



ROYAL AUDIT AUTHORITY
Bhutan Integrity House



Audit of Industries on environmental compliance

**The Hon'ble Deputy Minister,
National Environment Commission,
Thimphu.**

Sub: Audit Report of Industries on environmental compliance.

Hon'ble Dasho,

Enclosed herewith please find a copy of the *Environmental Audit Report* on the compliance of Environmental Standards of industries in Pasakha and Gomtu. The audit was conducted on the principles of *Performance Audit* and in line with the mandates of the Royal Audit Authority (RAA) as enshrined in the Constitution of the Kingdom of Bhutan and the Audit Act of Bhutan 2006. The main objective of this audit was to ascertain the compliances of environmental norms and adequacy of existing compliance assurance and monitoring mechanism instituted at various levels.

The copies of the draft reports were issued to the Secretary, Ministry of Economic Affairs, Managing Director, PCAL, Managing Director, Lhaki Cement Works, Managing Director, Bhutan Carbide and Chemicals Ltd. and Managing Director, Bhutan Ferro Alloys Ltd., Pasakha for comments and factual confirmation. However, the RAA received comments only from Bhutan Ferro Alloys Ltd., which is duly incorporated in the report.

The RAA is pleased to note existence of relevant laws, rules and regulations as well as evidence of occasional monitoring carried out by the relevant authorities and compliances of environmental norms to a large extent by the industries.

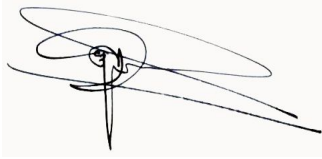
There were, however, cases of non-compliances of some of the environmental norms which included inappropriate disposal of wastes, river pollution, air pollution and inadequacies in strict enforcement and monitoring of environmental norms which had both visible and invisible adverse environmental impacts.

On the basis of the audit findings the RAA has made series of recommendations that are desirable for promoting compliance of environmental standards and norms. The recommendations may also be relevant and useful while undertaking development of new industrial estates in future.

The RAA would remain grateful, if Dasho could direct the agencies involved including the NEC Secretariat to submit a detailed action plan with clear and definite timeframe for implementing the audit recommendations and instituting appropriate controls and corrective measures on or before 25th January *2010*.

We would like to acknowledge the co-operation and assistance extended to the auditors by the officials of the audited agencies.

Yours Sincerely,



(Ugen Chewang)
Auditor General of Bhutan

Copy to:

1. The Hon'ble Prime Minister, Royal Government of Bhutan, Thimphu for kind information;
2. The Hon'ble Minister, Ministry of Agriculture, Thimphu;
3. The Hon'ble Minister, Ministry of Economic Affairs, Thimphu;
4. The Hon'ble Minister, Ministry of Education, Thimphu;
5. The Hon'ble Minister, Ministry of Finance, Thimphu;
6. The Hon'ble Minister, Ministry of Foreign Affairs, Thimphu;
7. The Hon'ble Minister, Ministry of Health, Thimphu;
8. The Hon'ble Minister, Ministry of Home and Cultural Affairs, Thimphu;
9. The Hon'ble Minister, Ministry of Information and Communication, Thimphu;
10. The Hon'ble Minister, Ministry of Labour and Human Resources, Thimphu;
11. The Hon'ble Minister, Ministry of Works and Human Settlement, Thimphu;
12. The Hon'ble Speaker, National Assembly, Thimphu;
13. The Hon'ble Chairman, National Council, Thimphu;
14. The Chairperson, Public Accounts Committee, Thimphu;
15. The Secretary to His Majesty, His Majesty's Secretariat, Thimphu;
16. The Secretary, Ministry of Economic Affairs, Thimphu;
17. The Secretary, GNH Commission, Thimphu;
18. The Dzongda, Samtse Dzongkhag Administration, Samtse;
19. The Dzongda, Chukha Dzongkhag Administration, Chukha;
20. The Director, Bhutan Trust Fund for Environment Conservation, Thimphu;
21. The Executive Director, Royal Society for the Protection of Nature, Thimphu;
22. The Managing Director, PCAL, Gomtu;
23. The Managing Director, Lhaki Cement Works, Gomtu;
24. The Managing Director, Bhutan Carbide and Chemicals Ltd., Pasakha;
25. The Managing Director, Bhutan Ferro Alloys Ltd., Pasakha;
26. Estate Manager, Industrial Estate, Pasakha;
27. PPAARD, RAA, Thimphu; and
28. Office copy.

