particular concern have been issues associated with the lack of proper safety procedures and equipment, the employment of children, training deficiencies and poor health provisions. Green Lead certification requires full compliance with the eight core ILO Conventions addressing the rights of workers, included in the 1998 ILO Declaration on Fundamental Principles and Rights at Work: They are:

- ✓ No. 29 Suppression of forced labour (1930)
- ✓ No. 87 Freedom of association and protection of right to organize (1948)
- ✓ No. 98 Right to organize and collective bargaining (1949)
- ✓ No. 100 Equal remuneration (equal pay for equal value) (1951)
- ✓ No. 105 Abolition of forced labour (1957)
- ✓ No. 111 Prevention of discrimination (1958)
- ✓ No. 138 Abolition of child labour (1973).
- ✓ No. 182 Worst form of Child Labour (1999)

It should be stated here that to date, the SBC study has not highlighted any obvious employment abuses, apart from the poor use of certain items of safety equipment at some battery repair shops operating in the informal sector. It should also be noted that the SBC study was not designed to check employment issues other than safety and lead exposure. Consequently, it should not be assumed that every organization in the Region is a good employer.

In 1998, the World Business Council for Sustainable Development (WBCSD) launched an ambitious two-year program aimed at providing a better understanding of what Corporate Social Responsibility (CSR) means and what represents good practice. Since then, the movement to introduce an honest, open and comprehensive form of reporting has been steadily gaining momentum. In the context of Green Lead the criteria required for CSR reflect precisely the issues key to GL Certification; and include:

- ✓ The impact of the business on society
- ✓ Key commitments to International conventions
- ✓ Activities related to business ethics, training/awareness
- ✓ Environmental/sustainable development
- ✓ Performance bench marking
- ✓ Employment practices on job security, health and safety
- ✓ Community involvement, including outreach activities, partnerships

