

# Integrated Management System (IMS) Implementation and Certification Challenges for BAEC

P.K. Saha, D. Das, K.M.R. Rahman and Q. Huda

*Quality Management Division, Bangladesh Atomic Energy Commission  
E-12/A Agargaon, Dhaka-1207, Bangladesh*

## Abstract

Bangladesh Atomic Energy Commission (BAEC) is willing to establish and have certification on Integrated Management System (IMS) following three International Standards namely ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007 with a view to addressing all of its organizational goals like quality, environment and health & Safety etc. A gap analysis was conducted in the Head Office of BAEC & Analytical Chemistry Laboratory under Chemistry Division, AECD. Non-Conformances found in the gap analysis listed in the tables need to be eliminated and corrective actions are to be taken. By adopting IMS, BAEC can gain various benefits like better management monitoring and control, better quality customer services, improved abilities to eliminate procedural weaknesses, enhanced efficiency in activities etc. In order to have a single framework or structure for the arrangement and processes necessary to address all organizational goals, some suggestions/recommendations have been provided to be considered for implementation of and certification to IMS.

**Keywords:** Integrated management system, Quality management system-ISO 9001:2015, Environmental management system-ISO 14001, Occupational health and safety management system-OHSAS 18001, Consulting firm, Implementation, Certification body

## 1. Introduction

BAEC was established in 1973 as a multidisciplinary R&D organization with the vision of "promotion of nuclear science and technology through peaceful uses of atomic energy to achieve self-reliance for overall socio-economic development". From the very beginning of its formation, BAEC started R&D works in areas covering physical sciences, biological sciences, engineering and nuclear medicine for human welfare and economic upliftment of the country. At present, BAEC has grown as the largest organization for research in the field of Nuclear Science & Technology in Bangladesh. BAEC has also been entrusted with the responsibility of establishing/implementing country's first nuclear power plant in order to make substantial contribution to the ever-increasing demand for electricity. BAEC is also committed to establishing nuclear safety culture as per international conventions and norms.

The commitment to provide quality services and research, conserve environment and take care of employees' health and safety is becoming a very important part of strategy and image for an organization's long-term perspective. Providing special attention to these areas, an organization actually pays attention to their responsibilities. In that way organizations increase the trust and loyalty of their partners. The connection between the quality of research, services or products and the return of an organization is unquestionable.

However, when we talk about employees' health and safety, environmental protection and other areas of management, some key questions arise; these questions are associated with the degree of organization's commitments, possible limitations of organization's direct actions & required resources and expected return. Controlling separate areas in a way which would allow giving synergistic effect and economic benefits is not so simple.

The optimization of management using requirements of international standards makes the finding of solution for this problem a bit easier.

ISO 9001 was meant to describe the organizational policy, procedures and rules that give the ability to ensure equal quality of organizational work. Now the latest version of ISO 9001 is ISO 9001:2015 [1] which is fifth edition of the standard.

ISO 14001 describes the organization's environmental protection management system as associated and together functioning elements that allow the assurance of effective and efficient management of activity or products and services having consequences on environment. According to statistical data, the necessity and scope for environmental protection has become very relevant for organizations. Now the latest version of ISO 14001 is ISO 14001:2015 which is the third edition of the standard.

Employees' health and safety management system is standardized after the standard OHSAS 18001:1999 [1], the authorship of which is assigned to a few organizations of standardization, certification and consultation (OHSAS 18001) [1]. Despite the fact that International Organization for Standardization does not describe this system, it is well coordinated with the standards of quality management and environmental protection management. The standard OHSAS 18001 is meant to help organizations to minimize the negative work effect on employees and to control the risks for employees' health and safety. In 2007 this standard was updated in cooperation with 43 organizations from 28 countries (OHSAS 18001:2007) [1].

In order to have a single framework or structure for the arrangement and processes necessary to address all organizational goals IMS is required [2]. Thus BAEC requires to implement and get certified in a set of international management standards with a view to increasing the competence and efficiency of the organization in order to respond to the requirements of clients/customers, other interested parties/stakeholders and competitive market.