TITLE SHEET

1. REPORT NAME : **Report on Audit of Industries in Pasakha and Gomtu on Environmental Compliance**

2. EXECUTING AGENCY : 1. Bhutan Ferro Alloys Limited;
2. Bhutan Carbide and Chemicals Limited;
3. New Industrial estate, Pasakha;
4. Penden Cement Authority Limited;
and
5. Lhaki Cement Works

3. NAME OF AUDITEE OFFICIALS:

SL. No.	NAME OF AUDITEE AGENCY
1.	Pasakha Industrial Estate
2.	Bhutan Ferro Alloys Limited
3.	Bhutan Carbide and Chemicals limited
4.	Penden Cement Authority limited
5	Lhaki Cement Works

4. PERIOD COVERED BY AUDIT : January 2005 to December 2007

5. SCHEDULE OF AUDIT EXECUTION : 25/11/08 to 14/12/08

6. NAME OF INSPECTING TEAM:

SL. No.	NAME	DESIGNATION
1	Chandra Bdr. Gurung	Senior Audit Officer
2	Sonam Wangmo	Audit Officer
3	Tenzin Chhoedup	Asstt. Audit Officer

7. SUPERVISING OFFICERS:

SL. No.	NAME	DESIGNATION
1	Tashi	Chief Audit Officer
2.	B.B. Chhetri	Deputy Auditor General

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DISCLAIMER NOTE

The coverage of this audit does not include financial auditing. The audit was confined to Multilateral Environmental Agreements on meeting environmental compliances. This audit was based on Audit Planning set by the Royal Audit Authority and facts & information made available and accessible to the audit team by National Environmental Commission Secretariat, National Soil Service Centre, Ministry of Agriculture, and Ministry of Foreign Affairs.

This is also to state that the auditors during the audit had neither yielded to pressure, nor dispensed any favor or resorted to any unethical means that would be considered as violation of the Royal Audit Authority's Code of Good Conduct, Ethics and Secrecy.

1

Executive Summary

WHY AUDIT INDUSTRIES?

Article 25.1 of the Constitution of the Kingdom of Bhutan and Section 3 of the Audit Act of Bhutan 2006 state that “There shall be a Royal Audit Authority to audit and report on the economy, efficiency and effectiveness in the use of public resources”. The Royal Audit Authority is, therefore, required to ascertain and report as to whether Government agencies adhere to the standards of economy and efficiency in their operations and achieve the intended objectives for which they are established and resources are allocated to them. Conservation of Environment is one of the pillars of the Gross National Happiness, the development philosophy of Bhutan. The Royal Government has always emphasized that economic development must not take place at the expense of our natural resources.

Industrialization is taking place at a rapid pace in Bhutan. For instance, the government has already developed an industrial estate in Pasakha and more are in the pipeline. Environmental issues like air pollution, water pollution, waste generation, land degradation, etc are inevitable consequences of industrialisation. However, with systematic and best practices in place, the negative effects can be minimized to the desired level. The Royal Audit Authority accordingly, conducted the audit of operations of industries with an environmental perspective to ascertain the compliances of environmental requirements and visible impacts and other ramifications of non-compliances of environmental norms by the industries.

The Royal Audit Authority took up the study on New Industrial Estate of Pasakha, Bhutan Carbide and Chemicals Ltd (BCCL) and Bhutan Ferro Alloys Ltd (BFAL) at Pasakha, Penden Cement Authority Ltd (PCAL) and Lhaki Cement at Gomtu.

The audit was conducted with the following objectives;

- To ascertain whether the industries complied with the environmental standards set by the National Environment Commission (NEC);

- To ascertain the adequacy of existing monitoring mechanism of environmental compliances;
- To ascertain whether the waste management system in the industries is adequate and appropriate;
- To ascertain the visible impacts of non-compliances of environmental norms; and
- To review the system of occupational health and safety of workers in the industries.

WHAT RAA

FOUND?

The RAA came across certain good practices and some noteworthy achievements as presented hereunder:

- ✓ Bhutan became party to Vienna Convention (1985) and Montreal Protocol (1987) in August 2004 and under this treaty Bhutan is obligated to phase out Ozone Depleting Substances (ODS) by the year 2010. Good progress in this direction has been made indicating that the industries would be able to phase out the ODS by 2010;
- ✓ The NECS, though constrained by limited man power take annual monitoring visits to industries and were fairly able to create environmental awareness amongst industries;
- ✓ Industries are providing employments to large numbers of both national and non-national workers. It was found that, generally the villagers have economically benefited from industries through employment; and
- ✓ Large scale industries especially, BCCL, BFAL and PCAL were generally aware of the environmental concerns and were found to adhere to most of the terms and conditions of the Environmental Clearance.