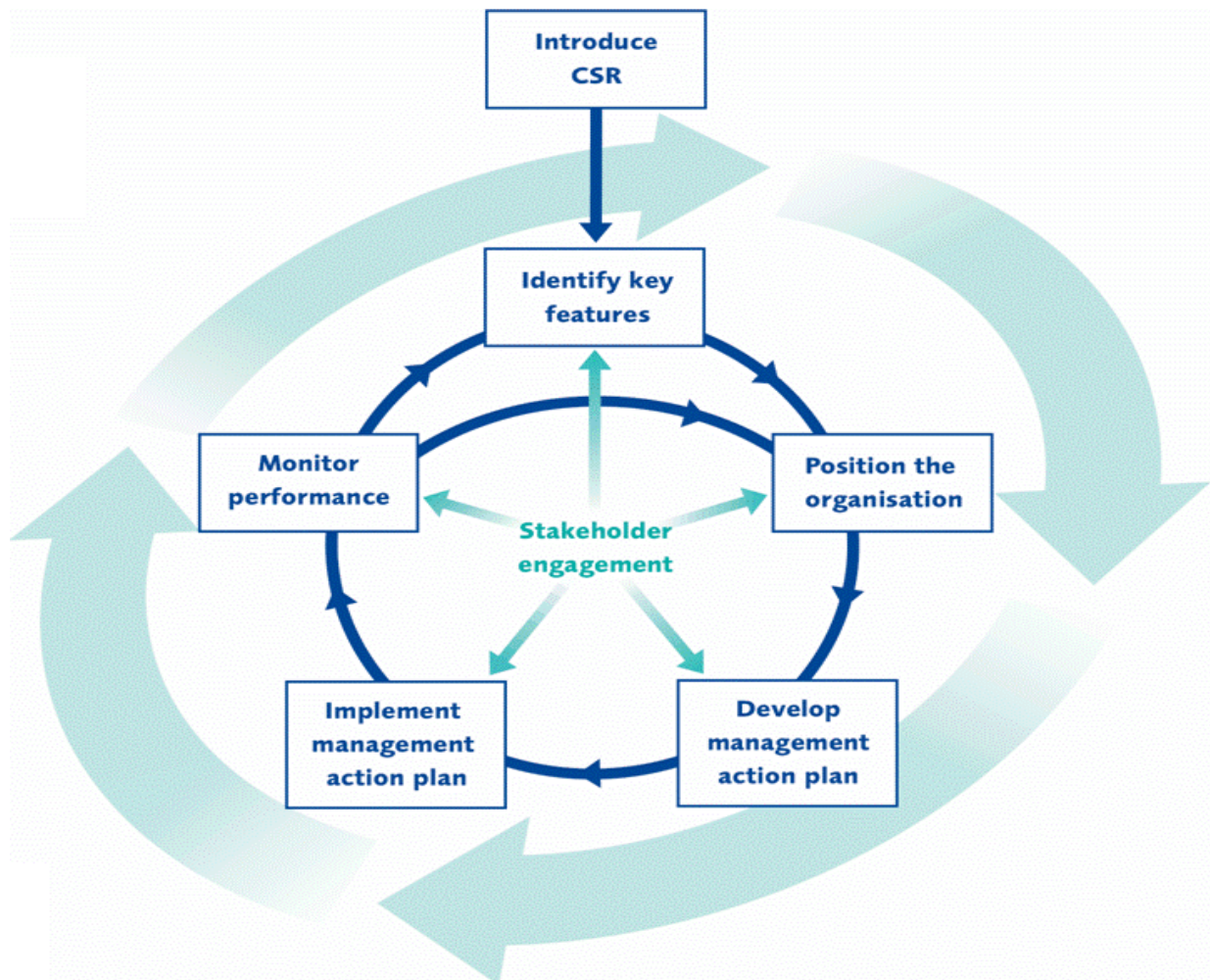


Figure 4 - Corporate Social Responsibility Reporting⁷

⁷ World Business Council for Sustainable Development (WBCSD); www.wbcsd@e-ydirect.com

As shown in Figure 4, if CSR is introduced into an organization with an interactive communications approach, then the reporting procedure itself will become an aid to continuous improvement. At first, such a comprehensive reporting system would seem to be an unnecessary imposition on organizations wishing to qualify for GL Certification, but it is an essential component in the drive to environmental excellence. Without measurement of performance there is no data and without proper data, issues cannot be analyzed and without analysis, informed management decisions to improve performance cannot be made.

Operator process and safety training is a key element in attaining ISO 14001 and OHSAS 18001 Certification and the same standards are applicable in the GL Certification procedure. However, GL also requires the introduction and use of pro active incident and accident reporting and investigation systems based on “Fixing the Problem, Not the Blame⁸!” There are a number of investigative techniques that can be used, but they all have one thing in common, that is, they are not based on single data points, such as an a injury to an employee, they are based on honest and open regular safety checks, inspections and audits and on the basis that time spent is an investment that will benefit everybody in the company and reduce the risk of accidents and injury. The techniques applicable to incident investigation associated with safety are also applicable to other issues such as occupational health, environmental controls and complaints from either the public or government agencies, making this particular management tool a very powerful means of minimizing the possibilities of rogue discharges, fugitive emissions, lead in blood elevations and complaints.

Finally, the Green Lead Certification will not be complete without a pro-active community outreach and stakeholder relations program. Any population working in or living close to a lead plant is susceptible to lead exposure as is the environment. It is clear therefore that the objectives of any outreach project must include a community care program and regular environmental and biological monitoring. It is also essential that education features strongly in the outreach agenda, particularly issues of childhood lead exposure. It is also clear from the SBC study that the better informed the public are about the dangers of illicit ULAB recovery, the more likely the used batteries will be returned through the formal sector for recycling.

Certainly Green Lead represents the most comprehensive approach to Product Stewardship of all the commodities and the delivery of such a scheme is critical. As far as the SBC study in Central and South America and the Caribbean is concerned Green Lead will be delivered and integrated into the project by the GL Working Group. This Group comprises of three people:

- ❖ Phillip Toyne - Phillip is a lawyer and was formerly Head of the Australian Conservation Foundation & Deputy Secretary of the Commonwealth Department of Environment.