---

\*Corresponding author: [pk\\_saha88@yahoo.com](mailto:pk_saha88@yahoo.com)

**2. Objectives**

- To demonstrate necessity of implementation of & certification to IMS;
- To describe some common contents of management systems;
- To identify some gaps in the Management System of BAEC with respect to three specific International Standards (ISO 9001:2015 QMS, ISO 14001:2015 EMS & OHSAS 18001:2007)
- To illustrate the procedure to implement an Integrated Management System to Certification with brief description and flow chart (Fig.4);
- To find some challenges to implementation of & certification to IMS;
- To outline some suggestions/recommendations to overcome the challenges regarding implementation of and Certification to IMS for BAEC.

**3. Benefits of IMS**

- Organizing the processes of organizational activity smoothly;
- Encouraging risk management;
- Meeting the deadlines;
- Not exceeding the planned budget;
- Reducing faulty work to a minimum;
- Avoiding the disturbance of employees' health and violations of environmental balance;
- Raising stakeholder perception and satisfaction.

**4. ISO 9001, ISO 14001, OHSAS 18001**

**4.1 Quality Management System**

4.1.1 ISO 9001 standard shortly known as Quality Management System (QMS) is one of the most important and popular standard & most structured quality framework in the world. It states QMS requirements. This standard was first published in 1987 and subsequently updated in 1994, 2000, 2008 and 2015. Intensive, methodical and established approach are guaranteed by QMS to realize reliable customer satisfaction and continuous improvement as shown in Fig.1.



**Fig. 1:** Representation of the structure of the QMS Standard in the PDCA (Deming) cycle

In the figure a remarkable strategy called Plan-Do-Check-Act or PDCA cycle that effectively assists in the

continuous improvement of QMS is shown. The PDCA cycle is adopted as a strategic management supplementary that ensures sustained growth and continuity to efficiency of management systems to achieve the desired goal [3-4]. Plan-Do-Check-Act approach is the simplification of the main aspect of a management system for continuous improvement. The components of PDCA cycle are explained below:

**Plan:** to establish the objectives of the system and its processes, and the resources needed to deliver results in accordance with customers' requirements and the organization's policies, and identify and address risks and opportunities.

**Do:** to implement what was planned.

**Check:** to monitor and (where applicable) measure processes and the resulting products and services against policies, objectives, requirements and planned activities, and report the results.

**Act:** to take actions to improve performance, as necessary.

QMS establishes and improves quality of the management of both product and service organization regardless the type and size of the organization.

**4.1.2 Key benefits of implementing ISO 9001**

- Better control & continual improvement in the organization.
- Enhanced customer satisfaction and improve customer loyalty leading to profitable business.
- Augmented output and outcomes by assimilating and lining up internal processes.
- Giving assurance to the involved parties about the organization regarding reliability, efficacy and competence.
- Anything wrong in the production or services can be found very earlier by frequent check.
- Protects recurrence of faults by taking appropriate corrective action.
- Makes management more active.
- A great marketing tool. Buyers are more likely to do business with an ISO certified organization than non-certified one.
- Ensures quality to end users.

**4.2 Environmental Management System**

4.2.1 ISO 14001 popularly known as Environmental Management System (EMS), a systemic approach to identify, manage and control environmental issues within an organization. In order to pay attention to environment consisted of air, water and soil and to gain a competitive benefit an organization needs to implement this standard at this current situation. It assists organizations to improve their environmental performance through more efficient use of resources and reduction of waste, gaining a competitive advantage and the trust of interested parties as shown in Fig.2.

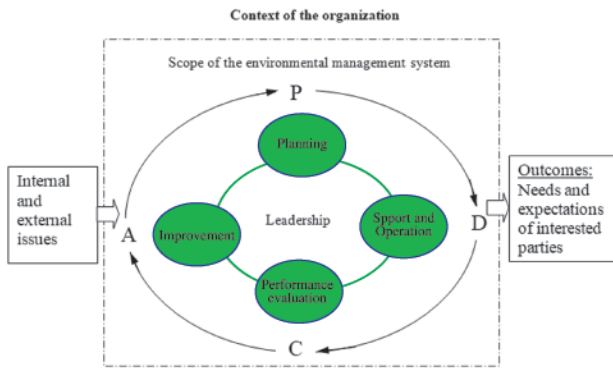


Fig. 2: Relationship between PDCA and the framework of EMS

In the figure PDCA cycle that efficiently assists in the continuous improvement of Environmental Management System is shown.