Notwithstanding the aforementioned good practices and achievements, the Royal Audit Authority also noted some deficiencies and weaknesses, as briefly highlighted below:

- ✗ There is no clarity of roles and responsibilities between NECS and MoEA (competent authority) which could lead to duplication of efforts and blurring accountability;

- * Pollution abatement devices were either not found installed in many industries or not utilized optimally emitting beyond the standards set by NEC;
- * Non-compliance of clauses contained in the environmental clearance was also observed;
- * There is no standardized and regular approach in implementing environmental awareness programmes amongst Industries;
- * Due to the collective emissions or discharges there is no one point source responsible for the growing environmental impacts. Some of the issues noted were disposal of solid and chemical waste, servicing of vehicles in the river, open transportation of raw materials etc.;
- * Workers were found without their protective gears though safety and risk information were displayed in and around almost all the factories;
- * The only school in Pasakha was located in the close vicinity of the new industrial estate posing risks on the health of school children and teachers and other employees; and
- * There were no budgetary provisions for environmental management in the financial statements of the companies.

The study indicated that lack of policy framework, weak implementation of Rules and systematic monitoring by environmental agencies were the principal causes for industries violating the environmental norms and standards.

WHAT RECOMMENDS	RAA ?
<p>Based on the findings of the study, the RAA has made certain recommendations that could aid government and agencies (both regulatory and implementing) in addressing the deficiencies and weaknesses. The report also provides some of the best environmental management practices. Recommendations contained in the report include the following:</p>	

- ✍ Government needs to develop Acts on air quality and appropriate rules and regulations;
- ✍ The roles and responsibilities of NECS and MoEA (competent authority) should be defined for clarity and better accountability;
- ✍ NECS and the competent authority (MoEA) should develop a clear strategy for air quality monitoring specifying proper timeline besides the surprise checks being conducted at present;

- ✎ Considering the vast mandate, the competent authorities (MoEA) need to study the adequacy and augment their human resource;
- ✎ The terms and conditions contained in the Environmental Clearance need to be enforced strictly;
- ✎ Public consultation needs to be enhanced before any project is proposed;
- ✎ Environmental Impact Assessment needs to be carried out more thoroughly and scientifically; and
- ✎ Industrial Infrastructure Development Division of MoEA and NECS should work in close co-ordination for developing any industrial estate in Bhutan.

2

Introduction

The Royal Government of Bhutan has always placed the conservation of environment over socio-economic development for centuries. Such policies are resoundingly enshrined in all environmental acts and importantly in the Constitution of the Kingdom of Bhutan. While the policies, visions and institutions are in place, it is also logical to take stock of realities and take appropriate measures of any shortfalls on time. Industrialization is taking place at a rapid pace in Bhutan. An industrial estate in Pasakha has already been developed and more are in the pipeline. Environmental issues like air pollution, water pollution, waste generation, land degradation, etc are inevitable consequences of industrialisation. However, with systematic and best practices in place the negative effects can be minimized to the desired level.

The Royal Audit Authority accordingly, conducted the audit of operations of industries with an environmental perspective to ascertain the compliances of environmental norms and visible impacts and other ramifications of non-compliances of environmental norms by the industries.

Therefore, the RAA took up the audit of industries with an environmental perspective to see as to how our young industries are complying with environmental standards to help government achieve its goal of preserving our pristine environment. The RAA, however, could not cover those industries such as S.D Eastern Coal Company in Samdrupjongkhar for want of resources. Therefore only those nearby industries located in Paskha and Gomtu, namely Bhutan Ferro Alloys Ltd, Bhutan Calcium and Carbide Ltd, New Industrial Estate in Pasakha (P/ling) and Penden Cement Authority Ltd & Lhaki Cement at Gomtu were selected for the purpose of audit.

The methodologies used for auditing were reviewing of Environmental Acts, relevant rules and regulations, visual inspection, discussions, interviews and review of documents of industries. Further, the team also took note of the expert view from various environmental officials stationed in different industries. The Team also consulted environmental officials from the National Environment Commission and

Ministry of Economic Affairs for technical issues in order to provide a balanced view on the report.

3

Observations

3.1 Overlapping functions and duties of NECS and MOEA

The Secretariat of the National Environment Commission and the Competent Authority of Ministry of Economic Affairs are vested with almost similar duties and functions. Amongst others, the duty to monitor and control compliance with the terms of environmental clearance stands prominent as enshrined in article 34 and 39 of the Environmental Assessment Act 2000.

Though the Secretariat and the competent authority liaise closely at present, there is a need for clear mandate and chain of reporting since these officials work independently under different administration. It could lead to overlapping and duplication of duties if not coordinated well. Further, visits by secretariat and competent authority officials at different period of time could hamper the daily activities of industries and factories.

3.2 Inadequate environmental impact assessment

Section 11, chapter III of the Environmental Assessment Act,2000, states that 'any person who seeks to carry out a project that requires a development consent shall include in the application to the competent authority a description of the potential environmental effects of the project'. Though the Act and the subsequent regulations clearly define procedures on Environmental Assessment, it sometimes becomes a mere formality especially when the proponent of a project is a Government agency. The Environmental Clearance is sought at a very last moment or sometimes when the project is already operational. Environmental Assessment is a tool and aid for decision making as to whether the proposed project should go ahead or continued further. Moreover, the current Environmental Assessment practice seems to focus only on environment and not much on social and economic aspects thus defeating the overall or all inclusive objective of carrying out purpose EIA. At present, the proponents submit just the information on physical environment without the information about the possible impact of the project on environment.

