

**Response to Public Comments Received on the draft
BEST Standard (dated June 22, 2007)
For Lead Battery Manufacturers**

A diverse group of stakeholders have contributed to development of the Better Environmental Sustainability Targets (BEST) Standard for conducting environmental audits of lead battery manufacturing facilities for a third party verification system. As a final step in the standard development process, comments on the draft Standard were solicited. The following records the detailed replies to each comment arranged in topical order. Please note that although the identities of the commenter have been withheld, the sector affiliation is shown in parenthesis. Below are the responses to all written comments received on the draft BEST Standard (dated June 22, 2007).

General

- Does this draft apply only to U.S. facilities, or do you intend to apply it internationally? (Expert. R-2)

The BEST Standard is intended to be international in scope.

Definitions:

- Probably want to alphabetize unless there is a reason for another ordering. You may want to add “stored during assembly” to the definition of manufacturing plant. Other definitions such as for PM10 and Mobius loop would be useful to also include. (Expert. R-3)

This is a good suggestion and therefore definitions will be alphabetized for the final draft.

The BEST Standard covers all activities within a battery manufacturing plant. To further break out processes or locations in the plant may imply that others are somehow excluded. However, some of the operational details and locations will be addressed in the audit protocol where appropriate.

It is recognized that there are some terms used in the BEST Standard may not be fully understood by all users and therefore we will add additional definitions.

- Engineering controls can also include substitution of less hazardous materials and process changes. (Expert. R-3)

The Audit Protocol that provides the detailed explanation of how to comply with the BEST Standard will address the substitution of less

hazardous materials where appropriate (Criteria 2.1). The definition will be edited to include this and will now read as follows: “**Engineering controls** mean a process to reduce exposures to potential hazards, including all pollution control systems (through isolation or removal), ventilation and enclosure mechanisms, and substituting materials used for less hazardous materials.”

- A specific observation that on page 2 in the definitions section under the heading “**Lead Battery Manufacturing Plant**” I feel it would be helpful/clearer if “...this standard” was better defined (i.e. the BEST standard). I recognize that this is very minor and may be an assumed or given connection but suggest that in this type of policy document there is ample room for redundancy so that nothing is left to the imagination. (NGO. R-4).

The addition of “...the BEST Standard” will be added to the definition of Lead battery manufacturing plant so that the definition will now read as follows: “**Lead battery manufacturing plant** means all locations where lead batteries or battery components are manufactured or assembled. The company or business entity that owns or operates the plant is the responsible party for implementing the BEST Standard.”

- You may want to include in the definitions such terms as mg/Nm^3 . (Expert. R-3)

This unit of measure is standard when addressing stack emissions (milligrams per Normal cubic meter of air). It will be defined in the final draft of the BEST Standard as follows: “ **mg/Nm^3** milligrams per normal cubic meter of air are the common units for measuring stack emissions normalized to standard conditions of 0°C (273.15 K) and 1 bar (i.e. 100 kPa) of pressure.

Objective 1:

Criteria 1.1

Air Emissions

- What is the regulatory, or health-based standard for your figure for stack emissions? Can you give me a reference? (Expert. R-2)

The BEST Standard has adopted a standard for stack emissions of 10.0 mg/Nm^3 after a review of various national standards. For example the Indian Government standard of 10.0 mg/Nm^3 can be found in the government’s Central Pollution Control Board regulations. In addition to India, many countries have similar stack emissions standards including the U.S., Thailand, Taiwan, Singapore, Dubai, and Luxembourg. Our review from these and other countries indicated that airborne lead emission

standards range from 5 mg/ Nm³ to 40 mg/ Nm³ with an average emission standard of 12 mg/Nm³.

- What is the regulatory, or health-based standard for your lead content in ambient air? Can you give me a reference? (Expert. R-2)

The BEST Standard has adopted an ambient air standard of 1.0 µg/m³ based on a review of various national standards. Many countries have similar ambient air standards including the US, UK, India, Russia, Australia, Germany, France, and many more. Our survey of 19 national ambient air standards for lead showed that the average level is 1.0 µg/m³ (range: 0.05 – 2.0 µg/ m³).

