THAILAND BOARD OF INVESTMENT GUIDE ON ENVIRONMENTAL REGULATIONS

12/19/2014

Table of Contents

Table of Contents (cont.)

THAILAND BOARD OF INVESTMENT GUIDE ON ENVIRONMENTAL REGULATIONS

I. *The Environment in Thailand*

Economic performance and environmental situation go hand in hand. The natural environment is central to economic activity and growth, providing the resources a country requires to produce goods and services, and absorbing and processing unwanted by-products in the form of pollution and waste.

Environmental assets contribute to managing risks to economic and social activity, helping to regulate flood risks, regulating the local climate (both air quality and temperature), and maintaining the supply of clean water and other resources. This underpins economic activity and wellbeing, and so maintaining the condition of natural assets is a key factor in sustaining growth for the longer term. Correspondingly, economic growth contributes to the investment and dynamism needed to develop and deploy new technology, which is fundamental to both productivity growth and managing environmental assets. Indeed, the natural environment plays an important role in supporting economic activity. It contributes directly, by providing resources and raw materials such as water, timber and minerals that are required as inputs for the production of goods and services; and indirectly, through services provided by ecosystems including carbon sequestration, water purification, managing flood risks, and nutrient cycling.

Natural resources are, therefore, vital for securing economic growth and development, not just today but for future generations. As such, the role of environmental policy is to manage the provision and use of environmental resources in a way that supports improvements in prosperity and wellbeing, for current and future generations.

There are a number of reasons why government intervention is needed to achieve this. In particular, market failures in the provision and use of environmental resources mean that natural assets would be over-used in the absence of government intervention. These market failures arise from the public good characteristics of the natural environment; 'external' costs and benefits where the use of a resource by one party has impacts on others; difficulties in capturing the full benefits of business investment in environmental R&D; and information failures.

As the second largest economy in Southeast Asia, Thailand confronts a number of increasingly pressing environmental challenges, such as: climate change (frequent flooding, drought, higher temperatures, and rising sea levels); intensive farming (usage of pesticides, herbicides, fertilizers, and irrigation); water pollution (urban runoff, ship transport, untreated sewage, septic tanks, animal feces, manure spreading, acid rain, and eutrophication); air pollution (automobiles, factories, aircraft, refineries, smog, slash and burn), resource depletion (overfishing, deforestation, water scarcity, land degradation, soil desertification, habitat destruction, and biodiversity loss); and waste generation (e-waste, medical waste, household waste, industrial waste, marine debris, river dumping, and landfills).

II. *Overview of EIA Proceedings*

Environmental management and administration in Thailand officially started in 1975 with the passage of the Enhancement and Conservation of National Environmental Quality Act, B.E. 2518 (1975). The translation of the act into policy, programs, plans, and compliance systems was then undertaken in a compartmentalized, segmented manner according to the functional responsibility of each of the relevant government agencies. In 1992, a new Environmental Act was issued in order to reform the management of natural resources and environmental conservation, based on effective, transparent and accountable monitoring. The new Act also enhances public participation, decentralizing management authority to local authorities and adheres to the 'polluter pays' principle. Simply put, the owner or possessor of the pollution source is held responsible for all costs of construction and operation of their treatment facilities or the payment of service fees to send their waste to the government's central treatment/disposal plant.

Large-scale ventures with significant environmental or surrounding habitat impact must forward Environmental Impact Assessment reports (EIA) to the Office of Natural Resources and Environmental Policy and Planning (ONEP), which then submits preliminary comments to the Expert Review Committee (ERC) for consideration. After the report has been approved, ONEP gives recommendations to permitting agencies. If a project must be approved by the Cabinet, then the ONEP summarizes the comments of the ERC and forwards them to the NEB and the Cabinet.

EIA reports must be prepared by a licensed consulting firm registered with ONEP. The Minister of Natural Resources and Environment, with the approval of the National Environment Board (NEB), has the power to determine the type and size of projects or activities requiring an EIA.

Projects and activities that may seriously affect the quality of the environment, natural resources and biological diversity are not permitted, unless the environmental impact and health of the people in the communities have been studied, evaluated and consultations held with the public and interested parties organized, and the opinion of an independent organization obtained prior to the operation of such project or activity.

The Ministry of Natural Resources and Environment has announced a list of 11 industrial activities that potentially could have a detrimental effect upon local communities in terms of natural resources, environment and health and for which assessments must be conducted (see below).

Item	Type of Project or Activity	Size	Criteria, Implementation Procedure
1.	Land reclamation from the sea or lake off the external existing coastline, except land claimed for beach rehabilitation.	300 rai	To be submitted during the project approval or permission process.
2.	Mining as defined by the Mineral Act:		
	2.1 Underground mining which the structure has been specifically designed for subsidence after stopping operation without being suspended or without refilling substituted material to avoid subsidence	All sizes	To be submitted with the application during the mining permit process.
	2.2 Lead mine, Zinc mine or other metal which used Cyanide or Mercury or Lead Nitrate in production process or other metal mine which used Arsenopyrite as associated mineral.	All sizes	To be submitted with the application during the mining permit process.
	2.3 Coal mining which is specifically loaded coal from the area by trucks.	≥ 200,000 tons/month or ≥ 2,400,000 tons/year	To be submitted with the application during the mining permit process.
	2.4 Marine mining	All sizes	To be submitted with the application during the mining permit process.
3.	Industrial Estate in accordance to the Industrial Estate Act or Project with identical characteristics of an Industrial Estate mentioned as follows:		
	3.1 Industrial Estate or Project with identical characteristics of Industrial Estate which is established to support petrochemical industry described in 4 or ironworks industry that described in 5.1 or 5.2 more than 1 factory.	All sizes	To be submitted during the project approval or permission process.
	3.2 Industrial Estate or Project with identical characteristics of Industrial Estate which is expanding area to support petrochemical industry described in 4 or ironworks industry that described in 5.1 or 5.2.	All sizes	To be submitted during the project approval or permission process.

