

ENVIRONMENTAL STUDIES AND ENVIRONMENTAL LABORATORY TESTING IN ACCORDANCE TO ISO STANDARDS

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ABSTRACT

ISO's standards have been applied not only by the manufacturing industries but also universities as well as research institutions. Three ISO standards are commonly applied: ISO 9001, ISO 17025, and ISO 14001. Although these three standards have differences in the purpose, criteria, and emphasis, these standards can be applied side-by-side by an organization. Eventhough, many questions arise when the organization undertake more than one ISO. These questions, for examples, are: Is it not enough possessing just one ISO, for example ISO 9000 series only? What is the relation between one ISO to another? What is the relation between ISO and the existing regulations? Following the ISO system there is an internal affair in the institution that maintains and manages the quality system according to ISO, for example ISO 14000, environmental management standards. On the other hand, there is a research group in the institution that performs technical services for environmental laboratory testing and environmental research and studies. What are actually the difference functions between these two activities? This paper tries to conduct study in order to give answers for those particular questions. This paper is neither intended for describing ISO in details nor for tutorial purposes. Either comprehensive training or implementing ISO is conducted by a special authorized agency.

Keywords: *environment, laboratory, ISO.*

I. INTRODUCTION

Research institution, such as “LEMIGAS” Research and Development Center for Oil and Gas Technology, besides its function in research and development (R&D) it also conducts technical services. These technical services are permitted by the government as far as these activities do not disturb its main function.

The services could be as a contract research or studies as well as laboratory testing services. The common clients are the industries which some reasons they are not able to perform research and laboratory testing by their own. When the services are given to the industries, the industries indeed ask to the service vendor concerning quality assurance and validation of the services.

Industries having head offices in the United States of America (USA) often ask whether the service vendor perform QA/QC (Quality Assurance/Quality Control) program for the services. This QA/QC program is actually a quality system that should be possessed by any vendor to ensure that the services have been conducted accordingly. Internationally, this system is known as ISO (*International Organization for Standardization*) standards that consists several series of ISO, such as ISO 9000, ISO 17025, and ISO 14000 series.

Indonesia through National Standardization Agency (*Badan Standarisasi Nasional*, BSN) as a member of ISO, ratifies this system either for the quality of products or services. It is therefore, the research institution in Indonesia that performs technical services also follow the ISO system.

In the meant time, a research institution has been following one of ISO series, for example ISO 17025 for laboratory testing, because in the beginning this institution gives a laboratory testing services. When the institution also conducts research and study services, they also apply ISO 9000 series. And eventually, they also apply ISO 14000 series concerning environmental management standards (EMS).

There are questions arise why the institution undertake more than one ISO. Is it not enough possessing just one ISO, for example ISO 9000 series only? What is the relation between one ISO to another? What is the relation between ISO and the existing regulations? One of the most interesting matters is that there are internal matters within the institution activities.

Following the ISO system there is an internal affair in the institution that maintains and manages the quality system according to ISO, for example ISO 14000, environmental management standards. On the other hand, there is a research group within the institution that performs technical services for environmental laboratory testing and environmental research and studies. What are actually the difference functions between these two activities?

This paper tries to conduct study in order to give answers for those particular questions. This paper is neither intended for describing ISO in details nor for tutorial purposes. Either comprehensive training or implementing ISO is conducted by a special authorized agency.