- Page 3, Indicators, Air Emissions, 1.1: I do not understand your units of 10.0 mg/Nm³, n stands for nano, N probably for 10 to the 6th power. This standard does not make sense to me to me on either basis. (Expert. R-2)

The units *mg/Nm³* are used universally and cited in most air pollution regulations pertaining to stack emissions. The “N” term represents “normal” or standard temperature and pressure and is a commonly used notation when discussing emissions.

- Page 3, Indicators, Air Emissions, 1.1.b: You wish to see a standard on 1.0 ug/m³ as an annual average. It is my impression that the present standard is 1.5 ug/m³ as a quarterly average. Has it been changed, or is this an alternative expression? (Expert. R-2)

The U.S. Ambient Air Quality standard is 1.5 µg/m³ based on quarterly sampling. The BEST Standard has adopted 1.0 µg/m³ for lead in air. The U.S. standard is currently under review by the U.S. Environmental Protection Agency and it will likely be reduced in the future. Some countries and local agencies require compliance with 24 hour, 30 day, quarterly or annual averages. The annual average was selected by the multi-stakeholder committee in setting the BEST Standard.

- It would be useful to mention discharges to land since ingestion is a very common pathway of lead exposure. Soil lead standards need to be encouraged. (Expert. R-3)

This standard specifies air and water emission limits because these are considered the most significant contributors to lead exposure pathways from lead battery manufacturers. In battery manufacturing, soil contamination is a likely result of the settling of airborne lead and other releases. The goal of the BEST Standard is to ensure that preventative measures are taken to avoid further soil contamination by controlling air emissions and wastewater discharge. Addressing soil lead levels within

operating battery plant sites would have limited public health benefit as very little off-site migration occurs from soil contamination. Site closure procedures should address soil abatement, but these are beyond the scope of the BEST Standard.

Waste Water Discharge

- What is the regulatory, or health-based standard for lead concentration in the waste water? Can you give me a reference? (Expert. R-2)

Waste water discharge standards for lead can vary greatly even within local water districts in the U.S. The BEST Standard, has adopted a waste water standard of 0.1 mg/l based on our review of applicable standards and industry practices. An example of a national standard that corresponds to this level can be found within the Indian Government's Central Pollution Control Board (<http://www.cpcb.nic.in/Environmental%20Standards/Effluent/standard5.html>).

Objective 2:

Criteria 2.3

- Page 4, Indicators, 2.3.a: The standard of 50 micrograms/m³ is similar to the OSHA standard of 50 micrograms/m³ of lead as an 8 hr time weighted average. Do you want your standard to be equivalent to the OSHA standard? If not, why not? (Expert. R-2)

The U.S. OSHA standard (29 CFR 1910.1025) stipulates that for employees working more than an 8-hour day the Permissible Exposure Level (PEL) will be reduced based on the actual length of the work day. The BEST Standard stipulates in Criteria 2.2.a that the facility shall conduct "full-shift personal air monitoring" to determine exposure levels. No additional requirements are triggered in the BEST Standard by exceeding a regulatory PEL other than the use of an appropriate respirator. All other health and safety requirements that are triggered in regulatory standards based on exceeding the PEL are already mandated in the BEST Standard without regard to airborne exposure.

- Page 4, Indicators, 2.3 b: The OSHA standard requires monitoring and training in personal protective equipment when the lead level exceeds the action level of 30 micrograms/m³ as a time-weighted average. Do you wish to eliminate consideration of the lower action level in your standard? If so, why? (Expert. R-2)

The U.S. OSHA Standard only requires the use of respirators in work areas above 50 µg/m³ (the Permissible Exposure Level), as does the BEST Standard. The BEST Standard has also adopted 50 µg/m³ as the targeted ceiling level in battery manufacturing. The BEST Standard requires air

monitoring, training, personal hygiene practices, and other measures without regard to airborne exposures. Therefore the U.S. OSHA “action level” would be redundant in the BEST Standard.

Criteria 2.4

- Suggest adding something like the following after “clothing”: “for the protection of the worker as well as his/her family and neighbors.” (Expert. R-3)

This is a good suggestion that will be incorporated into the training requirements. Training on topics listed in Criteria 2.8 already includes: “Good personal hygiene practices and the potential for take home exposures”.