⁸ Incident Investigation – Fix the Problem, Not the Blame; Larry Russell, BST, 1999

- ❖ Brian Wilson – Program Manager with the International Lead Management Center (ILMC) and is currently engaged on a range of lead related environmental projects including the SBC ULAB study in Central and South America and the Caribbean.
- ❖ Emma Tristan - is an Audit Consultant with the largest "all-environmental" consultancy in the world, Environmental Resources Management (ERM). Emma is from Costa Rica and completely bi-lingual in Spanish and English.

In the last six weeks the team has been working closely with Ian Burrell, the Head of Economics and Environmental Affairs at the International Lead Zinc Study Group. As part of the Study Group's initiative towards sustainable development Ian has prepared an application to the UN Common Fund for Commodities (CFC) for assistance in the development of the Green Lead initiative through Pilot Programs in Venezuela and the Philippines. The initial application is for funds to hold a workshop in London to finalize the working arrangements for the introduction of the Pilot Studies.

Two companies have been selected for participation in a Pilot Scheme for Green Lead. The first is RAMCAR, a major conglomerate in the Philippines that owns the Motolite Battery manufacturing plant, the largest secondary lead smelter in the Philippines, Philippine Recyclers Inc. (PRI) and a network of battery retailers throughout the archipelago. The second is the Duncan Group which is based in Venezuela and owns three battery manufacturing sites, a secondary lead plant and thirty three retailers and service centers. The RAMCAR Group, represented by PRI has already agreed to participate in the Pilot scheme and will be attending the GL Workshop in London next April. PRI's involvement in the GL Pilot Scheme will not impact on the SBC study.

However, the Duncan Group, as yet, has not been formally invited to participate in the Pilot Scheme, but will be invited within the next month when all the necessary GL materials have been translated into Spanish. Nevertheless, from the initial reaction of three representatives of the Duncan Group that attended the European Battery Conference in Berlin in September to the concept of GL, there is every prospect of the Group agreeing to join the Pilot Scheme.

On the basis that the Duncan Group agrees to participate in the Pilot Scheme and that the next Phase of the SBC study proceeds as planned in 2005/6, and assuming that Brian Wilson continues to work with the Secretariat as the Technical Advisor, he will also deliver training to the Duncan Group in the Technical Aspects of the GL Standards. Emma Tristan will familiarize the Duncan Group in the administrative procedures required to be adopted for GL Certification and also train them in the use of auditing for internal performance monitoring.

As the Duncan Group is an integrated company already certified to ISO 14001, the introduction of GL standards will not be a long and expensive exercise, but some changes to the way the company currently works are necessary and it is envisaged that it will take 12 months to introduce the scheme and have it up and running.

Should the Pilot Program be successful, then it is anticipated that there will be a further improvement in the environmental performance of the Duncan Group and a gradual phasing out of informal sector activities as Green Lead licensed battery manufacturers deal only with primary or secondary Green Lead suppliers.