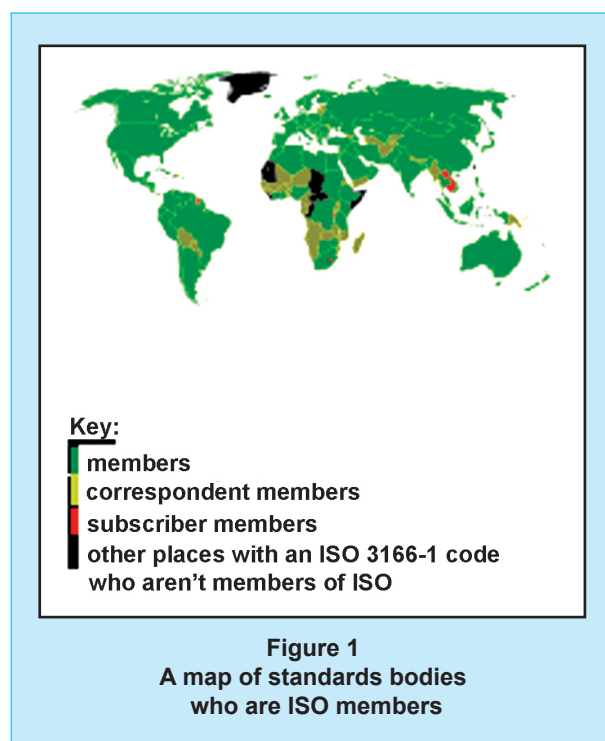
II. ISO IN BRIEF

ISO is an international standard setting body composed of representatives from various national standards organizations. Founded on February 23, 1947, the organization promulgates worldwide proprietary, industrial and commercial standards. It has its head-quarters in Geneva, Switzerland⁽¹⁾. ISO has 162 national members, out of the 204 total countries in the world (see Figure 1).

Indonesia through The National Standardization Agency of Indonesia (*Badan Standardisasi Nasional* - BSN) has been a member of ISO under the Presidential Decree 13-1997 and enhanced by the Presidential Decree No 166 2000^(2,3). BSN is a government institution, but not a department or a ministry, having the responsibility to develop and promote national standardization in Indonesia⁽⁴⁾.

The ISO organization's logos include the word ISO, and it is usually referred to by this short form name. The organization declares that ISO is not an acronym for the organization's full name. The official languages in ISO are English, French, and Russian. If the acronym of this organization has to be established according to those official languages, it would be "IOS" (International Organization for Standardization) in English or "OIN" (*Organisation internationale de normalisation*) in French. Thus it would have different acronyms in different languages. The founders decided to give it also a short, all purpose name. They chose "ISO", derived from the Greek *isos*, meaning "equal". Whatever the country, whatever the language, the short form of the organization's name is always ISO⁽⁵⁾. Figure 2 represents ISO's logos in English language.

ISO's main products are the International Standards. ISO also publishes Technical Reports,



Technical Specifications, Publicly Available Specifications, Technical Corrigenda, and Guides. Hundreds of International Standards have been published by ISO, so it is beyond the scope of this paper to discuss all of the standards. This paper discusses only three series of ISO commonly applied in the research and technical services institution.

A. ISO 9000

ISO 9000 was first published in 1987. It was based on the BS 5750 series of standards from BSI (British Standards Institution) that were proposed to ISO in 1979. However, its history can be traced back some twenty years before that⁽⁶⁾.

During World War II, there were quality problems in many British industries such as munitions, where bombs were exploding in factories during assembly. The solution adopted to address these quality problems required factories to document their manufacturing procedures and to prove by record keeping that the procedures were being followed. In an effort to keep under control such causalities, the United Kingdom's ministry of defense appointed inspectors in the factories to supervise the production process⁽⁷⁾.

In the USA, quality standards for military procurement were introduced at the end of the 1950s. During the 1960s, NASA developed its quality system requirements for suppliers and NATO accepted the AQAP (Allied Quality Assurance Procedures) specifications for the procurement of equipment. The Canadian CSA Z 299 series of standards were issued in the mid 1970s and the British standard BS 5750 was issued in 1979. In December 1979, the USA issued ANSI/ASQC Z-1.15, Generic Guidelines for quality systems.

Whilst the increase in international trade stimulated the development of internationally-recognized quality management standards, it was feared that a variety of different national standards would be a barrier to international trade. The ISO technical committee (TC) 176, Quality Management and Quality Assurance, was therefore established in 1979. The first standard issued by ISO/TC 176 was ISO 8402 in 1986, which standardized quality management terminology⁽⁸⁾.

In 1987, the British Government persuaded ISO to adopt BS 5750 as an international standard. The international standard then was published by International Organization for Standardization Technical

Committee (ISO/TC) 176, and the international standard was named ISO 9000. The standard BS 5750 was known as a management standard because it specified not what to manufacture, but how the manufacturing process was to be managed.

ISO 9000:1987 had the same structure as the British Standard BS 5750, with three 'models' for quality management systems, the selection of which was based on the scope of activities of the organization:

- i. **ISO 9001:**1987 Model for quality assurance in design, development, production, installation, and servicing was for companies and organizations whose activities included the creation of new products;
- ii. **ISO 9002:**1987 Model for quality assurance in production, installation, and servicing had basically the same material as ISO 9001 but without covering the creation of new products;
- iii. **ISO 9003:**1987 Model for quality assurance in final inspection and test covered only the final inspection of finished product, with no concern for how the product was produced.