4.2.2 Key benefits of implementing ISO 14001

- Controlling environmental pollution.
- Savings of resources/supplies.
- Reduced energy consumption.
- Reduced material storage costs.
- Reducing expenses for waste management and carrying, releases/discharges, radiations/emissions etc.

4.3 Occupational Health and Safety Management System

4.3.1 OHSAS 18001 is an internationally recognized occupational, health and safety management system series standard. OHSAS 18001 is broadly known as the Occupational Health and Safety Management Standard which is a British standard intends to address occupational health and safety by identifying, managing and controlling occupational Hazard and Risks including compliance with the legislation that applies to organization's activities as shown in Fig. 3.

In the figure Plan-Do-Check-Act approach that efficiently assists in the continuous improvement of occupational health and safety management system is shown. It can be applied to any type and size of organization who intends to eliminate or minimize hazards/risks, occupational accidents and their consequences to the employee and stakeholders.

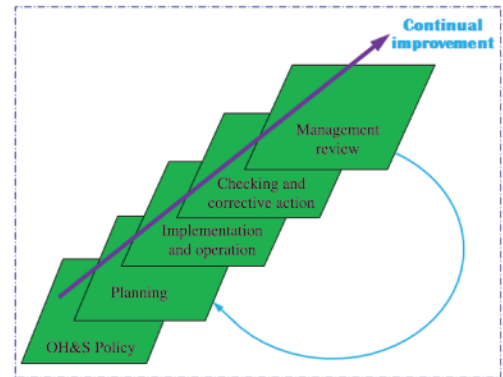


Fig. 3: OHS management system model for OHSAS Standard

4.3.2 Key benefits of implementing OHSAS 18001

- Identify, minimize and control health and safety risks.
- Ensures health and well-being of employees, sub-contractors and the public.
- Focused towards zero accidents.
- Ensures legislative awareness and compliance.
- Reduces information related security breaches.
- Reduces accident and incident rates by reducing and elimination workplace hazards and by investigation process.
- Increases employee motivation through the provision of a safer workplace and participation process.

5. Gaps in the Management System of BAEC with respect to ISO 9001:2015 QMS, ISO 14001:2015 EMS & OHSAS 18001:2007 [5-7].

Table 1: Salient features of identified gaps conducted in BAEC Head Office and Analytical Chemistry Laboratory under Chemistry Division of Atomic Energy Centre, Dhaka

Clauses (Requirements under ISO 9001, ISO 14001 & OHSAS 18001)	Gaps
8.1- ISO 9001, ISO 14001 and 4.4.6- OHSAS 18001	Documented procedures for the processes/activities under different Divisions of BAEC Head Office were absent. No documented planning format was available. Prescribed research writing format were absent. Internal Audit Plan under Accounts & Audit Division covering all processes of BAEC were missing. Decentralization of Financial Authority was found to be missing. No written plan for regular maintenance work under Transport Branch was found. Again, in the Transport Branch complaint (complaint by an employee who is using transport) register was not found. BAEC has Generator Operation & Maintenance Manual, however, the manual was not found at the site.
7.5- ISO 9001, ISO 14001 and 4.4.5-OHSAS 18001	Documented recording system regarding Project Director selection and evaluation was absent. List of external origin documents (i.e., list of IAEA documents) for relevant Division was found to be missing.
6.2.1-ISO 9001, ISO 14001 and 4.3.3-OHSAS 18001	No objectives have been set considering Quality, Environment, Health & Safety issues.