4.	Petrochemical Industry:		
	4.1 Upstream Petrochemical Industry	All sizes or production capacity is expanded by ≥ 35%	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	4.2 Intermediate Petrochemical Industry which is mentioned as follow:		
	4.2.1 Intermediate Petrochemical Industry which is manufactured chemical substance or used chemical substances which are Cancer stimulant group 1 as raw material	Production capacity of ≥100 tons/day or Total expansion of ≥ 100 tons/day per day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	4.2.2 Intermediate Petrochemical Industry which is manufactured chemical substance or used chemical substances which are Cancer stimulant group 2A as raw material	Production capacity of ≥700 tons/day or Total expansion of ≥ 700 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
5.	Mineral Smelting Industry or Melting Metal Industry which is mentioned in the following:		
	5.1 Ironworks Industry	Having input capacity of ≥ 5,000 tons/day or Having total input ≥ 5,000 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.2 Ironworks Industry which is manufactured Coke Coal or provided with	All sizes	To be submitted with the application during the process for a construction

	sintering process		permit or a factory operation permit as the case maybe.
	5.3 Mineral Smelting Industry of Copper, Gold or Zinc	Having input capacity of ≥ 1,000 tons/day or Having total input ≥ 1,000 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.4 Smelting Lead Ore	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	5.5 Melting Metal (except Iron and Aluminum) Industry	Having capacity of ≥ 50 tons/day or Having total capacity of ≥ 50 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.6 Melting Lead Industry	Having capacity of ≥ 10 tons/day or having total capacity of ≥ 10 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
6.	Manufacturing, disposal or modification of radioactive substance	All sizes	To be submitted with the application during the process for a factory operation permit.
7.	Central Waste Treatment Plant or buried garbage or unused material manufacturer as defined by the Factory Act which is burning or buried hazardous waste except burning in cement oven that used hazardous waste as substituted raw material or additional fuel.	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
8.	Project of aviation transportation system	Runway is constructed or expanded ≥ 3,000m	To be submitted during the project approval or permission process.

9.	Port	1) With berth length of ≥ 300m or Port area ≥ 10,000 sqm; excluding port for daily use or tourism purposes	To be submitted during the project approval or permission process.
		2) With channel dredging of ≥ 100,000m³	To be submitted during the project approval or permission process.
		3) Where hazardous substances or hazardous wastes considered as Group 1 carcinogens is transshipped in total quantity of ≥ 25,000 tons/month or ≥ 250,000 tons/year	To be submitted during the project approval or permission process.
10.	Dam or reservoir	1) Storage volume of ≥ 100 million m³, or	To be submitted during the project approval or permission process.
		2) Storage area of ≥ 15 km²	To be submitted during the project approval or permission process.

11.	Thermal Power Plants as follows:		
	11.1 Electric Plant using coal as fuel	Total capacity of ≥ 100 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.2 Electric Plant using biomass fertilization as fuel	Total capacity of ≥ 150 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.3 Electric Plant that used natural gas as fuel which is co-thermal system of combined cycle or co-generation	Total capacity of ≥ 3,000 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.4 Nuclear Power Plant	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.

With regards to the documentation analyzing the effects a business can have upon the immediate physical and social environment, three kinds of reports – EIA, E/HIA, and ESA – are required by ONEP, depending on the type and size of the proposed project/activity and its likely environmental impact. A fourth one – IEE – is used if the proposed project/activity is to be located within an Environmentally Protected Area, or if the planned business is set to take place at the Asia Industrial Estate in either Rayong or Samut Prakan provinces.

A. EIA (Environmental Impact Assessment)

The Environmental Impact Evaluation Bureau (EIEB), under ONEP, is responsible for the administration of the EIA process: 35 project types and sizes require an EIA (see below).

No.	Type of Project/Activity	Size	Criteria, Procedure, Regulation
1	Mining as defined by the Mineral Act		
	1.1 Mining as follows:		
	1.1.1 Coal mining	All sizes	Submit when applying for a concession
	1.1.2 Potash mining	All sizes	Submit when applying for a concession
	1.1.3 Rock salt mining	All sizes	Submit when applying for a concession
	1.1.4 Limestone mining for cement Industry	All sizes	Submit when applying for a concession
	1.1.5 All types of metal ore mining	All sizes	Submit when applying for a concession
	1.2 Underground mining	All sizes	Submit when applying for a concession
	1.3 All mining projects located in the following areas:		
	1.3.1 Watershed area that is Class 1 by a Cabinet resolution	All sizes	Submit when applying for a concession

	1.3.2 Reserved forest added by a Cabinet resolution	All sizes	Submit when applying for a concession
	1.3.3 Wetland, internationally recognized	All sizes	Submit when applying for a concession
	1.3.4 Areas adjacent within 2 km. to ancient site, archeological site, historical site or historical park defined by laws related with historical site and object, artifact, and national museum, and world heritage site registered according to the world heritage convention.	All sizes	Submit when applying for a concession
	1.4 Mining that uses explosives	All sizes	Submit when applying for a concession
	1.5 Other mining projects according to The Mineral Act, except 1.1, 1.2, 1.3, 1.4	All sizes	Submit when applying for a concession and shall be subject to the preparation of an IEE report
2.	Petroleum development		
	2.1 Petroleum exploration by geophysical drilling	All sizes	Submit when applying for an approval or permission from a competent office or an authority that grants a permit according to the petroleum law.
	2.2 Petroleum production	All sizes	
3.	Petroleum and oil transportation via pipeline	All sizes	Submit when applying for a license or for an approval from a competent office.
4.	Industrial estate as defined by the industrial estate laws; or other projects with similar features of industrial estate; or land development for industry project	All sizes	Submit when applying for approval or permission of the project.
5.	Petrochemical industry having chemical process	Production capacity of ≥100 ton/day	Submit when applying for permission for construction or operation, as the case maybe.
6.	Oil refinery	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
7.	Natural gas separation or processing	All sizes	Submit when applying for permission for construction or operation, as the case maybe.

8.	Chlor-alkaline Industry using sodium chloride (NaCl) as a raw material for the production of sodium carbonate (Na2Co3), sodium hydroxide (NaOH), hydrochloric acid (HCl), chlorine (Cl2), sodium hypochlorite (NaOCl) and bleaching powder	Production capacity of each or combined products ≥100 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
9.	Cement production	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
10.	Pulp production	Production capacity of ≥50 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
11.	Pesticide Industry or industry producing active ingredient by chemical process	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
12.	Chemical fertilizer industry by chemical process	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
13.	Sugar industry as follows:		
	13.1 Producing raw sugar, white sugar, refined sugar	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
	13.2 producing glucose, dextrose, fructose or others similar	Production capacity of ≥20 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
14.	Iron or steel industry	Production capacity of ≥100 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
15.	Ore or metal smelting, other than iron and steel industry	Production capacity of ≥50 tons/day	Submit when applying for permission for construction or operation, as the case maybe.