3.3 Issue of Environmental Clearance without installation of Pollution abatement device.

The Pollution Abatement Devices (PAD) are those designed particularly to combat pollution by reducing the amount or concentration of, or eliminating pollution. One of the prerequisites for obtaining an environmental clearance is the installation and operation of PAD at all times during the operation of the plant. It is therefore mandatory for every industry to identify and install a pollution control devices to minimize pollution. Gas cleaning plant (bag filter) is one of the most important pollution control equipment used by industries in Bhutan. Since, dust is a major pollutant in all the industries and the workers if, continuously exposed to dust could result in respiratory problems such as silicosis, lung cancer and bronchitis, etc. besides polluting the atmosphere.

During the site inspection, the audit team came across factories that were issued with an environmental clearance without having installed a pollution abatement device. For instance, the NEC had issued an Environmental Clearance to Ugen Ferro Alloys limited (UFAL), when there was no Pollution abatement device installed in the factory.

3.4 Emission of Suspended Particulate Matter (SPM) beyond allowable standards

NECS and MoEA had recently conducted two rounds of stack emission monitoring during December 2008 and January 2009 for the industries in Pasakha and Phuentsholing areas with technical assistance from Central Pollution Control Board (CPCB) from India. As pointed out in the joint report 40% of the stack sampled for Suspended Particulate Matter (SPM) measured beyond the maximum allowable limits under the emission standards adopted by the government in 2007. Emission measurement results can be known from Annexure I.

The quarterly emission reports submitted by industries also suggests that the emission standards set by government is not met by most of the industries.

The principal reasons that were observed both by the audit team and the teams from NECS and MoEA for not meeting the emission standards were non-usage of pollution abatement equipment and using of mediocre pollution control equipment. Based on the monitoring conducted by NECS and MoEA, M/s Druk Cement Pvt Ltd. was amongst the highest polluter whereas M/s Bhutan Concast Pvt Ltd. polluted the least.

3.5

Inadequate information on air quality

According to Chapter III, Article 419(b) of the National Environment Protection Act of Bhutan, 2007, the Secretariat is responsible for, monitoring the state of the environment including ambient air and water quality and land use changes. NEC Secretariat and environmental officials from MoEA (competent authority) carries out periodic compliance monitoring and emission data collection of all the industries in Bhutan.

BFAL, BCCL and PCAL have their own air quality monitoring device. No system is in place to make air quality information regularly available to the public and the parliament. The sampling results are not made known to the people as such they are unaware as to whether the level of air pollution in the locality is a concern or not. The likely impacts of air pollution generated from these different industries on the environment and human health are yet to be known. There is lack of information on air pollution or studies conducted to measure and assess air pollution. The likely impacts of the air pollution can be known from the Annexure II.

3.6

Inadequate environmental awareness.

With rapid industrialization, growth in infrastructure development and urbanization, there is an urgent need to raise public awareness on environmental issues and its impacts on both the environment and human health.

Environmental awareness though crucial for citizens at large, it becomes imminently important for those who are directly affected by pollution hazards, namely the factory workers and the residence who live in the vicinity of such industrialized areas. On interviewing, auditors were made to understand that the floor workers were not aware of the risks involved in working in cement plant, a chemical factory or a steel factory. Many of the industries have put up occupational health and safety signs in and around the factory premises but did not create the intended impact. Lack of adequate awareness amongst workers about the safety and environmental issues would not only pose possible threat to their health and safety as well as people in the vicinity but their actions or inactions could also be environmentally damaging.

3.7 Non compliance identified against the environmental clearance.

An Environmental Clearance is issued upon an agreement between the NEC and the company, which requires the company to follow and adhere to certain terms and conditions specified in the clearance.

While the industries have complied with almost all the terms and conditions (80% on average), there were a few instances where the audit team noted non or partial compliance of environmental terms and conditions that were laid down in the Environmental Clearance (EC) as presented below.

Terms and conditions	PCAL	BFAL	LHAKI	BCCL	Others
Vehicles used for transportation of raw materials/products not found covered					
No routine medical checkup for the workers					
No separate meters to check the operation of the pollution control					
OHS measures not implemented					
No yearly environmental budget					
GCP not in operation (JUNE 19 TH , 2008)					

(Shaded boxes represent non-compliances)

Industries responded that despite their best efforts, it is difficult to achieve cent percent of all the terms and conditions laid down in the Environmental Clearance.

3.8 Emerging environmental Concerns.

The growing environmental effects depend mainly upon the number, size and location of industries. With increased number of industries especially in the Pasakha area, the cumulative environmental impacts are bound to increase such as increase in air emissions, increase of pollutants discharged to a common water body, storage and disposal of wastes, industrial accidents, spills, and noise.