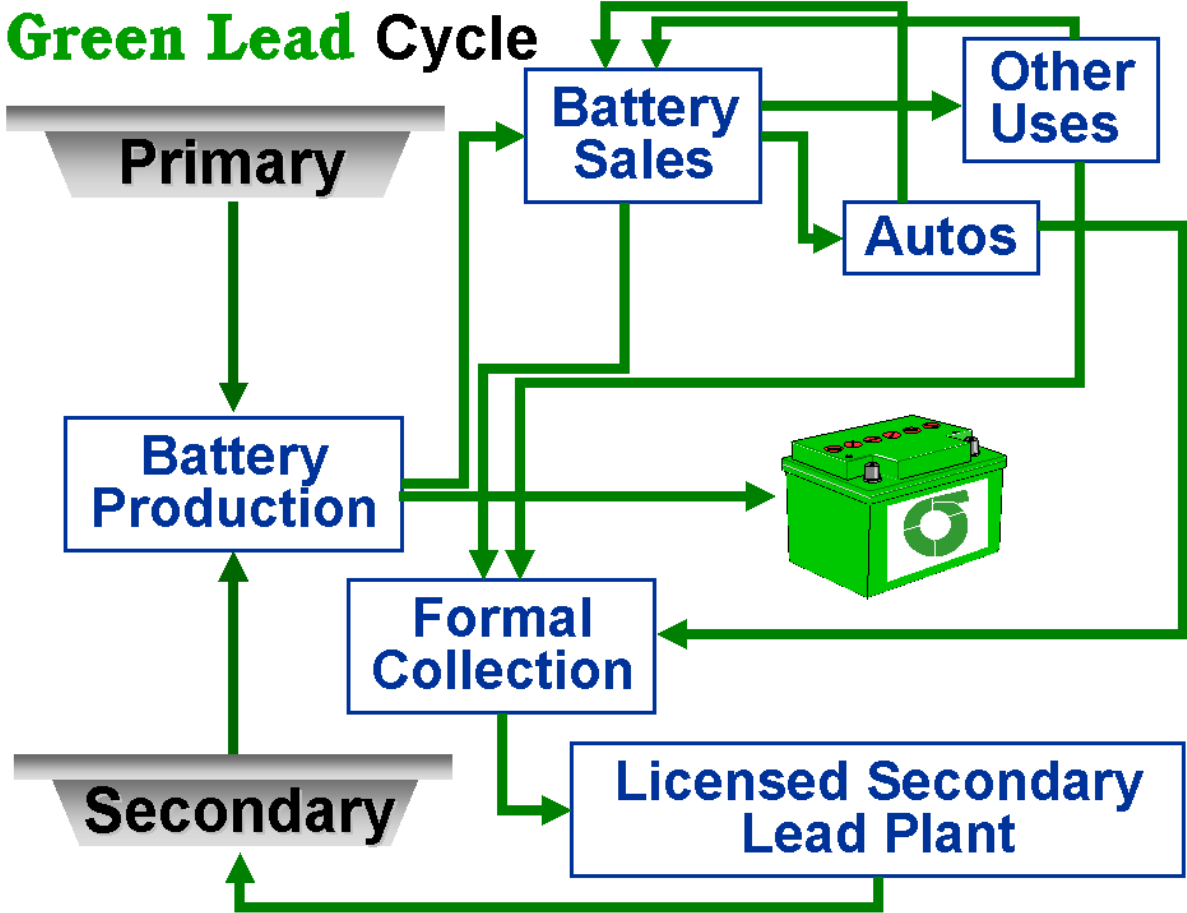


Figure 5 – Maintaining the Chain of Custody for the LAB

Furthermore, the requirements of the Custody Chain require greater efforts to be made to ensure that ULAB are returned to Duncan retailers and Service Centers. In this respect, the company will have to work closely with the Government to devise ways and means of improving incentives for sound recovery and disincentives for ULAB that are delivered to the informal sector. If the GL scheme works as it is designed, then the flow of ULAB to the informal sector will reduce to a “trickle” and those working in the informal sector will either get out of the ULAB business or become legitimate collectors of ULAB and deliver them to the Duncan smelter.

11. Conclusion

The Green Lead regime has tremendous potential in the developing world as model to assist in the elimination of poor recovery practices, unsafe working conditions and provide a credible environmental certification procedure that can be used for the authorization of transboundary movements of ULAB.

The Green Lead Working Group believe that management of the chain of custody for lead acid batteries will improve recovery rates for ULAB and considerably reduce the supply of ULAB to the informal sector. The environmental and health benefits for many countries in the world without a developed infrastructure for LAB management are potentially enormous.

The Green Lead Working Group shares the aims and objectives of the SBC in their desire to manage ULAB in an environmentally sound manner in order to minimize risks to the environment and populations.

The Green Lead Working Group would like to work in partnership with the SBC and assist in the development of a “holistic” approach to lead acid battery management and the environmentally sound management of ULAB.