Since the first publication of ISO 9000:1987, it has been evolving or being revised several times. The first revision was in 1994 (ISO 9000:1994). ISO 9000:1994 emphasized quality assurance via preventive actions, instead of just checking final product, and continued to require evidence of compliance with documented procedures.

The next revision was in 2000 and it was published as ISO 9001:2000. ISO 9001:2000 combines the three standards 9001, 9002, and 9003 into one, called ISO 9001. Design and development procedures are required only if a company engages in the creation of new products. The Year 2000 version also demands involvement by upper executives, in order to integrate quality into the business system and avoid delegation of quality functions to junior administrators.

The latest revision was made in 2008. The new ISO 9001:2008 was published on 15 November 2008. ISO 9001:2008 uses the same numbering system as ISO 9001:2000 to organize the standard. As a result, the new ISO 9001:2008 standard looks very much like the old standard. However, some important clarifications and modifications have been made. Organizations registered to ISO 9001:2000 will be given a period to transition to the ISO 9001:2008 standard, assuming changes are needed.

There is often much confusion around the various ISO 9000 standards. ISO 9000 is a series of documents that define requirements for the Quality Management System (QMS) Standard. The current ISO 9000 Family is:

- **ISO 9000:2005**: “Quality Management Systems - Basic Principles and Vocabulary”. The ISO 9000 standard describes the principles of a quality management system and defines the terminology;
- **ISO 9001:2008**: “Quality Management Systems - Requirements”. The ISO 9001 standard describes the requirements relative to a quality management system either for internal use or for contractual or certification purposes. Therefore, this standard is a group of requirements that companies must follow;
- **ISO 9004:2009**: “Quality Management Systems - Guide lines for Improving Performance”. This standard, which is intended for internal use and not for contractual purposes, focuses particularly on continually improving performance.

The previous version of ISO 9000:2005 was ISO 9000:2000. The last 4 digits (2000) represent the year of the last revision. People often confused ISO 9000:2000 with ISO 9001:2000, which has been updated to ISO 9001:2008. People often say “ISO 9000” certified, but what they mean is they have met the requirements of the ISO 9001 standard.

Although in the beginning ISO 9001 standard was applied by the manufacturing industries, recently it has also been applied by many companies and organizations, including universities and research institutions.

B. ISO 17025

The technical competence and quality of test and calibration laboratories has long been concerned for industries. When measurements are in doubt there will be a barrier to world wide free trade. This concern has led to the first International Laboratory Accreditation Conference (ILAC) in 1977. This conference was sponsored by the Lab Accreditation Systems of the United States, Denmark, New Zealand, and Australia. ILAC provided input to the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) which represent worldwide standards develop-

ment organizations. ISO and IEC produced a joint document, designated as ISO/IEC Guide 25-1982, “General Requirements for the Competence of Testing Laboratories” in 1982⁽⁹⁾.

In 1990, Guide 25 was revised by adding calibration laboratories and, “the relevant requirements of the ISO 9000 series of standards...”. This guide then became ISO/IEC Guide 25-1990, “General Requirements for the Competence of Calibration and Testing Laboratories”. This Guide 25 had been used for more than a decade for managing laboratory testing and calibrations. Since this Guide did not include all of the management requirements as stated in ISO 9001, the ISO Guide 25 was then revised again in 1999 and became ISO 17025.

In the meant time, ISO 9001 has been revised several times. It is therefore so did ISO 17025. The first revision of ISO 17025 was in 2005 and became ISO 17025:2005 which has been included all of management requirements stated in ISO 9001:2000.

In general, ISO 17025 is comprised of five elements: Scope, Normative References, Terms and Definitions, Management Requirements, and Technical Requirements. The last two elements, Management Requirements and Technical Requirements, are the main elements of ISO/IEC 17025. The Management Requirements of ISO/IEC 17025 consists of 14 paragraphs describing management quality system in the laboratory, while Technical Requirements consists of 10 paragraphs that include factors which determine correctness and reliability of the tests and calibrations performed in the laboratory⁽¹⁰⁾.

Laboratories use ISO/IEC 17025 to implement a quality system aimed at improving their ability to consistently produce valid results. It is also the basis for accreditation from an Accreditation Body. Since the standard is about competence, accreditation is simply formal recognition of a demonstration of that competence.