Some of the emerging issues and concerns which were observed by the audit team during their visits are as follows:

3.8.1 Servicing of vehicles transporting raw materials:

After unloading the raw materials, the servicing of the vehicles are usually carried out in the river flowing near the industries. Other equipment which contains oil and grease are also washed which is likely to contaminate the water.



Raw material transportation vehicles found servicing in the river

3.8.2 Disposal of solid waste:

Clause 3.7.8, Chapter Solid water requirement, of the Water and Sanitation Rules, 1995 clearly states that “No industry shall store and dispose its industrial waste except in a manner that does not threaten environment or the health and safety of its workers and the public”.



Industrial waste disposed below the road side

off
the

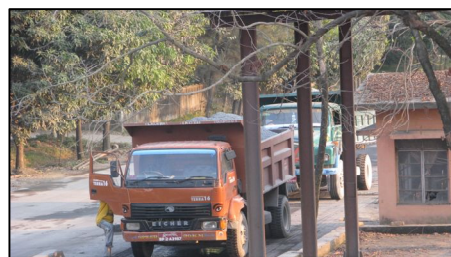
Contrary to the above mentioned rule, solid waste could be seen along the road side, backyard of the factory premises and also in front of the school gate, as depicted in the picture above. Besides the potential environmental hazards these industrial wastes pose, the aesthetic look of the area is greatly disturbed. It was learnt that the Ministry of Economic Affairs and NEC is surveying some potential area to designate a landfill site.



Industrial waste disposed at the entrance of the only school in Pasakha.

3.8.3 Vehicles carrying raw materials and products not covered.

One of the terms and conditions stated in the environmental clearance for almost all the industries is that “the holder shall ensure that vehicles carrying raw materials and products are totally covered/closed”.



Raw material transport vehicle at the weighing bridge at PCAL.

Non-compliance of this particular terms and condition was particularly noted in the PCAL. The vehicles transporting raw materials for PCAL were found uncovered. These vehicles were found running at very high speed

emitting lots of dust thereby aggravating the dust pollution both in the town and factory premises.

3.9 Absence of separate electricity meters for pollution abatement device.

One of the terms and conditions, amongst others, laid down in the Environmental Clearance is to install and operate separate energy meters for all pollution control devices. The amount of electricity bill paid for the pollution abatement equipments would testify that the equipments had been used for required number of hours.

Despite frequent and strict instructions issued by the NEC and MoEA, the industries had not installed separate electricity meters for pollution abatement equipments. Therefore, the audit team could not verify whether the pollution abatement equipments were run round the clock to control atmospheric pollution. Nevertheless, some of the large scale industries like BFAL, BCCL and PCAL justified to the audit team by stating that they have centralized computer system wherein one can see the log to verify the number of hours the equipments have run. The adherence and implementation to the NEC's instructions and follow up actions is yet to be known in this regard.

3.10 Inadequate Public consultation

As per the article 86 of National Environment Protection Act (NEPA) of Bhutan 2007, "the citizens are entitled to participate in the decision-making processes concerning the environment which is further elaborated in Regulation for the Environmental Clearance of Projects and Strategic Environmental Assessment". However on interviewing, many of the local residents felt that they were not consulted while the industries were developed. Many of them were of the view that they would not understand the adverse impacts of such industries, even if they were consulted. Rather, they felt that the project proponents or the regulatory authority should have explained to them in details of such implications.

They generally felt that their crop yields have reduced comparatively over the years. They have even put up the issue in GYT. Further, the people also felt that the instances of people contracting diseases like red eyes, fever, cough and diarrhea have also increased. Other effects are the noise and the dust pollution. Nevertheless, the local residents in general felt that economically they have gained through employment in nearby industries.

3.11 Absence of Disaster Management Plan

Pasakha houses the maximum number of industries in the country. The new industrial estate alone houses 29 different industries sprawling in an area of 108 acres with investments worth millions of Ngultrums. The number of employees and workers runs into several thousands.

Considering the size of investments and employees and workers it is imperative that these industries have comprehensive Disaster Management Plan. Amongst others, the flash floods are the most urgent concern to be addressed. The industrial area was hit by flash floods in 1996 and 2000 in which properties were destroyed and human lives lost.

BFAL and BCCL dredge the nearby river annually and also have constructed some river protection wall, but these measures do not seem adequate if we had to consider the scale of floods in the past. Other disasters could be Earthquake, Industrial accidents, fire, heat waves, spillage and leakages etc. Existing more of a reactive approach towards disaster management could prove to be too costly in absence of adequate Disaster Management Plan in place.

3.12 Workers found without protective gears

The entire process of production in a cement, ferro alloy and chemical industries involves many intrinsic hazards and risks. Hazards and risks mainly depend upon the atmosphere where employees work, the nature of operation, reactors and machinery used.