GL Working Group
December 2004

Appendix 1 – Green Lead™ Audit Report Summary – National/International Legislation

<u>Legislation</u>	Compliance	Non-compliance	Recommendations	Action Points	Responsible Person	Timetable
2. Employment						
3. Environment <ul style="list-style-type: none"> • Atmospheric • Aquatic • Terrestrial 						
4. Waste <ul style="list-style-type: none"> • Hazardous • Non-hazardous 						
5. Occupational Health <ul style="list-style-type: none"> • Blood Leads • Screening 						
6. Safety Systems <ul style="list-style-type: none"> • Risk Assessments • Safety Procedures • Accident Reporting • Accident Investigation 						
7. Reporting <ul style="list-style-type: none"> • E M Performance • Discharges • Incidents 						
8. Training <ul style="list-style-type: none"> • Induction • Safety • Health • Environment • Development 						
9. Emergencies <ul style="list-style-type: none"> • Fire • Evacuation • Disaster Plan 						
10. Remediation <ul style="list-style-type: none"> • Ongoing Plans (legacy) • Closure Plan 						
11. Batteries <ul style="list-style-type: none"> • New • Used 						

Appendix 2 – Green Lead™ Audit Report Summary – Company Policies

<u>Policies</u>	Compliance	Non-compliance	Recommendations	Action Points	Responsible Person	Timetable
12. Employment						
13. Environment <ul style="list-style-type: none"> • Atmospheric • Aquatic • Terrestrial 						
14. Waste <ul style="list-style-type: none"> • Hazardous • Non-hazardous 						
15. Occupational Health <ul style="list-style-type: none"> • Blood Leads • Screening 						
16. Safety Systems <ul style="list-style-type: none"> • Risk Assessments • Safety Procedures • Accident Reporting • Accident Investigation 						
17. Reporting <ul style="list-style-type: none"> • E M Performance • Discharges • Incidents 						
18. Training <ul style="list-style-type: none"> • Induction • Safety • Health • Environment • Development 						
19. Emergencies <ul style="list-style-type: none"> • Fire • Evacuation • Disaster Plan 						
20. Remediation <ul style="list-style-type: none"> • Ongoing Plans (legacy) • Closure Plan 						
21. Batteries <ul style="list-style-type: none"> • New • Used 						
22. Community Relations <ul style="list-style-type: none"> • Complaints • Educational activities 						
23. Public Relations <ul style="list-style-type: none"> • Press • TV 						
24. Chain Interaction <ul style="list-style-type: none"> • Upstream • Downstream 						

Certification Standards**Biological Monitoring and Medical Surveillance****1. Introduction**

In most countries there is already legislation in place that lists the lead industries and business sectors that must maintain biological monitoring and medical surveillance and sets out the detailed requirements for the management of occupational lead exposure.

Where such legislation exists then the first requirement of Green Lead certification is that the company or organization complies fully with the prevailing national laws, regulations and codes of practice for the maintenance of biological monitoring and medical surveillance. In those instances where such legislation does exist the company or organization applying for Green Lead certification will supply the Green Lead Audit Team with a copy of the relevant legislation and written evidence of compliance at least three months before the certification audit.

In any event, the minimum requirements for Green Lead Certification is that biological monitoring and medical surveillance must be in place and operational for at least 12 months prior to the Green Lead Audit and is necessary in those places of work where employees or persons on the premises are exposed to lead in any form such that it may be ingested, inhaled or otherwise absorbed. The most common industrial processes which create lead dust, fume or vapor include:

- lead smelting, ULAB and scrap recovery, refining, alloying and casting
- lead-acid battery manufacture and breaking
- manufacturing lead compounds, including pigments and colors.
- working with metallic lead and alloys containing lead, e.g. soldering
- manufacturing leaded-glass and certain ceramics
- some painting of buildings; some spray-painting of vehicles
- hot cutting in demolition and dismantling operations
- Certain jewelry and badge enameling techniques

Where any national legislation requires lead in blood levels more stringent than the levels indicated below in the Green Lead Standard for either, action, suspension or medical removal, the levels defined in the national legislation will prevail. Similarly, sampling will be more frequent than the periods specified below for Green Lead Certification if national legislation dictates a shorter period between consecutive samples.

In addition, whereas the criteria for biological monitoring and medical surveillance for Green Lead certification is based on lead in blood, some countries also require additional testing for other indicators of lead absorption. In these cases, evidence of the additional sampling requirements will be a necessary part of the Green Lead Audit.

This Green Lead standard will also be subject to regular reviews to take account of new medical advice and changes in best practice, such as testing frequency.

This Green Lead standard also recognizes the confidentiality of the relationship between the medical officer/occupational nursing officer and the employee.