C. ISO 14000

The ISO 14000 environmental management standards exist to help organizations to minimize how their operations negatively affect the environment and to comply with applicable laws, regulations, and other environmentally oriented requirements. ISO 14000 is similar to ISO 9000 quality management in that both relate to the process of how a product is produced, rather than to the product itself.

The concept of an environmental management system evolved in the early nineties and its origin can be traced back to 1972, when the United Nations organized a Conference on the Human Environment in Stockholm and the United Nations Environment Program (UNEP) was launched. These early initiatives led to the establishment of the World Commission on Environment and Development (WCED) and the adoption of the Montreal Protocol (1987) and Basel Convention (1989).

Prior to the development of the ISO 14000 series, organizations voluntarily constructed their own EMS systems. This, however, made comparisons of environmental effects between companies are difficult. In 1992, the first Earth Summit was held in Rio-de-Janeiro, which served to generate a global commitment to the environment.

In the same year, BSI (British Standard Institution) Group published the world's first environmental management systems standard, BS 7750. This standard then was used by the International Organization for Standardization (ISO) as a model for the development of the ISO 14000 series in 1996⁽¹¹⁾.

The ISO 14000 family includes most notably the ISO 14001 standard, which represents the core set of standards used by organizations for designing and implementing an effective environmental management system. Other standards included in this series are ISO 14004, which gives additional guidelines for a good environmental management system, and more specialized standards dealing with specific aspects of environmental management.

Unlike previous environmental regulations, that began with command and control approaches, ISO 14000 was based on a voluntary approach to environmental regulation. The ISO 14001 standard provides guidelines for the establishment or improvement of an EMS. Other standards in the series are actually guidelines, many to help in achieving registration to ISO 14001. These include the following:

- **ISO 14010** provides general principles of environmental auditing (now superseded by ISO 19011);
- **ISO 14011** provides specific guidance on audit an environmental management system (now superseded by ISO 19011);
- **ISO 14012** provides guidance on qualification criteria for environmental auditors and lead auditors (now superseded by ISO 19011);

- **ISO 14013/5** provides audit pro-gram review and assessment material.;
- **ISO 14020+** labeling issues;
- **ISO 14030+** provides guidance on performance targets and monitoring within an Environmental Management System;
- **ISO 14040+** covers life cycle issues.

III. DISCUSSIONS

A. ISO 17025 and ISO 9001

Since the introduction of ISO 9000 in 1987 and the promotions that followed, it has become fashionable to seek certification to the ISO 9000 standards. Today, unfortunately, many companies are seeking ISO 9000 (in a right manner is ISO 9001) not primarily to improve their quality practices but as a quality achievements to satisfy their customer's demands. In other words, the primary reason for seeking ISO 9001 certification does not necessarily determine the effectiveness of the process or the value of the outcome.

ISO 9001 certification has been interpreted by many customers as "the quality credential" regardless of the circumstances. On the other hand, however, laboratory customers should really be asking for technical accreditation of the laboratory based on ISO/IEC 17025. This is a far more effective demonstration of a laboratory's technical competence than ISO 9001.

Both ISO/IEC 17025 and ISO 9001 have similar quality requirements. Laboratory Accreditation, however, covers not only the generic quality management requirements of ISO 9001 but extends its criteria to cover aspects affecting technical competency, i.e., the accuracy and precision of the analytical data produced.

In general, it is agreed that the appropriate accreditation for commercial testing and calibration laboratories is to ISO 17025. As a result of agreements with laboratory accreditation bodies many ISO 9001 certification bodies will not allow their certification to be cited by commercial testing or calibration laboratories in support of their services.

If the organization is an ISO 9001 certified organization with an inhouse laboratory which forms part of the quality control system, the laboratory will be included in the ISO 9001 external audit.

This would be a quality control laboratory within the manufacture and refining industries, e.g. oil refineries.

However, if the organizations then want to sell the services of that laboratory to outsiders as a testing service, the organization cannot advertise it as an ISO 9001 accredited/certified laboratory. This laboratory would need to obtain accreditation to ISO 17025.

It is not uncommon, however, for organizations with laboratories used purely for internal quality control purposes to seek to accredit the laboratory to ISO 17025. This is generally done to enhance the laboratory's, and hence the overall quality control system's, credibility or as part of the application of an ISO 9001-compliant system.