Clauses (Requirements under ISO 9001, ISO 14001 & OHSAS 18001)	Gaps
8.4-ISO 9001, 8.1-ISO 14001 and 4.4.6- OHSAS 18001	Evaluation of suppliers for selection purposes was available; however, re-evaluation of suppliers after a certain time interval (e.g. 6 months or 1 year) was not done. Again, there must be certain clauses/conditions (say, the service/product will be delivered/supplied in such a way that it must not do any harm to human body; It will not contaminate soil, air and water) in the Purchase Order considering the Health, Safety and Environmental issues which were found to be missing.
6.1.3-ISO 14001 and 4.3.2- OHSAS 18001	Head Office of BAEC has two lifts for internal purposes which require regular inspection. But according to Bangladesh Labour Law 2006 regular inspection of the lifts by competent personnel or authority was not carried out.
4.4.7-OHSAS 18001 and 8.2-ISO 14001	No documented procedure (under relevant Division) for Emergency Preparedness & Response was available.
8.5.1-ISO 9001, 8.1-ISO 14001 and 4.4.6-OHSAS 18001	Documented assessment system for selecting, placing and establishing NINMAS and INMAS in the country was absent. No documented planning format was available for monitoring the activities, although, monitoring was done through visiting the NINMAS and INMAS. Moreover, no monitoring records were found.
7.2-ISO 9001, ISO 14001 and 4.4.2-OHSAS 18001	No training plan was found. No training centre was found under the Human Resources Division. Coordination gap was apparent between Human Resources Division & Training Institute. Absence of documented selection format for selecting participants for training was observed. Lack of coordination between Human Resources Division & International Affairs Division was found. Uniform practice of training evaluation was absent. Absence of Training Need Assessment (TNA) process for personnel of BAEC was observed. Identification of competence criteria for different posts was missing.
5.3-ISO 9001, ISO 14001 and 4.4.1-OHSAS 18001	No defined Job Description (JD) was found for each and every post of BAEC.
4.4.7-OHSAS 18001 and 8.2-ISO 14001	No practice of Mock-Drill (Fire, Earthquake etc.) was observed. No provision (i.e. inspection plan and records) for monthly examination for inspecting the effectiveness of fire-extinguisher(s) was noticed. Absence of Fire-Fighting, Rescue and First Aid teams to address emergency situations was observed.
4.5.1-OHSAS 18001 and 9.1.1-ISO 14001	Cleaning Schedule and Checklist were absent. Provision for testing Potable Water annually was missing. (Periodic testing (at least once a year) of potable water shall be performed by the Public Health and Engineering Department or any other public establishment or agency approved by the Government as per Bangladesh labor Rule 2015, Section 50, sub-section 5. No First-Aid Box was available in any floor for emergency purpose, although BAEC has a Clinic for performing the same.
4.5.1 and 4.5.2- OHSAS 18001	First Aid box was seen without having the list of materials on it. No practice of maintaining register of medicine with expiry date was seen. No provision of documented record of Annual Health Screening of personnel was found.
10.3-ISO 9001 and ISO 14001	To reduce recurrence of effort, paper work & work load and for timely delivery of work it is necessary to keep pace with new and recent technology. Software gives insights of overall financial performance. It handles all financial aspects and keeps the record of transactions. It manages general ledger, accounts receivable and accounts payable. Moreover, it allows tracking cash flow, revenue and expenses. Therefore, BAEC may introduce software for Finance & Budget Division, for maintaining Payroll & Cash Account.
8.5.1-ISO 9001, 8.1-ISO 14001 and 4.4.6-OHSAS 18001	BAEC has engaged Contractors for getting vehicle support for the officers and staffs. However, no records of repair & maintenance of Contractors' Vehicle were found.
9.1.2-ISO 14001 and 4.5.2-OHSAS 18001	No written schedule for verifying the renewal status of drivers' Licenses was found. Speed limit of vehicles inside the facility was not defined and visualized. Absence of Fire Extinguishers in the facility as well as in vehicles was observed.
8.4-ISO 9001, 8.1-ISO 14001 and 4.4.6-OHSAS 18001	BAEC has a practice of preserving the list of workshops through some sorts of assessment. However, workshops performance evaluation after certain time interval was not found.
9.1.2-ISO 14001 and 4.5.2-OHSAS 18001	No documented Schedule Maintenance Plan was available for the Generator for ensuring services on time. No rubber mat (mainly to provide insulation to avoid electrical shock) was available which was required for compliance. Unnecessary things were found kept inside the Generator room which may cause fire.
8.4-ISO 9001, 8.1- ISO 14001 and 4.4.6-OHSAS 18001	In the Procurement Branch absence of documented Requisition format was noticed. Defined instructions related to purchasing issues were absent. There were three sections/units involved in purchasing. However, which sections/units responsible for "What to Purchase" was found missing.