2. Blood lead sampling and analysis.

2.1 Frequency

The owner or employer will make available to employees and any other person working on the site for more than one day, biological monitoring in the form of blood sampling according to the following schedule:

- At least every 6 months to each employee or person under contract to work at the site.
- At least every one month for each employee whose last blood sampling and analysis indicated a blood lead level at or above 40 µg/100 g of lead in blood for men and women of childbearing age who work in exposed areas. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40 µg/100 g of lead in blood.
- At least monthly during the first three months of employment, contractual work or during pregnancy.
- Monthly during the removal period of each employee removed from exposure to lead due to an elevated blood lead level.

2.1 Follow-up blood sampling tests.

Whenever the results of a blood test indicate that an employee's lead in blood level exceeds the numerical criterion for medical removal under either national legislation or paragraph A.b. of this section, the employer shall provide a second blood sampling test within two weeks after the date that the employee receives the results of the first blood sampling test. During the period between the first and follow-up blood test the employee's place of work will be inspected to ascertain if there are changes in the operation or shortcomings in the control measures that might have contributed to an increase in lead in blood levels.

2.2 Accuracy of lead in blood level sampling and analysis.

Lead in blood level sampling and analysis shall have an accuracy within plus or minus 15 percent or 6 µg/100 ml of the lead in blood, whichever is greater, and shall only be conducted by an accredited laboratory licensed by such bodies as the Center for Disease Control, United States Department of Health, Education and Welfare (CDC). An accredited laboratory, in the context of Green Lead certification, is one that has received a satisfactory grade in lead in blood proficiency testing from the CDC or equivalent body in the twelve months prior to the Green Lead Audit.

2.3 Employee notification.

- The employer shall arrange, and on occasions this will be through the medical officer, to notify in writing each employee of their lead in blood results within five working days/shifts.
- In addition, those employees whose lead in blood level exceeds 40 µg/100 g for men and are above a level that causes concern to the medical officer in the case of women of child bearing age, will also be advised in writing that their lead in blood level is above the standard for occupational exposure and that a second test must be taken within two weeks. The notice will also advise the employee that they must:
 - Have their respiratory equipment checked for fit, in the case of the neoprene type of respirator and efficiency in the case of the “airflow” helmet type of respirator.
 - Attend an interview with an occupational nursing officer familiar with the lead operations who will discuss personal control measures, such as washing hands prior to eating, smoking habits and any other activities outside work, such as demolition or hobbies using leaded materials, such as shooting, that might be a contributing factor in raising lead in blood levels.
 - The employee must also be advised at this time that if the second test is above the standard for occupational exposure then action will be taken and the employee removed from working in a job where they are exposed to lead in any form such that it may be ingested, inhaled or otherwise absorbed.
 - The period of removal will be for a minimum of four weeks and at the end of the fourth week a sample of blood will be taken and analyzed.

- If the employee's lead in blood level is below 40 µg/100 g of lead in blood for men and at a level that is determined by the medical officer to be safe for women of child bearing age, then a second sample will be taken 7 days after the first sample and if this result is also below 40 µg/100 g of lead in blood for men and at a satisfactory level for women of child bearing age, then the employee can return to normal duties.
- However, if the sample of blood taken four weeks after the initial removal is above 40 µg/100 g of lead in blood for men and is still a cause for concern to the medical officer in the case of women of child bearing age, then the employee will remain suspended from normal duties and confined to work where they are not exposed to lead.
- This regime of removal and testing will continue until two consecutive blood samples and analyses indicate a blood lead level below 40 µg/100 g of lead in blood for men and level deemed safe by the medical officer for women of child bearing age, or for a maximum period of eighteen months whichever is the sooner.
- Employees removed from normal duties under the terms of the Green Lead standard outlined in paragraphs D. b. and D.c. above, will retain their full wages and benefits for the duration of their removal provided they comply with the sampling requirements and have their respirators inspected.