Furthermore, a testing laboratory accredited to ISO/IEC 17025 may also have reason to maintain a certified ISO 9001 management system. For example, many laboratory-based organizations undertake activities additional to the generation of test, measurement, and calibration data. Laboratory accreditation does not address these additional activities. If an organization's quality system covers non-testing functions such as, information, study and research services, education, etc., it may be necessary or desirable to have such activities recognized through an ISO 9001 certification process.

The additional requirements in ISO 17025, as opposed to ISO 9001, include participation in proficiency testing, adherence to documented, validated, methodology and specification of technical competence, especially on the part of senior laboratory personnel. There is also a difference in the method of inspection of laboratories under ISO 9001 as compared to ISO 17025 assessments.

ISO 17025 assessment bodies will always use technical assessors who are specialists and who carry out a review of the methods being used by the laboratory and the way in which those methods are applied. An ISO 9001 external audit to determine suitability for certification does not include this review of technical aspects and the auditors are not required to be technical specialists. They limit their attention to the quality management system.

Many laboratories are stand-alone as commercial testing laboratories and are not as in-house laboratories. There are several laboratories which are included in this category. In Indonesia, for example, these laboratories include clinical laboratories and environ-

mental laboratories. Many of them are not attached with certain company or organization. Do they have to follow ISO 9001 or just ISO 17025? ISO 17025 also comprises management requirements stated in ISO 9001, and in addition, ISO 17025 contains more detail of technical requirements. Hence, such of those laboratories are not necessarily certified to ISO 9001.

B. Environmental Laboratory and ISO 17025

Eventhough environmental laboratories hold the terminology of "environment", actually they perform "analytical" measurement. The environmental laboratories play a very important role in assessing the status of environment comprising both abiotic and biotic components. An environmental laboratory is a laboratory processing samples taken from the environmental media (air, water, soil, biota) both from the environment as well as from sources disposing into the environment (industries, domestic and agriculture sources, automobiles etc.).

The need for laboratories in implementation of the various pollution control acts is essential under the various environmental acts and regulations. One of the most important regulation concerning with the environmental laboratory is the Ministry of Environment Regulation No. 06/2009 describing "Environmental Laboratory"⁽¹²⁾.

In brief, this regulation states that in order a laboratory achieves acknowledgment as an environmental laboratory, the laboratory has to possess identity of registration issued by the Minister of Environment (Article 4, point 1b). Before the laboratory can apply for the registration, however, the laboratory has to possess a certificate of accreditation issued by an authorized accreditation agency (Article 4, point 1a). The authorized accreditation agency in Indonesia is National Accreditation Body of Indonesia. (KAN, *Komite Akreditasi Nasional*; see Figure 3).



Figure 3
Indonesia National Accreditation
Body's logos

In addition to point 1a and point 1b of the Article 4, the regulation states that in applying for accreditation, the laboratory has to comply with the latest issue of ISO 17025 (Article 4, point 3a) and all of the requirements stated in the Attachment I of the regulation (Article 4, point 3b). It is obvious that environmental laboratory is an analytical laboratory which should also follow the provisions of ISO 17025.

How is an environmental laboratory related to ISO 14000? The 1996 publication of the ISO 14000 series of standards for environmental management systems has also resulted in some customers requesting the laboratory be certified to this particular standard. It must be realized, however, that these ISO 14000 standards have nothing to do with the technical performance of analytical laboratories. The standards are intended for use as a voluntary, internal management tool for good environmental compliance, not as a specification standard.

C. ISO 14000 and ISO 9001

ISO 9001 (quality) and ISO 14001 (environment) are “generic management system standards”. “Generic” means that the same standard can be applied to any organization, large or small, whatever its product or service, in any sector of activity, and whether it is a business enterprise, a public administration, or a government department. ISO 9001 contains a generic set of requirements for implementing a quality management system and ISO 14001 for an environmental management system⁽¹³⁾. Both ISO 9001 and ISO 14001 concern the way an organization goes about its work.

While ISO 9001 is achieved to ensure that the products or services of the company satisfy the customer’s quality requirements, ISO 14001 is to minimize harmful effects on the environment caused by the company activities. Both ISO are managed and control by a management system within the organization that perform technical services. Both ISO 9001 and ISO 14001 are accredited by an authorized accreditation agency which is internationally agreed.