16.	Liquor, alcohol, including beer and wine production		
	16.1 Liquor and alcohol production	≥40,000 L/month (calculated at 28 degrees)	Submit when applying for permission for construction or operation, as the case maybe.
	16.2 Wine production	≥600,000 L/month	Submit when applying for permission for construction or operation, as the case maybe.
	16.3 Beer production	≥600,000 L/month	Submit when applying for permission for construction or operation, as the case maybe.
17.	Central waste treatment plant according to the Factory Act	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
18.	Thermal power plant	≥10 MW	Submit when applying for permission for construction or operation, as the case maybe.
19.	Expressway as defined by the Expressway and Rapid Transit Authority of Thailand Act or other projects alike	All sizes	Submit when applying for project approval or permission.

20.	Highway or road as defined by the Highway Act, passing through following areas:		
	20.1 Wildlife sanctuaries and wildlife non-hunting areas as defined by the Wildlife Conservation and Protection Act	All sizes	Submit when applying for project approval or permission.
	20.2 National park as defined by the National Park Act	All sizes	Submit when applying for project approval or permission.
	20.3 Watershed area that is Class 2 as approved by a Cabinet resolution	All sizes	Submit when applying for project approval or permission.
	20.4 Mangrove forests designated as a national forest reserve	All sizes	Submit when applying for project approval or permission.
	20.5 Coastal area within 50 meters of high tide level	All sizes	Submit when applying for project approval or permission.
	20.6 Area adjacent within 2 km to the internationally recognized watershed area or world heritage site registered according to the World Heritage Convention.	All sizes	Submit when applying for project approval or permission.
	20.7 Areas adjacent within 2 km to ancient site, archeological site, historical site or historical park defined by laws related with historical site and object, artifact, and national museum.	All sizes	Submit when applying for project approval or permission.
21.	Mass transportation system by rail	All sizes	Submit when applying for project approval or permission.
22.	Port	Accommodation capacity of ≥500 ton gross Ship or port width ≥100 m or Total port area ≥ 1,000 m2	Submit when applying for project approval or permission.
23.	Port for cruise and sport ship	Accommodation of ≥50 ships or ≥ 1,000 m2	Submit when applying for project approval or permission.
24.	Land reclamation	All sizes	Submit when applying for project approval or permission.

25.	Construction or expansion of a structure both onshore and offshore		
	25.1 Sea wall next to coastline	≥200 m	Submit when applying for project approval or permission.
	25.2 Groin, training jetty, training wall	All sizes	Submit when applying for project approval or permission.
	25.3 Offshore breakwater	All sizes	Submit when applying for project approval or permission.
26.	Air transportation system		
	26.1 Construction or expansion of commercial airport or temporary take off and landing strip	Runway ≥1,100 m	Submit when applying for project approval or permission.
	26.2 Water airport	All sizes	Submit when applying for establishment or aircraft take off/landing permits and shall be subject to the preparation of an IEE report.
27.	Building, as defined by the building control law, having located at or its purpose of utilization as follows:		
	27.1 Adjacent to river, sea, lake, beach, national park or historical park, which may cause impact to environmental quality of those areas	Height ≥ 23 m or Total floor area or individual floor area of ≥ 10,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
	27.2 Building used for retail or wholesale business	Height ≥ 23 m or Total floor area or individual floor area of ≥ 10,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
	27.3 Office building	Height ≥ 23 m or Total floor area or individual floor area of ≥ 10,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.

28.	Land development for residential or commercial purpose according to the land development law	≥500 land plots or Area >100 rai	Submit when applying for land development permit according to the Land Development Act.
29.	Hospital or health facility according to the health facility law as follows:		
	29.1 Adjacent within 50 m to river, seashore, lake or beach	In-patient beds ≥30	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
	29.2 Others not specified in 29.1	In-patient beds ≥60	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
30.	Hotel or resort as defined by the Hotel Act	Rooms ≥80 or Total area ≥4,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
31.	Residential building as defined by the building control law	Rooms ≥80 or Total area ≥4,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
32.	Irrigation	Irrigated area ≥ 80,000 rai	Submit when applying for project approval or permission.
33.	All types of projects located in areas approved by the Cabinet as Class 1 watershed areas	All sizes	Submit when applying for project approval or permission.
34.	Inter-basin water diversion as follows:		
	34.1 Diversion across main river basins, except in a disaster case or for national security, which is temporarily implemented.	All sizes	Submit when applying for project approval or permission.
	34.2 International water diversion, except in a disaster case or for national security, which is a temporarily implemented.		
35.	Sluice in the main river	All sizes	Submit when applying for project approval or permission.

Different stakeholders involved in the EIA process:

1. Project Proponent
The project proponent may be a government agency, state enterprise or private sector enterprise undertaking a project/activity that falls under the classification of types and sizes of projects that require an EIA. The project proponent is responsible for the preparation of the EIA report.