Clauses (Requirements under ISO 9001, ISO 14001 & OHSAS 18001)	Gaps
4.4.7- OHSAS 18001 and 8.2- ISO 14001	Absence of proper security system including irregular maintenance of visitor register log was apparent in the Analytical Chemistry Laboratory under Chemistry Division of Atomic Energy Centre, Dhaka. Again, Eye wash facility in the Analytical Chemistry Laboratory under Chemistry Division was found missing. This is a requirement under emergency preparedness and response. The first few seconds after exposure to a hazardous chemical (especially a corrosive chemical) are critical. Delaying treatment, even for a few seconds, may result in huge damage to eye.

**Table 2: Findings regarding Mandatory documents of the IMS**

Following Mandatory Documents/Procedures compulsory for IMS Standard were found absent in the BAEC Head Office and Analytical Chemistry Laboratory under Chemistry Division, AECD.

Clauses	Documents/procedures
Clause 5.2 of ISO 9001, ISO 14001 & Clause 4.2 of OHSAS 18001	IMS policy covering Quality, Health, Safety & Environmental issues.
Clause 6.1.1 of ISO 9001 & ISO 14001	Risk Based thinking or Risk Assessment following Quality, Environment & overall business activities.
Clause 4.3.1 of OHSAS 18001	Procedure for Hazard Identification and Risk Assessment.
Clause 6.1.2 of ISO 14001	Procedure for Environmental Aspect and Impact.
Clause 6.1.3 of ISO 14001 & Clause 4.3.2 of OHSAS 18001	Procedure for Legal and other requirements.
Clause 4.4.3.1 & 4.4.3.2 of OHSAS 18001	Procedure for Participation, Communication & Consultation.
Clause 9.1.1 of ISO 14001 & Clause 4.5.1 of OHSAS 18001	Procedure for Performance Monitoring & Measuring.
Clause 9.1.2 of ISO 14001 & Clause 4.5.2 of OHSAS 18001	Procedure for Evaluation of Compliance.
Clause 9.2 of ISO 9001, ISO 14001 & Clause 4.5.5 of OHSAS 18001	Procedure for Internal System Audit.
Clause 10.2 of ISO 9001, ISO 14001 & Clause 4.5.3.2 of OHSAS 18001	Procedure for Nonconformity and corrective action.
Clause 4.5.3.1 of OHSAS 18001	Procedure for Incident Investigation.
Clause 9.3 of ISO 9001, ISO 14001 & Clause 4.6 of OHSAS 18001	Procedure for Management Review.

**6. Brief Description on Implementing an IMS to Certification**

Different levels of management of an organization should be aware and motivated enough to implement IMS with knowledge about various standards covered under IMS. An organization should have Vision, Missions, QMS policy, Quality objectives, process flow chart, organogram in place. Then, manual, Standard Operating Procedure (SOPs), job descriptions, work instructions, records, forms etc. should be developed and implemented. In the next stage internal gap analysis needs to be carried out to compare the compliance of present system against requirements of the standards under IMS. If Non Conformances are found then, those must be eliminated and in that case the organization may require helps from a consulting firm. Thereafter, Management Review meeting is required whether to proceed for certification. Once the top level management decides for certification to IMS, tendering process should be started to select Internationally Accredited Certification Body. After selecting an Internationally Accredited Certification Body request to conduct certification audit is made. At that point contract signing between the two parties takes place. Then, the Certification Body carries out two stages of audits. In the first stage the Certification Body checks that documents

required under the standards are in place to get certified. Here the Certification Body shows the gaps if any and provide recommendations for corrective actions. In second stage of audit it goes for final checking if the identified gaps are filled up and verifies whether non conformances still persist with recommendations. Then, the Certification Body is informed after non conformances are closed. Once satisfied, the Certification Body issue certificate. Then, it carries out surveillance audit for recertification.