3. Medical examinations and consultations

3.1 Frequency.

The employer shall make available medical examinations and consultations to every employee covered under the Green Lead standard following this schedule:

At least annually for each employee who has had a lead in blood result in the preceding 12 months at or above 40 µ g/100 g of lead in blood for men and all women of child bearing age;

- Prior to assignment for each employee assigned for the first time to an area in which the airborne concentrations of lead exceed the prevailing statutory limits for exposure without wearing respiratory equipment at all times. These areas will be enclosed or encapsulated parts of the process where manual activities are not the norm and entry is restricted for maintenance only. Such areas will typically be, inside baghouses or filter plants, oxide storage silos, inside brick lined furnaces.

- As soon as possible, upon notification by an employee or their supervisor that an employee has developed signs or symptoms commonly associated with lead intoxication, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during use;
- As soon as possible, upon notification by an employee that they are pregnant.
- .
- As medically appropriate, for a period approaching eighteen months, especially for purposes of protecting reproductive function of employees.

4. Content.

4.1 Medical examinations shall include the following elements:

A detailed work record and medical history, with particular attention to past levels of lead exposure (occupational and non-occupational), personal habits (smoking, hygiene), and any past gastrointestinal, hematological, renal, cardiovascular, reproductive and neurological problems;

- A thorough physical examination, with particular attention to teeth, gums, hematological, gastrointestinal, renal, cardiovascular, and neurological systems. Pulmonary status should be evaluated if respiratory protection is being or will be used in the next twelve months;
- A blood pressure measurement;
- A blood sample and analysis which determines:
 - Lead in blood level;
 - Hemoglobin and red cell indices.
 - Any laboratory or other test which the examining physician deems necessary by sound medical practice.

When the results of all the tests are available, the appointed medical officer will interview the employee and explain the significance of the results. Where the results indicate that there is or might be a lead exposure issue, the employee will be advised of the necessary action to take to resolve the real or potential problem. The outcome of the interview will be confirmed in writing to the employee.

The immediate supervisor will be advised if there are operational consequences arising from the results of the medical examination.

All other aspects of the medical examination will be strictly confidential.

4.2 Second medical opinion.

- The employer shall notify an employee of the right to seek a second medical opinion after each occasion that a company or government appointed physician conducts a medical examination or consultation in pursuit of the biological monitoring and medical surveillance program.
- If the employee decides to seek a second opinion, they must inform the employer and the appointed medical officer.
- In the event that the conclusions, determinations or recommendations of the second doctor differ from those of the appointed medical officer, then the employer and the employee will secure conditions to permit the two doctors to resolve any differences in medical opinion, even if that means engaging or seeking advice from a third doctor.

5. Medical Removal Protection

5.1 Medical Removal Protection – Former Job Status

At the end of medical removal or suspension from normal duties, the employer must return the employee to his or her former job status, although not necessarily the job the employee was undertaking prior to the removal. At the same time, there must be an end to any special protective measures provided to the employee, and any limitations placed upon the employee, consistent with the medical findings, determinations, or recommendations of any of the doctors who may have reviewed the employee's health status, with one exception. The exception is when an employee has been on removal status for the preceding eighteen months due to an elevated blood lead level, then the employer shall await a final medical determination.

5.2 Medical Removal Protection - Protection of employment benefits;

The employer shall provide to an employee up to eighteen months of medical removal protection benefits, that is, earnings, seniority and other employment rights and benefits, such as pension and sickness provisions, to which the employee was eligible at the time of removal.

5.3 Medical Removal Protection - Employees whose lead in blood levels do not adequately decline within 18 months of removal.

The employer shall take the following measures with respect to any employee removed from exposure to lead due to an elevated blood lead level whose blood lead level has not declined within a period of past eighteen (18) months of removal:

- The employer shall make available to the employee a medical examination to obtain a final medical determination with respect to the employee's lead in blood levels and the prospects for a return to normal duties;
- If the employee is deemed in a suitable condition to return to normal duties, then the provisions set out in 5.1 will apply.
- If the final medical determination is that the employee is incapable of ever safely returning to his or her former job then the employer is no longer bound to maintain the employee's earnings and other benefits. However, the employer is bound to offer the employee useful and gainful employment within the organization.
- If the employee declines any offer of alternative employment made by the employer under the terms outlined in the paragraph above, then the employee can opt to leave employment with full severance pay as set out in the employment contract.

Third Draft