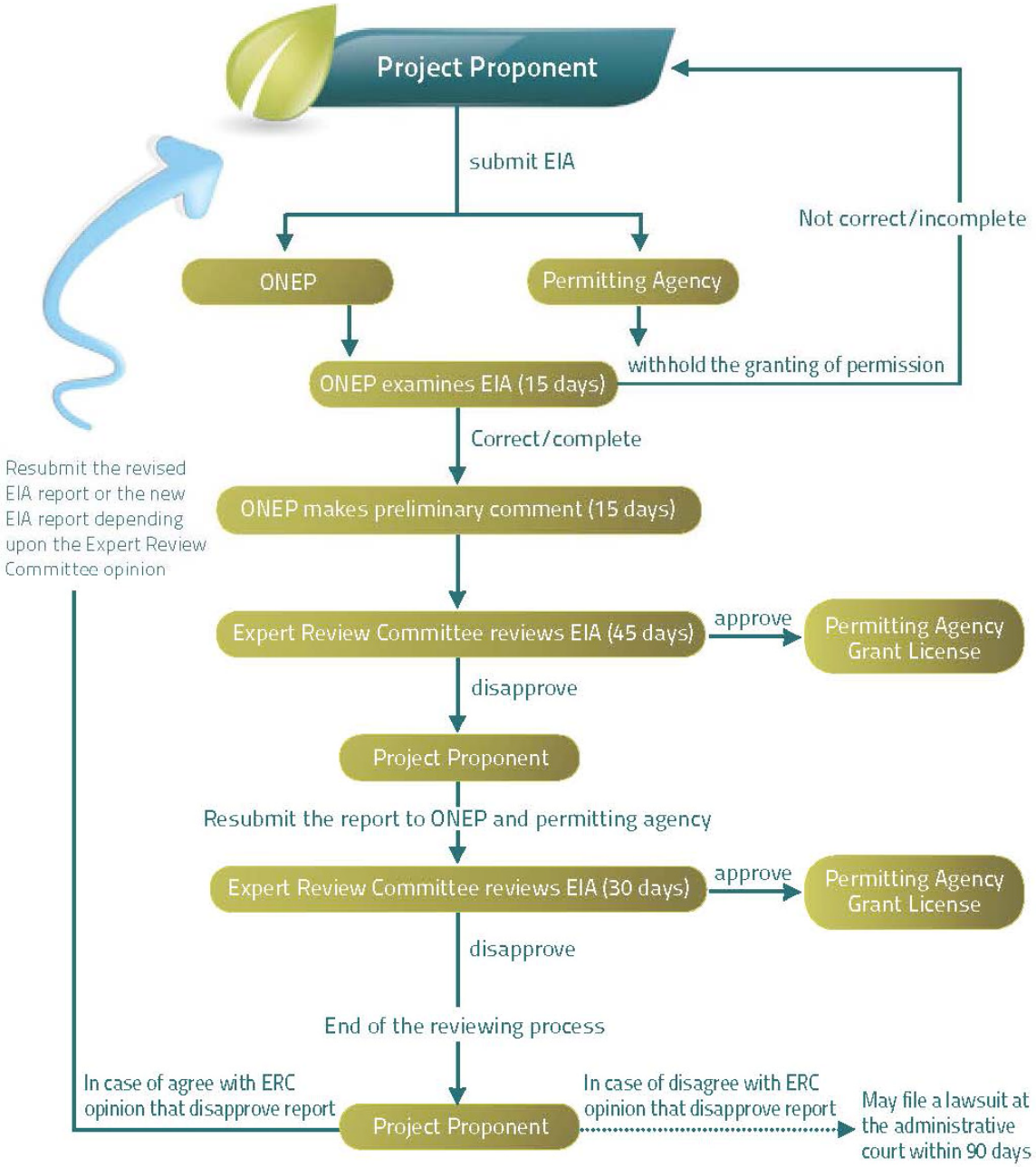
2. Permitting Agency
The permitting agency by law has the power and duty to consider and grant a permit to any proponent in order to enable implementation of any project under said notification; moreover, the permitting agency has the power to delay the granting of permission to the applicant until the EIA report of such project is approved by the Expert Review Committee (or the committee does not finish the review within the period stated by law). All conditions set by ONEP through the Expert Review Committee are bound to the license for the private project. If the proponent is a government agency or state enterprise, final decision rests with the Cabinet. The recommendation for such project, however, will be submitted to the Cabinet by the National Environment Board.

3. Expert Review Committee
The EIA report has to be submitted to ONEP for preliminary review before a final decision on the report is made by the Expert Review Committee. The Environmental Impact Evaluation Bureau (EIEB) of ONEP is responsible for examining the EIA report. Related documents need to be filed and are subject to preliminary review. Then the report, together with the preliminary comments, is handed over to the Expert Review Committee for final consideration. The Committee is composed of members who are qualified or specialized in various fields of related disciplines and who possess the requisite competency to grant permission for the given project or activity under review. An ONEP representative shall be included in its membership. The Expert Review Committee may approve or disapprove the report or may ask for report revision or additional information.

4. Consultants
By ministerial order, EIA reports have to be prepared by consulting firms registered with ONEP. The license issued for each consulting firm will remain valid for a period of 2 or 3 years, depending on how long it has been in operation and level of expertise (see *Annex I*).

Stages and timeframe of the EIA approval process according to the National Environment Quality Act (1992), hereafter (NEQA):

1. Approval process for projects/activities that are required by law and projects/activities that do not require the approval of the Cabinet.



Source: Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, 2012. Environmental Impact Assessment In Thailand. p.11. (http://www.onep.go.th/eia/images/7handbook/Environmental_Impact_Assessment_in_Thailand.pdf)