	Description of hazards
Physical hazards	noise, vibration, heat and coal stress, emission, etc.
Chemical hazards	inhalable gases/vapor/dust/fumes, asbestos, insulation wools etc.
Safety hazards	limited space, electrical/ mechanical/ hydraulic/pneumatic sources of energy, machineries prone to accident including cranes and hoist, falling weights and dangerous objects, slips, trips and falls

It is therefore imperative that adequate safeguard measures are in place to ensure the health and safety of workers engaged in the industries. The RAA observed the following health and safety concerns either not addressed or adhered to by the industries and workers.

3.12.1 Regular workers found without protective gears

While the safety and risk specification were displayed in and around almost all the factories, the workers (regular) were found not using the protective gears issued by the companies. A BCCL worker working near a furnace of approx. 2000°C has been depicted as an example.



A regular worker working near a furnace without protective gears, BCCL.

The BCCL and BFAL have a system of imposing fine in case a worker is found without protective gears. The adherence and implementation to the OHS measures was found generally lacking. Many of the workers responded that protective gears were not comfortable while working, especially during summer.

3.12.2 Contract workers not issued with protective gears

As per the general rules and regulations chapter VI, clause 24.1 on occupational health and safety (OHS) in construction, manufacturing, mining and service industries, 2006, an employer shall be responsible for providing, at no cost to the worker, all items of personal protective equipment required by these Rules and Regulations. The list of the personal protective equipment are as detailed in the *Annexure III*.

In addition to the general rule and regulation on OHS issued by the MoLHR the companies draws an agreement with the Contractor before the award of the contract specifically highlighting that, “the contractor shall provide the required tools and safety items like, gloves, helmets, duster clothes, shoes/boots, etc to the workers engaged in the contractors cost, any such item are taken from the company’s store on exceptional cases, the cost of the items will be deducted from the bill of the contractor”.

While interviewing the contract workers and also through observation, it was clear that most of the contract workers were not supplied with necessary protective gears thus exposing the workers to unnecessary risks to their



Workers at PCAL with their own protective gears (helmet and mask)

health and safety. Those that were found with some protection had bought it themselves from the local market. However, the contractor justified that many of those contract labourers are on temporary basis and would imply a huge cost if all of them were to be issued with such protective gears.

3.13 Pasakha school located in industrial area.

The only school in Pasakha depicted in the picture on the right side) was constructed by BCCL and BFAL mainly for the education of the employees' children. Considering the health and



(as

safety of the school going children the school was located almost 3 kilometres away from the factory site. However, with the development of the new industrial estate, the school is now just a hundred metre away. Moreover, the new industrial estate houses 29 industries, all of which emits high level of dust and other particulate matters. The list of the factories is as attached in Annexure IV.

Recent study conducted by NECS and MoEA shows that the emission level of SPM is especially very high in the school area. Audit team, during the site visit, found that the children had to wear protective mask and were found eating their pack lunch in the open air full with dust and smoke. Besides, the industrial wastes were also found dumped in the vicinity of the school.

NECS and MoEA had also constantly raised this issue but could not reach the decision as there was no consensus on who would bear the relocation cost and also due to difficulty in finding the new site.

3.14 Inadequate Housekeeping

Housekeeping is a basic requirement of an industry for the health and safety of the workers. The state of housekeeping reflects the administrative competence of the company as a whole. The general housekeeping of the industries was assessed by means of site visits and interviewing with workers. Cleaners list was also collected to see if adequate cleaners were employed.

The team observed accumulation of dust around the site including the processing plant in almost all the industries. Factory wastes and house hold wastes were found disposed within the factory premises. The management attributed inadequate housekeeping to illiteracy of workers and their attitude and explained that they had put their best efforts to educate workers on the issue.

4

Recommendations

1. Institute legal instrument (Clean Air Act)

Though the NEC has developed National Standards for Ambient Air Quality, Industrial Emission, Workplace Emission and Noise Levels for Bhutan 2007, there is a need for a Clean Air Act and its regulations. This would provide a legal and regulatory framework for enforcing standards and norms.

2. NEC should have clear strategy on air quality management

NEC and the competent authority needs to develop a clear strategy for air quality management monitoring specifying proper timelines for long, medium and short term plans and strategies.

3. Define specific roles and responsibilities and accountability

Lack of clarity in the roles and responsibilities would create confusion amongst the ministries and enforcing agencies with resultant non-monitoring and non-compliances of environmental norms. Thus the roles and responsibilities of NEC and competent authorities of line ministries should be clearly specified for better enforcement, monitoring and accountability.

4. MoEA should enhance Human Resource Capacity in Environmental Unit section

As per the EA Act 2000, the competent authorities in the line ministries have a vast mandate to monitor and report the compliance of environmental norms. MoEA has currently only three personnel in the unit which is not adequate to effectively monitor and report on such issues. The MoEA needs to strengthen their Human Resource capacity.