Criteria 2.4.a

- Suggest adding “at no cost to the worker” after “Provide”. (Expert. R-3)

The BEST Standard Audit Protocols does not stipulate that the employer will provide protective clothing at no cost to the worker. Although the BEST Standard is clear in requiring that the employer provide all health and safety equipment, the Standard does not address wages, labour practices, or social criteria not related to occupational health (see Limitations). Therefore, the issue of who pays for such equipment may be beyond the scope of the standard. However, this issue will be taken up in the audit protocols, as auditors will need to verify that adequate equipment is supplied. Employers would be greatly challenged in trying to reliably provide protective clothing if workers were paying all costs.

Criteria 2.5

- Page 5, Indicators 2.5.a, last bullet; Page 6, 2.5.d; Page 6, 2.5.e: I strongly oppose the concept of differential standards for men and women for several reasons. Differential standards make it more difficult for women to assume higher pay-level jobs and advance equivalently to men in the trade, thus representing a retrenchment in previously adopted policies of gender equity in the workplace. There is too little known about the comparative effects of lead on the fetus from the mother's lead level during gestation, and the effects of lead-damaged sperm from a high lead level father to dictate that the female has a more deleterious influence on development. It is possible that that is true, but I think that, even if it is, the warning should be given and the woman be allowed the choice on the basis of other personal circumstances. Since the health and the life expectancy of a bread-winning father is also deeply influential on the well-being of the family, I think that the standard needs to be set as something considered "acceptable" for both sexes on an equal basis. (Expert. R-2)

It is true that research into reproductive effects of lead is still ongoing to better quantify threshold levels for effects on sperm and the developing fetus and that comparing such levels would be inappropriate. The different

blood lead levels in these criteria should not be interpreted to mean that there are different threshold effects for men and women. It is important to recognize that none of the occupational blood lead levels employed today are health-based standards.

The stakeholders participating in the BEST Standard setting process were provided with examples of regulatory blood lead levels from many countries and they observed that most have more protective blood lead level criteria for women (www.okinternational.org/StandardTable.pdf).

As the BEST Standard is intended to reward companies that meet better performance standards, the blood lead level targets agreed to by the participating stakeholders are similar to those enforced in Europe where different standards for men and women are common.

Criteria 2.5.b

- Most qualified phlebotomists are not physicians or nurses so I would suggest deleting the parenthetical phrase. (Expert. R-3)

This will be corrected. The criteria will now read as follows: *“Obtain the services of a qualified phlebotomist, occupational physician, or nurse and arrange for blood lead analysis by a laboratory...”*

Criteria 2.8

- Although Objective 2 includes “improve health status of workers...exposed to ...other hazardous materials.” very little attention is paid to threats to health other than lead. Training for these other hazards is mentioned in Criteria 2.8 but the “Indicators” to document such (2.8a to 2.8c) do not mention any chemicals other than lead and do not mention any other safety or health issues. Suggest that a few of the more common other safety/health hazards in battery manufacturing be included. (Expert. R-3)

This is an important observation that may need to be reevaluated in future updates of the BEST Standard. Although the BEST Standard does emphasize the health related consequences of lead exposure, other exposures to chemicals such as sulfuric acid are addressed in the requirements for development of an Emergency Action Plan in Criteria 2.7.

The following comment addresses the first draft of the BEST Standard, but was not received until after the Standard was revised:

- Criteria 2.8.b.: The final training topic shall now state: “Good personal hygiene practices and the potential for take home exposures.” (Expert. R-1)

In the June 22, 2007 draft copy of the BEST Standard this issue was addressed and the suggested language was added to section 2.8.b.

Criteria 2.8.b

- This is a very important section. The training course description (2.8b) needs to be expanded to also cover safety and non-lead health issues as mentioned in the title of this section. (Expert. R-3)

The BEST Standard does recognize the importance of these topics and does address them in both Criteria 2.7 and Criteria 3. The Audit Protocols in Criteria 2.7 requires the development of an Emergency Action Plan covering topics such as chemical precautions and fire hazards. Criteria 3.1 require proper training on the handling and storage of hazardous materials.