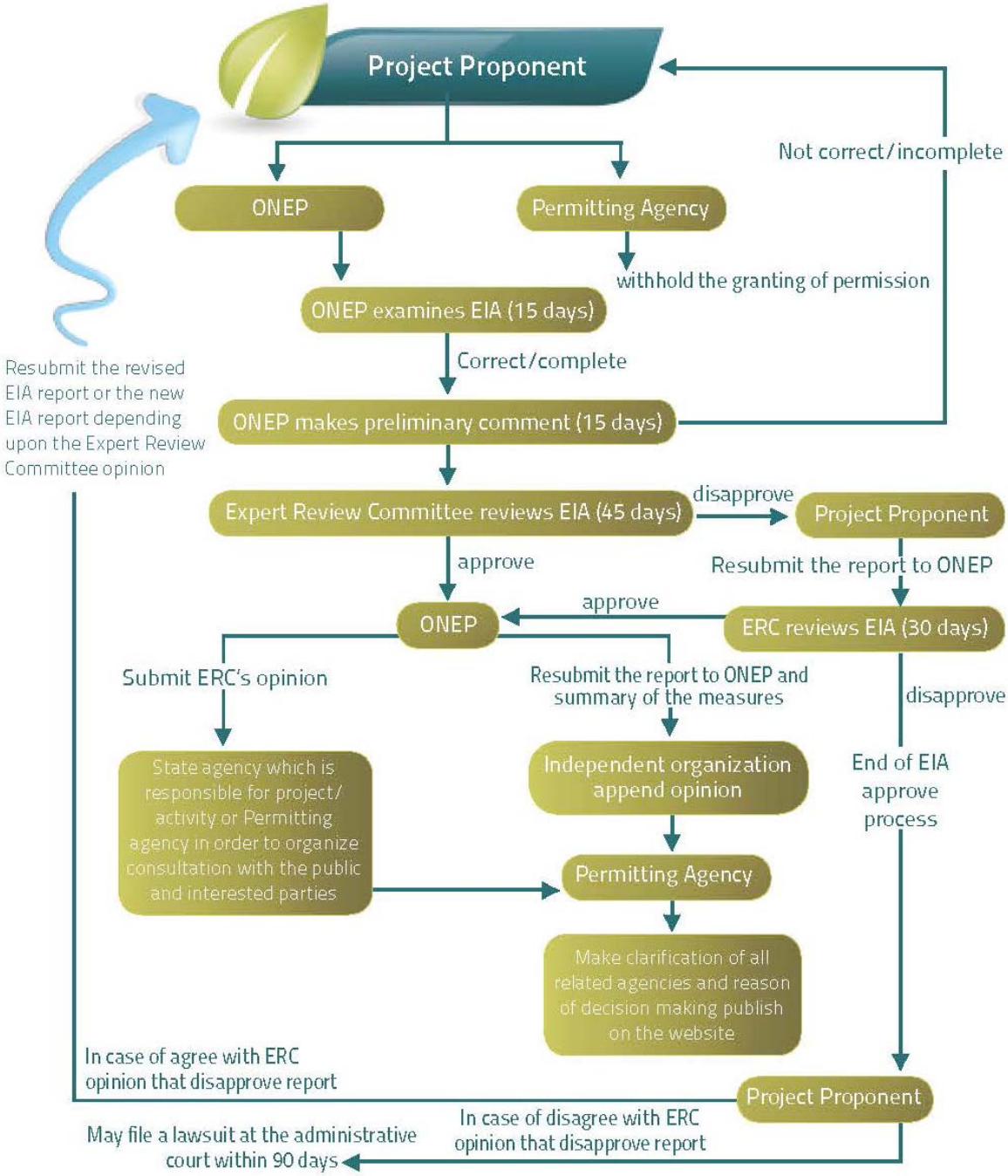
ONEP examines the EIA report within 15 days. In case the report is not correct or incomplete, ONEP sends the report back to the proponent. In case the report is correct or complete, ONEP provides preliminary comments on the EIA report within 30 days. The EIA report together with the preliminary comments is then proposed to the Expert Review Committee (ERC) which, in turn, considers the report for approval within 45 days. If the report is approved, the permitting agency shall grant the permit to the project/activity with the inclusion of preconditions, such as mitigation measures and a monitoring program. But, if the report is not approved, the proponent must submit a revised report to the Committee, which then must review the amended report within 30 days after date of receipt.

2. Approval process for projects/activities that require the approval of the Cabinet.

Source: Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, 2012. Environmental Impact Assessment In Thailand. p.12. (http://www.onep.go.th/eia/images/7handbook/Environmental_Impact_Assessment_in_Thailand.pdf)

ONEP examines and provides preliminary comments on the EIA report. Then the EIA report together with the preliminary comments is forwarded to the ERC. The Committee then submits its remarks to the National Environment Board (NEB). Upon the conclusion of its review, the NEB tenders its comments to the Cabinet. At this stage, expert persons or institutes may present opinions. The project has to be approved by the Cabinet.

3. Approval process for projects/activities potentially affecting the community in an adverse manner with respect to the Environment, Natural Resources and Health that require permission as stipulated by law, and projects/activities that do not require the approval of the Cabinet.



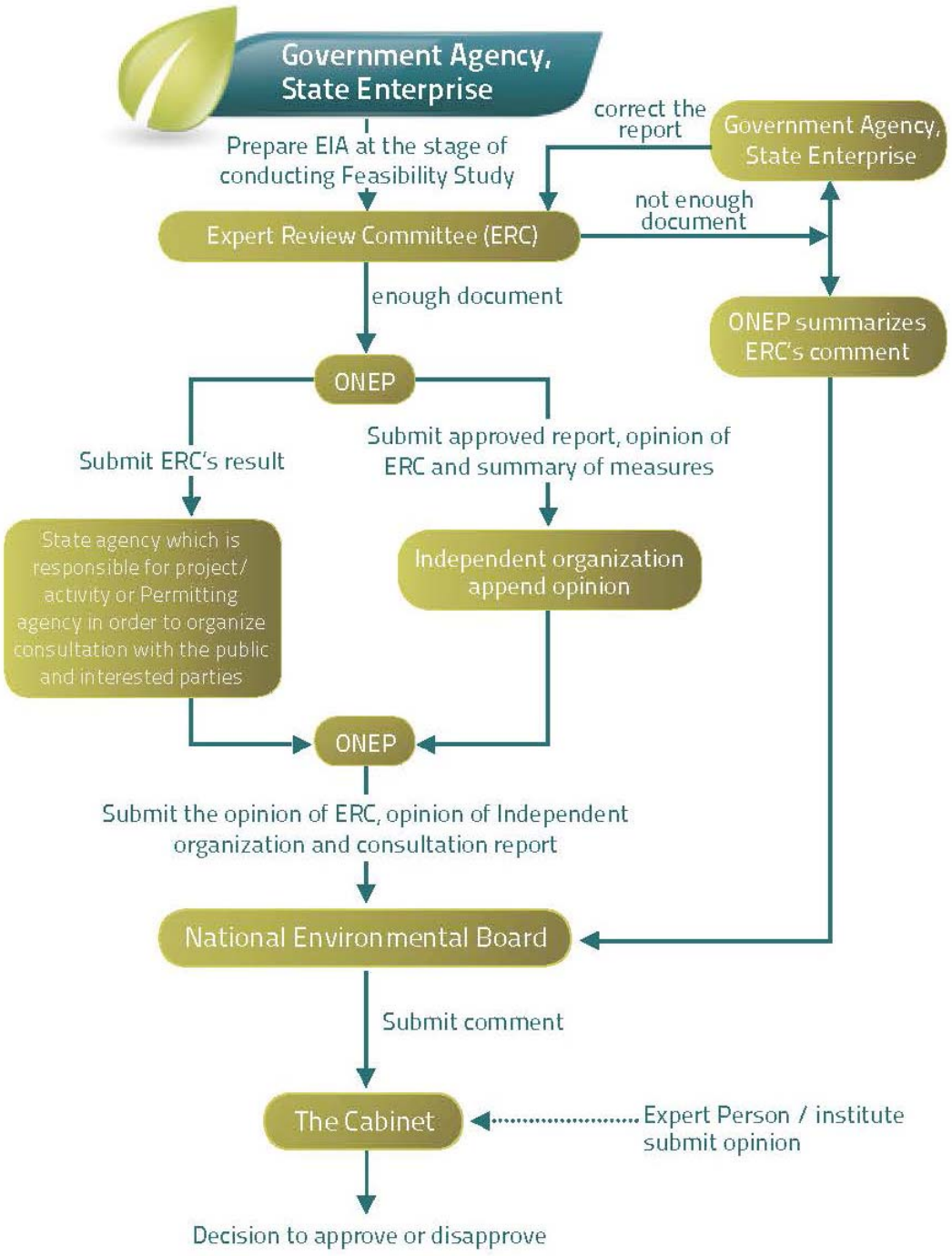
Source: Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, 2012. Environmental Impact Assessment In Thailand. p.13. http://www.onep.go.th/eia/images/7handbook/Environmental_Impact_Assessment_in_Thailand.pdf)