5. Introduce fiscal instruments

NEC as an apex environmental institute should look in to the possibilities of providing fiscal incentives for those industries using environmentally friendly technologies, code of best practices and eco-labeling. Industries that provide

environmental services and manufacture environmentally friendly products should be provided with tax incentives. Customs and other duties could be reduced for import of environmentally friendly and energy efficient technologies.

6. Strict Enforcement of Environmental Clearance

Most of the findings by the audit team were non-adherence to the Environmental Clearance. Therefore, the NEC and the MoEA should work out proper mechanisms to monitor these non-adherences. One of the ways could be to station officials in the industrial area permanently for physical monitoring and vigilance.

7. NEC and MoEA should conduct proper check on EIA

NEC should intervene by way of proper verification of EIA, if the proposed project is likely to have adverse impacts on social, economic and environmental issues. This is critical since most of our industries are located or are planned in the border areas and could have regional and trans-boundary impact.

8. Relocate the School

The authorities should review the appropriateness of continuance of the school in the present location at the Pasakha industrial area in view of dust and other environmental pollutions adversely affecting the students, teachers and other employees. The possibility of relocating the existing school in an appropriate place in Pasakha should be considered.

9. Environmental Performance reporting by industries

Often, environment is taken by industries in isolation. There is a need to integrate environment with the over all functions of the industries and report appropriately. Such reports should specify the performance of the industries against the various standards set forth by Environmental agencies.

10. Improving social responsiveness

Though some industries have contributed to society in some form or other, there is much more they can do to the society and the nation. There do not seem to exist proper co-ordination among the industries as to how they can be more responsive

to the society. Environmental agencies could play a crucial role in bringing the industries together in pooling resources and educating them on the long term benefits and impacts of on their business of such initiatives. Nonetheless, there are no legal obligations for these industries to do so.

11. Revision of Current penalty slab

The existing penalty slab of Nu. 5,000.00 – 50,000.00 may be reviewed. Firstly, the fines levied should be sufficiently deterring for the pollution and should discourage repeated violation. Secondly, the discretion to levy either 5,000.00 or 50,000.00 provide scope for undue negotiation between the enforcing agency and the defaulter negating the sanctity of the rule.

GLOSSARY

BAIL	<i>Bhutan Agro Industries Limited</i>
BCCL	<i>Bhutan Carbide and Chemicals Limited</i>
BFAL	<i>Bhutan Ferro-Alloys Limited</i>
CO	<i>Carbon monoxide</i>
CO ₂	<i>Carbon dioxide</i>
DRC	<i>Department of Revenue and Customs</i>
EA	<i>Environmental Assessment</i>
EC	<i>Environmental Clearance</i>
EIA	<i>Environmental Impact Assessment</i>
GCP	<i>Gas cleaning plant</i>
IIDD	<i>Industrial Infrastructure Development Division</i>
LCW	<i>Lhaki Cement Works</i>
MoEA	<i>Ministry of Economic Affairs</i>
MoLHR	<i>Ministry of Labour and Human Resources</i>
MoWHS	<i>Ministry of Works and Human Settlement</i>
NEC	<i>National Environment Commission</i>
NEPA	<i>National Environment Protection Act</i>
NO ₂	<i>Nitrogen oxide</i>
ODS	<i>Ozone Depleting Substances</i>
OHS	<i>Occupational Health and Safety</i>
PCAL	<i>Penden Cement Authority Limited</i>
RAA	<i>Royal Audit Authority</i>
RTO	<i>Regional Trade Office</i>
SO ₂	<i>Sulphur dioxide</i>
SPM	<i>Suspended Particulate matter</i>
UFAL	<i>Ugen Ferro-Alloys Limited</i>

APPENDIX

AUDIT MANDATE, SCOPE, CRITERIA & METHODOLOGY

The Royal Audit Authority (RAA) conducted the audit on operation of Industries – an environmental perspective (BCCL, BFAL, PCAL & LCW) in accordance with the Constitution of the Kingdom of Bhutan (article 25) and Audit Act of Bhutan 2006 (Chapter 2b). The RAA is mandated to report on the functions and operations of the Government Agencies and other organizations and recommends measures to improve their efficiency and effectiveness.

Scope

The audit was performed to review and assess the operation of industries in an environmentally friendly manner. In the process, the RAA took up the audit of BCCL, BFAL, PCAL, LCW & new industrial estate in Pasakha). Wherever possible site visits were also made based on the need and requirement.