D. ISO 14000 and Government Environmental Regulations

From the perspectives of business organizations, there are many reasons for the development of the ISO 14000 series standards. Companies operating

in the global marketplace are seeking to harmonize various environmental management systems. Businesses are working toward a new paradigm of proactive approaches to environmental management. Businesses want to “self-regulate” instead of being subjected to command and control regulation by the government.

Another major of motivations for the ISO 14000 standards is the need for harmonization among various environmental management and auditing programs. There are a variety of certification programs sponsored by government and industry. These programs make compliance difficult for companies operating or performing services in more than one country.

The kinds of regulations which are developed are called “command and control” regulations because they focus on crisis-by-crisis, reactive enforcement of statutes and regulations. Such regulations can be described as “top down” regulation, and, generally, it operates using governmental mechanisms.

Government officials establish a set of performance standards for business and enforce it through a system of permits allowing pollutants to be emitted at regulated rates. An alternative mechanism is one in which government requires controls based on the technology for specific activities that cause pollution.

In contrast, the ISO 14000 series is designed to assist companies in developing a systematic, preventive, and holistic approach to environmental management. These new holistic approaches represent a new paradigm for business.

The ISO 14000 series standards do not create legal standards. They are designed to help organizations manage their environmental obligations such as compliance with legal requirements.

The legal significance of standards of ISO 14000 series varies depending on the country involved. The perspectives of developing countries differ from those of industrialized countries such as the United States and Great Britain. In many developing countries, governments have not adopted and consistently enforced environmental legislation. Thus, there has been much discussion about whether the ISO 14000 series standards can be used to fulfill the environmental protection needs of those countries.

For example, Zimbabwe has incorporated ISO 14001 into its national regulatory system. Its plan is

to use ISO 14001 in conjunction with its preexisting legislation and a “tuned up” monitoring system. China is an example of a developing country that quickly and enthusiastically announced its support of ISO 14000. The ISO 14000 standards are viewed as a mechanism that can promote enforcement of applicable environmental laws and regulations. In addition, it is viewed as a means to generate good publicity for China as it invites foreign investors.

How about in Indonesia? Based on discussions with various interested parties, the Ministry of Environment (*Kementerian Lingkungan Hidup*, KLH) is aware of the potential application of ISO 14000 standards. The standards are useful for improving the quality of environmental management and enhancing the role of the business world to proactively manage the environment. It is therefore, KLH encourages and facilitates the implementation of ISO 14000 standards in Indonesia.

KLH expects that the role for the application of ISO 14000 standards would be continued by private parties. This is consistent with the background of the development of standards ISO 14000 that was driven by the business and supported by experienced practitioners.

How is ISO 14000 status and relation with the legislation of environmental laws and regulation? Implementation of ISO 14000 does not substitute legislation for environmental management. Although voluntary, the application of ISO 14000 is expected to complete the implementation of the legislation provisions for the environment management organizational activities or business.

Many people have an inaccurate perception of the EMS and its certification. ISO 14001 certification is not provided by the Government, but by the authorized certification agency which follow the rules that are internationally agreed. Therefore, the Certification Agency is directly responsible for ensuring the accuracy of the ISO 14001 certification.

If there are situations of non-compliance of the provisions of the legislation for environmental management, ISO 14001 certificate is not automatically cancelled by the Certification Agency that published the certificate. However, based on the EMS concerned, the organization should take immediate corrective action and prevent that such non-compliance will not occur again. Certification Agency will evaluate the effectiveness of the repair process.

It is obvious that ISO 14001 can serve as a tool to promote an evolutionary change away from command and control toward more cooperative environmental enforcement efforts. Although ISO 14000 standards are the product of a non-governmental organization and compliance with the standards is voluntary, one of the primary purposes of the standards is to ensure that businesses comply with applicable environmental law.

E. AMDAL and ISO 14000

AMDAL (*Analisis Mengenai Dampak Lingkungan*) or Environmental Impact Assessments (EIA) is an assessment of the possible positive or negative impact that a proposed project may have on the environment. In the Government Regulation (*Peraturan Pemerintah*, PP) No. 27/1999⁽¹⁴⁾ it is stated that AMDAL is the process of studying the significant impact of a proposed business or activity on the environment, which is required as part of the decision-making process.