After report approval from the Committee, ONEP will undertake the following actions:

1) Submit the ERC's result either to the state enterprise, which is responsible for the proposed project/activity, or to the permitting government agency, in order to organize consultations with the public and interested parties in accordance with the consultative procedure stated in the Ministry of Natural Resources and Environment Announcement of 29 December B.E. 2552 (2009).

2) Submit approved report, comments of the Committee to the independent organization in order to append opinion before permitting government agency consents to the proposed project/activity.

4. Approval process for projects/activities potentially affecting the community in an adverse manner with respect to the Environment, Natural Resources and Health that require the approval of the Cabinet.



Source: Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, 2012. Environmental Impact Assessment In Thailand. p.14. http://www.onep.go.th/eia/images/7handbook/Environmental_Impact_Assessment_in_Thailand.pdf)

In case of projects/activities that may affect negatively the living conditions of a nearby community and that require the approval of the Cabinet, authorization is more time-consuming and involves more stakeholders to ensure compliance with the law.

For instance, once the ERC has amassed enough documentation, ONEP submits the findings of the Committee to the government agency/state enterprise, which is responsible for the proposed project/activity, the opinion of the ERC and a summary of measures to the independent organization for study. After that, ONEP turns over both the opinion of the ERC and the opinion of independent organization as well as the consultation report to the National Environment Board for review. The NEB then submits comments to the Cabinet for consideration. At this stage, expert persons or institutes may tender opinions to the Cabinet. The project has to be approved by the Cabinet.

Guidelines for the preparing the EIA report are listed below:

1. Key elements
   1.1 Executive summary

      1.1.1 Detail of a project or an activity including related activities

      1.1.2 Site of the project: Presentation of photos and maps of the site showing environmental surroundings that may be affected by the project. Scale of map shall be 1: 50,000 or as appropriate.

      1.1.3 Alternative options of the project site and the project implementation methodology (reasons and justifications).

      1.1.4 Identification of impacts that may cause severe effect to a community concerning quality of environment, natural resources and health. Reasons or criteria for these findings shall be described.

   1.2 Main body

      1.2.1 Introduction: Background, objective and justification of the project, including aims, scope and methodology of the EIA report.

      1.2.2 Site of the project: Presentation of photos and maps of the site showing environmental surroundings that may be affected by the project. Scale of map shall be 1: 50,000 or as appropriate.

      1.2.3 Project detail: Describing a clear detailed overview of the project, such as type and size of the project, location, project implementation methodology, or related activities, as well as a layout of land utilization of the project shown in appropriate scale and direction.

      1.2.4 Current environmental condition: Presentation of detailed photos of natural

resources and environment regarding their physical and biological aspects by classifying their rehabilitative and non-rehabilitative capacities; human use value; quality of life value; as well as describing existing problems around the site together with photos showing the surrounding area; and utilization of land around the site and other areas that may be affected by the project both in the short term and long term.

1.2.5 Evaluation of alternative options for implementing the project and evaluation of the impact that may be caused by the project.

(1) Alternative options for implementing the project: The EIA report for a project or an activity that may cause severe impact to quality of environment, natural resources and health of a community shall describe alternative options, which may be an option for the project site or the project implementation methodology. Every proposed option shall be in line with the stated objectives and shall describe reasons addressing to the project's goals and necessities, regardless whether the project is approved or cancelled. Mitigation measures shall be proposed for each option. The most suitable option and justification of the project shall be identified together with reasons and necessities based on health and social data collected from people living in the area who may be impacted by the implementation of the project/activity both in the short and long term.

(2) Evaluation of environmental impact: Appraisal of the impact from a project or an activity, both direct and indirect, upon the natural resources and environment and upon all values mentioned in 1.2.4, shall be conducted. Natural resources shall be classified as either rehabilitative or non-rehabilitative. Impacts that may result from each proposed option also shall be evaluated and compared. Furthermore, a health impact assessment (HIA) shall be conducted, while a public hearing for area residents and stakeholders shall be conducted. It shall specify the impact that may cause severe effect on the environment, natural resources and health of the community as well as examine the reasons or criteria used for this evaluation.

1.2.6 Prevention, mitigation and compensation measures: Details of prevention and mitigation measures caused by 1.2.5 and compensation measures in case of unavoidable damages shall be described. These prevention, mitigation and compensation measures shall be conducted with regards to mitigation measures on health and social aspects.

1.2.7 Monitoring measures: Environmental monitoring plan, which is practical and technically suitable for the project, shall be proposed. This monitoring plan will be used for the project's post monitoring and evaluation. Also, it shall include a plan for health and social monitoring.