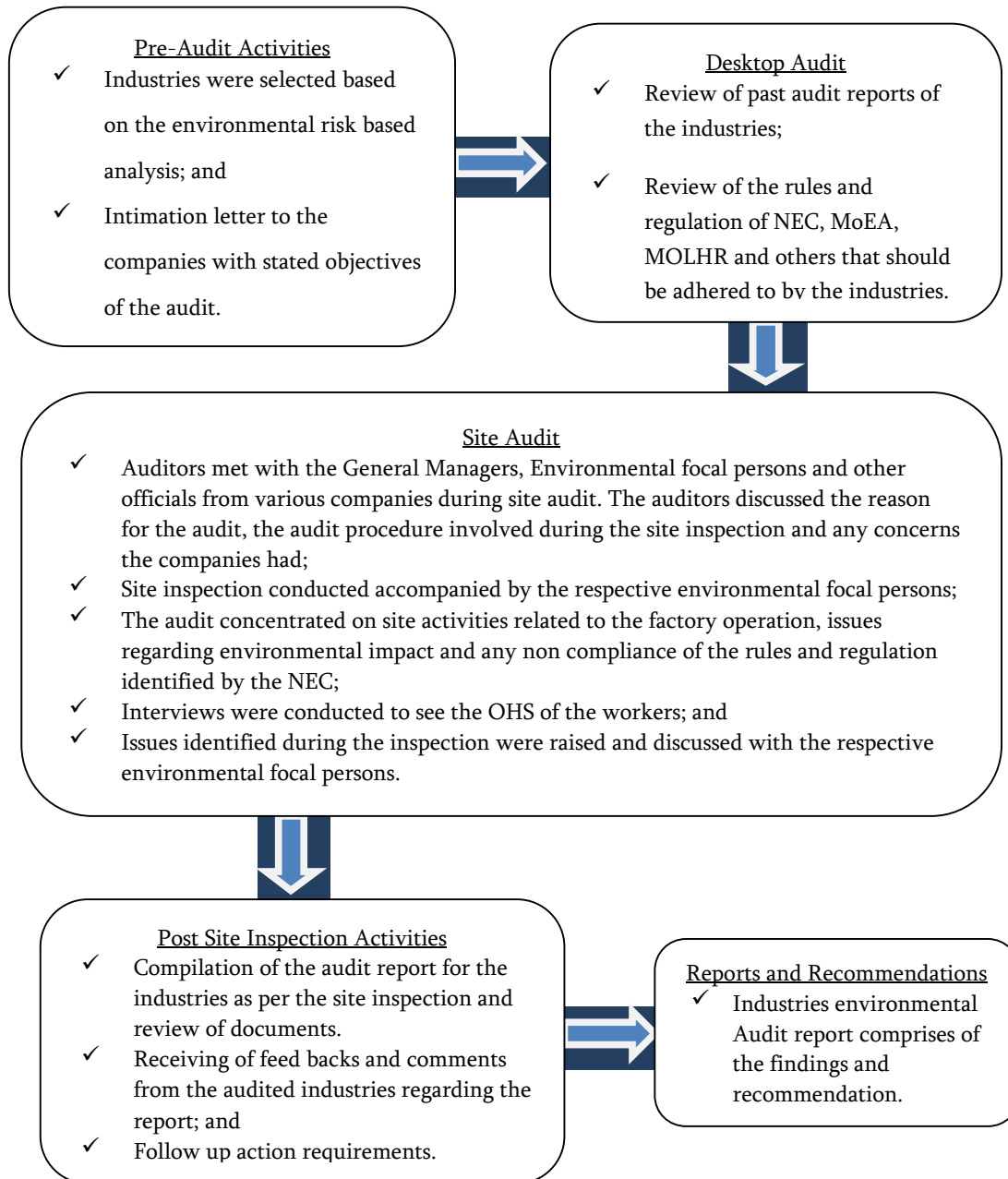
Sources of Audit Criteria

The RAA prepared the audit criteria based on the following sources;

1. Environment Assessment of Existing Industries, 1999;
2. Environment Assessment Act, 2000;
3. National Environment Protection Act of Bhutan, 2007;
4. Environment Act 2004;
5. Ninth plan Document (2002-2007);
6. Bhutan 2020 – A vision for peace, prosperity and Happiness;
7. Application for environmental clearance guideline for the preparation of industrial project reports;
8. Regulation for the environmental clearance of projects and regulation on strategic environmental assessment;
9. Water and Sanitation Rules, 1995; and
10. General rules and regulations on occupational health and safety (OHS) in construction, manufacturing, mining and service industries, 2006; and
11. Labour and employment act of Bhutan, 2007.

Methodology

The main methods used for this audit include Document Review, Physical Observation, Interviews, Walk through Tests and Questionnaires. However, due to lack of records, mainly the interviews and site visits were used.



Study Design

The audit was an explorative study. The team reviewed documents of the various industries. For the purpose of gathering primary information, the team interviewed

several Industry managers and officials. A well-structured questionnaire forms was also designed separately for the management, workers and local people. However, since most of the workers and locals were un-educated interviews were the only option.

Secondary data were collected from the reports of the Industries.

ANNEXURE