6.1 Implementation of Integrated Management System for Certification is shown in the following flow chart.

**7. Challenges to Implementation of & Certification to IMS**

**7.1 Commitment and engagement of top management to implementing IMS**

Long-term united efforts of strategic level leaders and high level of organizational maturity are needed to ensure smooth stages of management integration planning, preparation of documentations, and realization of new management practices. Coordination and maintenance of management systems are complex work that require constant review and at the same time innovations/improvements in separate areas. Practical realization of

IMS is inherent to organizational culture which supports changes and management innovations.

Theoretical analysis of IMS shows that all of the management systems can't be well integrated in principle. Advantages of IMS would certainly become even stronger if scientists and researchers joined their forces in search of "organizational management" development.

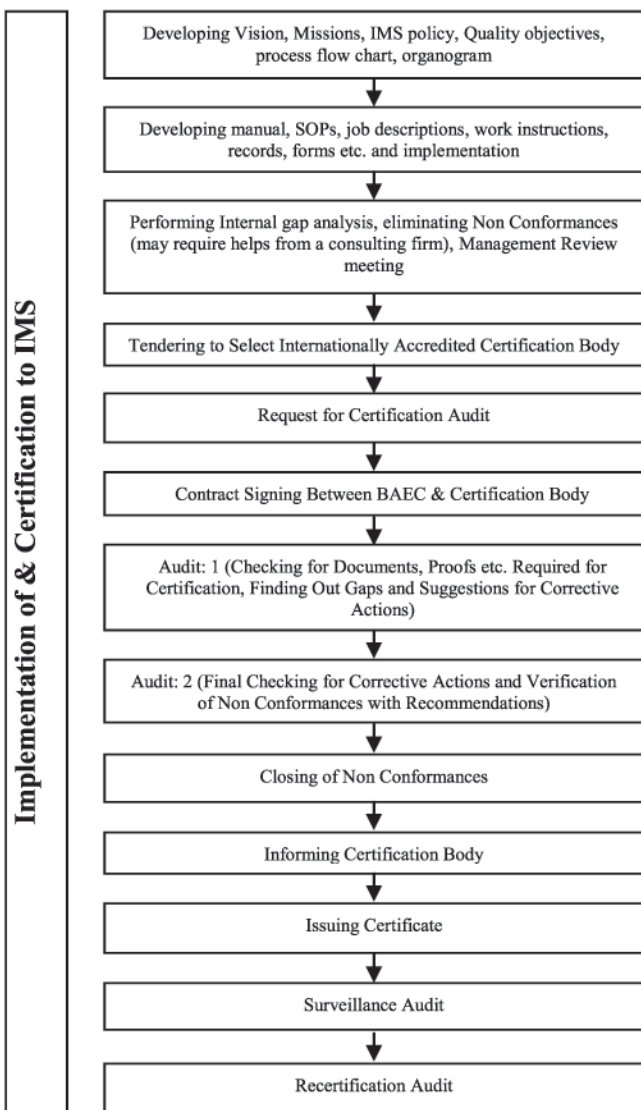


Fig. 4: Flowchart for Implementation of & Certification to IMS

**7.2 Selecting a consulting firm**

There are numerous Consulting Firms that can help implement different kinds of international standards and we are to proceed through tendering process. But, it is really a challenging task to find out a capable & qualified one whose services can assist BAEC achieve the followings-

- An Integrated Management System (IMS) compliant to international guidelines ISO 9001: 2015, ISO 14001:2015 and OHSAS 18001:2007 within the workplaces of BAEC.

- A documented Integrated Management System Manual.
- Respective procedures and forms as required.
- Trained manpower to be able to maintain the system.
- A pool of Internal Auditor.
- Compliance to obtain the required certificate from a reputed and worldwide recognized certification body.