1.2.8 Table summarizing important impacts on the environment as well as identifying prevention and mitigation measures.

2. Documents to be submitted:

2.1 No fewer than 15 copies of the Main Report are to be produced

2.2 No fewer than 15 copies of the Executive Summary are to be produced

2.3 Front cover and title page shall be in line with the EIA report format as shown in Sor Por 2 Form (see *Annex II*)

2.4 Certified letter, as shown in Sor Por 3 Form (see *Annex II*)

2.5 A copy of the license of those legitimate persons who conducted and compiled the EIA report

2.6 List of the EIA study team, as shown in Sor Por 5 Form (*see Annex II*)

2.7 EIA report submission form, as shown in Sor Por 6 Form (*see Annex II*)

B. E/HIA (Environmental/Health Impact Assessment)

An E/HIA is a study forecasting the environmental impact for projects or activities that may seriously affect the health of a nearby community. The E/HIA differs from a typical EIA in that, with regards to consideration of the report, it fulfills the requirements stated in Section 67 of the Constitution of the Kingdom of Thailand. There are 11 types and sizes of projects that require an E/HIA (see below).

No.	Type of Project/Activity	Size	Criteria, Implementing Procedure
1	Land reclaimed from sea or lake off the existed coastal area, excluding a land claimed for beach rehabilitation	300 rai	To be submitted during the project approval or permission process.
2	Mining according to the Mining Act as follows:		
	2.1 Underground mining, only that its supported structure is designed to subside after mining without using any supporters or substitute material to prevent a subsidence.	All sizes	To be submitted with the application during the mining permit process.
	2.2 Lead mining, zinc mining, or other metal ore mining that uses cyanide or mercury or lead nitrate in a process, or other metal ore mining having arsenopyrite as an associated mineral	All sizes	To be submitted with the application during the mining permit process.
	2.3 Coal mining, only the case that coal is transported out of the mining area by land vehicle	≥ 200,000 ton/month or ≥ 2,400,000 ton/year	To be submitted with the application during the mining permit process.
	2.4 Sea mining	All sizes	To be submitted with the application during the mining permit process.
3	Industrial estate as defined by the industrial estate laws; or other projects with similar features of industrial estate, as follows:		
	3.1 Industrial estate or its similarity established for facilitating more than 1 factory of petrochemical as specified in No. 4 or iron smelting industry as specified in No. 5.1 or 5.2 as the case maybe.	All sizes	To be submitted during the project approval or permission process.
	3.2 Industrial estate or its similarity that is expanded to facilitate petrochemical industry as specified in No. 4 or iron smelting industry as specified in No. 5.1 or 5.2	All sizes	To be submitted during the project approval or permission process.
4	Petrochemical industry as follows:		

	4.1 Upstream petrochemical industry	All sizes or All sizes or production capacity is expanded by ≥ 35%	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	4.2 Intermediate petrochemical industry, as follows:		
	4.2.1 That produces Group 1 carcinogens or that uses Group 1 carcinogens as raw material	Production capacity of ≥100 ton/day or Total expansion of ≥ 100 ton/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	4.2.2 That produces Group 2A carcinogens or that uses Group 2A carcinogens as raw material	Production capacity of ≥700 ton/day or Total expansion of ≥ 700 ton/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
5	Ore or metal smelting industry, as follows:		
	5.1 Iron smelting industry	Having input capacity of ≥ 5,000 ton/day or Having total input ≥ 5,000 ton/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.2 Iron smelting industry having coke production process or sintering process	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	5.3 Copper, gold, or zinc smelting	Having input capacity of ≥ 1,000 ton/day or Having total input ≥ 1,000 ton/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.4 Lead ore smelting	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	5.5 Metal smelting (except iron and aluminum)	Having capacity of ≥ 50 ton/day or Having total capacity of ≥ 50 ton/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.6 Lead smelting	Having capacity of ≥ 10 ton/day or having total capacity of ≥ 10 ton/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.

6	Production or disposal or treatment of radioactive substances	All sizes	To be submitted with the application during the process for a factory operation permit
7	*Central waste treatment plant, landfill or incinerator according to the factory law, having incinerated or landfilled hazardous waste, except when hazardous waste is used as a substitute raw material or fuel in a cement kiln	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
8	Air transportation system	Runway is constructed or expanded ≥ 3,000 m.	To be submitted during the project approval or permission process.
9	*Port	1) Berth length ≥ 300m Or Port area ≥ 10,000 sqm; excluding port for daily life transportation or tourism	To be submitted during the project approval or permission process.
		2) With channel dredging of ≥ 100,000 m3	To be submitted during the project approval or permission process.
		3) Where hazardous substances or hazardous wastes considered as Group 1 carcinogens is transshipped in total quantity of ≥ 25,000 ton/month or ≥ 250,000 ton/year	To be submitted during the project approval or permission process.
10	Dam or reservoir	1) Storage volume of ≥ 100 million m3, or	To be submitted during the project approval or permission process.
		2) Storage area of ≥ 15 sq. km.	To be submitted during the project approval or permission process.
11	Thermal power plant as follows:		
	11.1 Coal power plant	Total capacity of ≥ 100 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.2 Biomass power plant	Total capacity of ≥ 150 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.3 Natural gas power plant, which is combined cycle or cogeneration power plant	Total capacity of ≥ 3,000 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.4 Nuclear power plant	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.

The health impact assessment (HIA) for a project or an activity must conform to guidelines set in the EIA report, as issued in August 2010 by the Office of Natural Resources and Environmental Policy and Planning, the Ministry of Natural Resources and Environment. Or, the health impact assessment shall conform to a revised guideline in line with criteria and methodology prepared by the National Health Commission of Thailand as follows:

1 Regarding the participation of people, stakeholders, and all sectors in expressing their concerns and issues concerning HIA guidelines and for the compilation of a well-rounded health impact assessment, the project or activity proponent or the project approval authority shall arrange a public assembly to discuss HIA guidelines and shall submit a report of such scope and HIA guidelines to the EIA's expert committee. The public assembly shall be conducted according to parameters specified below:

1.1 The project/activity proponent shall inform about the arrangement of a public hearing to ONEP, the National Health Commission of Thailand, and public at least one month in advance. Communication method to public shall be done through public communication media at least 3 ways for a public-wide acceptance and preparation to participate in the hearing.

1.2 The project document describing background, necessity, financial source, procedure, and implementing guideline shall be disclosed. Preliminary information regarding factors that may cause impact to environment and health, and a draft proposal of the scope and guidelines of the HIA also shall be presented to all stakeholders and public via at least 3 means of communication 15 days at least prior to the hearing date.

1.3 Registration system for people, stakeholders and related agencies that are interested in giving comment to scope set up and guideline of EIA and HIA shall be arranged in advance for convenience of those mentioned parties.