Objective 3:

Criteria 3.1

- Waste/Hazardous Wastes (pg 8) Somewhere in the document the importance of good housekeeping to minimize release of and exposure to lead and other materials. Routine cleaning of surfaces should be required. Perhaps an “Indicator” can be added that refers to having a system for routinely checking for presence of waste materials on floors or in other areas. (Expert. R-3)

Criteria 2.8.b, fifth bullet down, does state that training will be conducted on engineering controls and work practices used to minimize exposures. As such, the BEST Standard Audit Protocols will specifically describe the worker training required to address good housekeeping practices. Furthermore, the definition for “Work Practice Controls” will be added and will read as follows: *Work practices are procedures or policies that reduce employee exposures and environmental contamination by minimizing the release of airborne dust and by cleaning to limit dust and debris.*

Criteria 3.8

- This may be the location to indicate that lead source material for the battery manufacturing should only be obtained from properly operating/registered recyclers. Documentation of this should be one of the Indicators of such. 1. requirement about auditing suppliers (e.g., supplier of Pb must adhere to the protocols). (Expert. R-3)

Monitoring suppliers is addressed in Criteria 3.7. As a condition for BEST certification, manufactures are required to monitor their suppliers as stipulated in criteria 3.7. Moreover, indicator 3.7.b requires that all suppliers comply with applicable portions of the BEST Standard and battery companies must provide a written verification that all suppliers are compliant. Recycling facilities would therefore come under this provision.

In addition, suppliers that “manufacture lead-based components or parts” are subject to a third party audit under the provisions of the BEST Standard. More detail on this issue will be incorporated in the Audit Protocol.

Annexure I:

1. Definitions

- The percentage of lead in the definition 1(a) seems very low (Expert. R-3).

The intent of this definition is to ensure that all lead acid batteries are included in the take back provision. However, batteries that may have lead impurities associated with the use of other metals are not covered by this requirement. The percentage of lead in a lead acid battery will vary and some new technologies are coming into the market that is significantly lowering the lead content of lead batteries. To be most inclusive, the BEST Standard characterizes lead-acid batteries as any battery containing more than 1% lead by weight.

- Battery fee: Does it seem reasonable to have a uniform battery fee that applies to all countries and all locations within? (Expert. R-3)

The battery fee in the BEST Standard is the amount paid to the bulk “consumer” or wholesaler and not the amount the consumer pays to dispose of the battery. The fee paid to bulk consumers is set to provide an incentive for a high rate of collection return. The costs will become part of the contract negotiated between the bulk consumer and the bulk supplier. This fee does not pertain to retail consumer batteries.

The goal with the fee is to set a level that will provide an incentive in developing countries that will encourage bulk battery purchasers to return the batteries back to battery producers to make sure they get to environmentally sound recycling facilities and not to the “unorganized” sector and roadside smelters. This fee is also designed to avoid bulk purchasers from auctioning off used batteries to the highest bidder.

- Add in definition of “B” “in kilograms” after “battery”. (Expert. R-3)

This will be changed to read: *Battery Fee, B = Dry weight of lead in battery (in kilograms).*

2. Battery Take Back Provisions

- Change the following as indicated: “(d) The rate of lead-acid batteries collected per the number of lead-acid batteries sold shall increase by at least 20 percent [over the previous reporting period] per annum until the target goal of 90 percent

overall collection is achieved. A minimum collection rate of 20 percent must be maintained on an annual basis." (Expert. R-1)

This is a good point, however, Section 2.a of the BEST Battery Take Back System (Annexure 1) requires the manufacturer to report the number of batteries sold and the number collected on a "half-yearly basis." Because of this, 2.d was worded as such to account for possible fluctuations throughout the year, and it only requires that they improve the annual battery collection rate by at least 20%.

- This section seems to imply that many battery manufacturing plants actually collect and, presumably process, used batteries as part of their operation. When this occurs they are then actually secondary smelters as well. Health and safety hazards of the smelting process would also seem to be covered under the BEST system. (Expert. R-3)

Many manufactures do take back used batteries, and some operate recycling/ secondary smelting plants. The BEST Standard is limited to the manufacturing sector, and specifically excludes the recycling sector other than including criteria for a battery collection system. However, recycling operations at a battery plant would be subject to most provisions of the BEST Standard as the entire site is covered by the scope. A distinct standard may be developed in the future to cover lead recycling enterprises.

Moreover, indicator 3.7.b requires that all suppliers comply with applicable portions of the BEST Standard and battery companies must provide a written verification that all suppliers are compliant. Recycling facilities owned by battery manufacturers but operating at separate locations would therefore come under this provision.