**7.3 Selecting a certification body**

There are different types of Certification Bodies that can provide us with IMS Certificate and we are to proceed through tendering process. But, it is also not an easy task to select a capable & qualified Certification Body which can deliver the following services-

**7.3.1 Stage-1 audit**

- To review Documents.
- To assess the readiness of the management system for stage-2 audit.
- To plan for the certification audit.
- To validate of scope of management system and certification.
- To verify design of management system.
- To verify applicable legal and other requirements.
- To audit internal audit process and management review process.
- To present audit report.

**7.3.2 Stage-2 audit**

- Final certification audit performed for evaluation of implementation, including the effectiveness of the Management System of the organization.
- Presentation of audit report.
- Declaration of certification.
- Issuance of certificate.

**7.3.3 Periodic surveillance audit at the end of Year 01**

**7.3.4 Periodic surveillance audit at the end of Year 02**

**8. Conclusion**

Non-Conformances found in the Gap Analysis need to be eliminated and corrective actions may be commenced. Some suggestions/recommendations given below may be considered for implementation of and Certification to IMS.

- BAEC should engage an experienced, qualified and competent consulting firm (through tendering process) to support it to implement an Integrated Management System (IMS) that will incorporate the requirements of the abovementioned three standards.
- After implementation of IMS with the assistance of the consulting firm, BAEC may engage an internationally accredited and reputed certification body to assess the system implemented in the Head Office of BAEC and

also for obtaining certification for ISO 9001: 2015, ISO 14001:2015 and BS OHSAS 18001:2007.

- Direct engagement and commitment of top management is essential to ensure effective implementation of IMS.
- BAEC needs to enhance existing management practices to systematically identify affected issues, define applicable mitigation measures and communicate programmes in terms of quality, environment and occupational health & safety issues.
- BAEC may develop an IMS manual for its effective operation and continued suitability, although manual is not mandatory for the ISO 9001: 2015, ISO 14001:2015 and BS OHSAS 18001:2007 standards.
- BAEC should develop human resources to maintain as well as sustain the IMS.
- BAEC should establish Training Need Assessment (TNA) process for developing competent human resources.
- There shall be a strengthened full-fledged single entity in BAEC like Human Resources Division for recruitment & selection, training and human resources development etc. in order to minimize the coordination gap amongst the International Affairs Division, Establishment Division, Training Institute & Human Resources Division.
- BAEC should also focus on the effectiveness of its security system, cleaning processes, availability of pure drinking water, availability and effectiveness of fire protection system etc.
- BAEC should ensure effective system on procurement based on the requirements of different Divisions/ Sections/Units in a coordinated manner.
- BAEC is a multidisciplinary organization with many scientific institutes/centres/units etc. under it. So, it has to deal with both technical (R&D, services etc.) and

non-technical (administration/Accounts/Finance/Budget etc.) affairs. Implementing and maintaining IMS in all working places/areas of BAEC in a single attempt or in a single phase are practically a massive and considerable task. So, it is better to adopt phase out approach (step by step). This step by step tactic will also give opportunity to evaluate the effectiveness of IMS. But one thing is important that both technical non-technical entities should be considered at the first stage. So, preliminarily, along with the Head Office BAEC should integrate one of its Research/Service Centers/Institutes like Atomic Energy Center, Dhaka (AECD) in the scope of IMS in order to get comprehensive benefits of the IMS Standards.

- For the improvement of its management system BAEC may introduce IT (Information Technology) based system for maintaining Payroll & Cash Account, Finance & Budget, Foreign & Local trainings, employee records for their effective operation and continual suitability.

### References

1. Gap Analysis Report following Integrated Management System (IMS), [ISO 9001:2015 QMS, ISO 14001:2015 EMS and OHSAS 18001:2007], International Standards Requirements for Head Office of Bangladesh Atomic Energy Commission, Dhaka, 2017.
2. Quality Management System-Requirements, ISO 9001:2015.
3. Environmental Management System-Requirements, ISO 14001:2015.
4. Occupational Health and Safety Management System-Requirements, OHSAS 18001:2007.
5. IAEA Safety Guide No. GS-G-3.1.
6. <https://www.iso.org/obp/ui/#iso:std:iso:9001:ed-5:v1:en>
7. <https://www.iso.org/obp/ui/#iso:std:iso:14001:ed-3:v1:en>