Results of the AMDAL study consists of five documents: (1) A Terms of Reference (*Kerangka Acuan*, KA) which result from the scoping process; (2) An Environmental Impact Statement (*Analisis Dampak Lingkungan*, ANDAL) describing detailed and in-depth research study on the significant impacts of a proposed business or activity; (3) An Environmental Management Plan (*Rencana Pengelolaan Lingkungan*, RKL), a document presenting those efforts that will be made to manage the significant environmental impacts which will result from a proposed business or activity; (4) An Environmental Monitoring Plan (*Rencana Peman-tauan Lingkungan*, RPL), a document presenting those efforts that will be made to monitor the environmental components which will be subjected to significant impacts arising from a proposed business or activity; and (5) An Executive Summary Document.

It is obvious that the purpose of the assessment of AMDAL is to ensure that decision makers consider the environmental impacts that will happen when deciding whether to proceed with a project. When the project or activities fulfills or comply with the study (ANDAL) then the project could be accomplished and it should conducts or performs RKL and RPL afterward. This RKL and RPL is in fact an environmental management system (EMS) which is in accordance to ISO 14000.

The provisions for the activities that should or should not establish AMDAL is described in the Ministry of Environment Regulation (*Pera-turan Menteri Negara Lingkungan Hidup*) No. 11/2006⁽¹⁵⁾. Whereas the activity has not to establish AMDAL due to its environmental impact is regarded not significant, the activity still has to publish a document describing environmental management and monitoring effort (*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup, UKL-UPL*)⁽¹⁶⁾. Again, this UKL-UPL actually is an EMS for small activity which does not produce significant environmental impacts.

The main difference between the two EMS, RKL-RPL and UKL-UPL in one side and ISO 14000 in other side, is that the former is “compulsory” and the latter is “voluntary”. Both are a management system to protect the environment.

There are also some other differences between the two EMS. People who undertake environmental management system of ISO 14000 are not necessarily possess a certificate of personal competence, whereas those who perform AMDAL study should possess provisory as AMDAL compiler with minimum requirements as stated in the Ministry of Environment Regulation (*Peraturan Menteri Negara Lingkungan Hidup*) No. 07/2010 describing Competence Certification for Environmental Impact Assessment Document Compiler and Training Institution Requirements for Environmental Impact Assessment Document Compiler⁽¹⁷⁾.

AMDAL is not a permit. Even so, AMDAL document that comply with the environmental aspects has to be attached as a requirement to get a permit. AMDAL document is evaluated by a commission as stated in the Ministry of Environment Regulation (*Peraturan Menteri Negara Lingkungan Hidup*) No. 05/2008 regarding Work Administration for AMDAL Document Evaluation Commission⁽¹⁸⁾. While AMDAL is evaluated by an AMDAL Commission, ISO 14000 is accredited by an Accreditation Agency which is internationally agreed.

IV. CONCLUSIONS

As conclusions it can be drawn several remarks as follows:

1. There are differences in the purpose, criteria, and emphasis of the ISO 9001 quality system standard

and those of the accreditation standard ISO/IEC 17025. For environmental laboratories concerned with demonstrating technical competence supported by a quality system, ISO/IEC 17025 is the appropriate standard.

2. Accreditation of environmental laboratories complied with ISO/IEC 17025 is given by an authorized accreditation agency which is internationally agreed, while certification of registration is given by Ministry of Environment.
3. An environmental laboratory accredited to ISO/IEC 17025 may have reason to also maintain a certified ISO 9001 management system. This would be when laboratory based organizations undertake activities additional to the generation of test, measurement, and/or calibration data; such activities, for examples, are information, education, studies and research services.
4. ISO 9001 and ISO 14001 are “generic management system standards”. “Generic” means that the same standard can be applied to any organization, large or small, whatever its product or service, in any sector of activity, and whether it is a business enterprise, a public administration, or a government department. ISO 9001 contains a generic set of requirements for implementing a quality management system and ISO 14001 for an environmental management system.
5. Both ISO 9001 and ISO 14001 are accredited by an authorized accreditation agency which is internationally agreed.
6. ISO 14001 does not substitute legislation for environmental management. Although voluntary, the application of ISO 14001 is expected to complete the implementation of the legislation provisions for the environment management organizational activities or business.
7. People who undertake environmental management system of ISO 14000 are not necessarily possess a certificate of personal competence, whereas those who perform AMDAL study should possess provisory as AMDAL compiler with minimum requirements.

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