1.4 A public hearing shall provide a session of an appropriate length of time (at least 2 hours and not less than half the total time of the hearing) for listening to opinions, comments, concerns, and related data of both residents and stakeholders.

1.5 After arranging a public hearing, it shall provide at least 2 communication channels to get opinion from public for at least 15 consecutive days.

2 In conducting an HIA for a project or an activity that may cause severe impact to the quality of the environment, natural resources and health of a community, a study shall be done to cover at least the following factors that may cause impact to health.

2.1 Change of natural resources condition and consumption such as land, water resource, fishery, forest, biodiversity, minerals, other resources and biological system.

2.2 Production, transportation and storage of hazardous substances. Type, quantity, and

operating method of all type of hazardous substances shall be reported.

2.3 Generation and discharge of waste and health-deteriorating matter from construction, production, and any other processes such as solid waste, waste, hazardous waste, wastewater, infection waste, heat, air pollutant, dust, light, noise, odor, vibration, and radiation.

2.4 Contact with pollution and health-deteriorating matter into a human body via breathing, eating, touching, for example. Contact by workers or operators in the project/ activity, or contact by people living around the project/activity.

2.5 Change of and impact to occupation, employment, and working condition in local area either positively or negatively, e.g. risk and accidents at work, change of biological system, natural resources and supply chain of product and service, which are a vital living base for any certain group of people in the area.

2.6 Change of and impact to relationship between people and community either inside or outside a community, in particular a migration of people and workers, increasing/decreasing of community's public area, and conflict that may cause by the project/activity.

2.7 Change in the art and culture site such as religious site, a place of worship, and historical site.

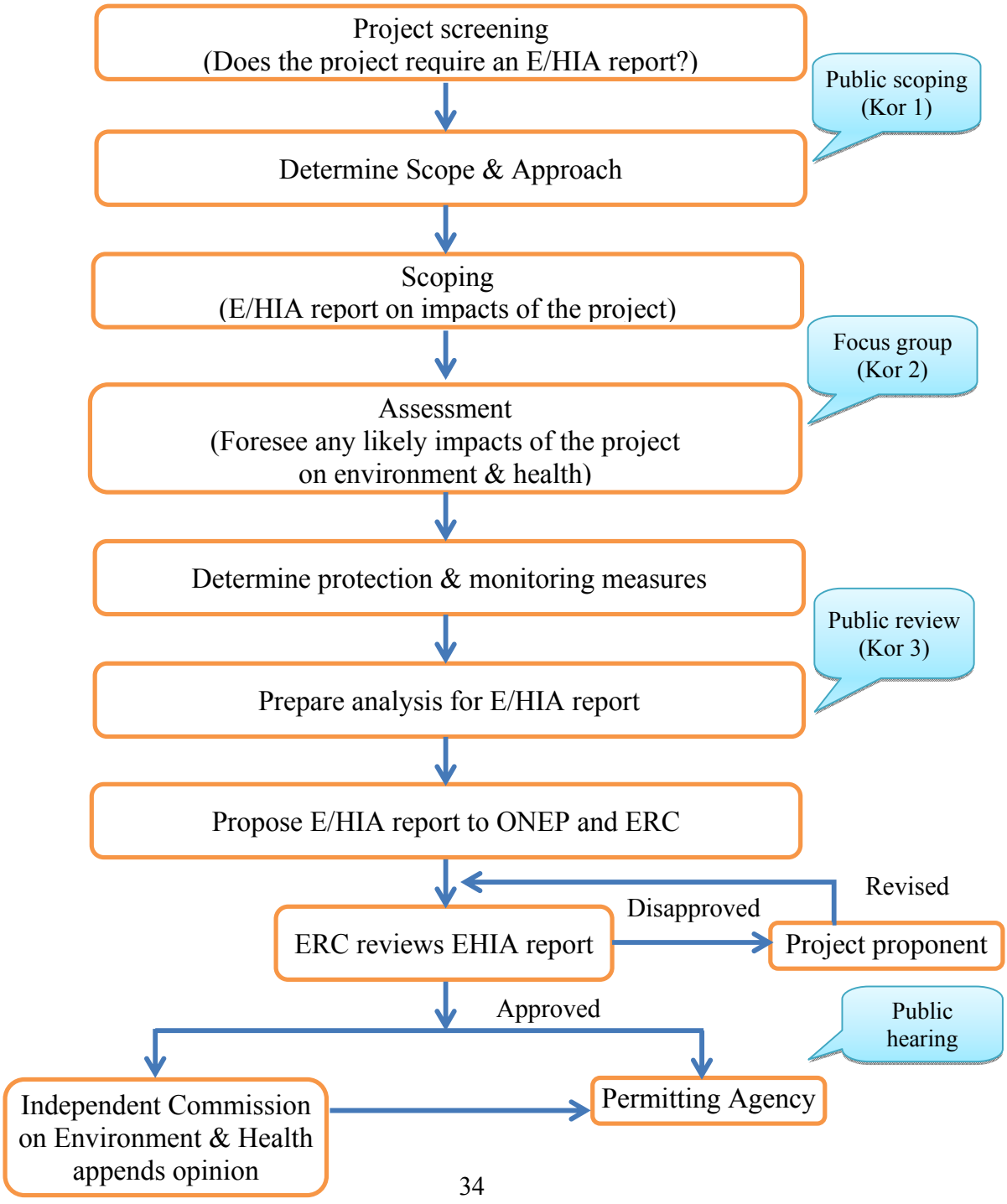
2.8 Impact specifically or seriously occurred to any particular group of people, especially sensitive group such as children, handicaps, elders, single parent, minority, etc.

2.9 Public health resources and preparedness in the aspects of strengthening, preventing, curing, and recovering of people's health, which may relate with the project or activity, as well as preparedness of health status data in the area before the operation of the project or activity, development of database system to monitor the impact, disease survey capacity, and response to incident and disaster that may occur.

3 In order to complete the HIA process, the project or activity proponent or the project approval authority shall arrange a public hearing to review a draft EIA report for a project or an activity that may cause severe impact to quality of environment, natural resources and health of a community. Also, a report shall be submitted that contains opinions from people, stakeholders and the public together with comments and explanations to the expert committee for further consideration. The public hearing shall proceed according to both the EIA and HIA guidelines specified earlier.

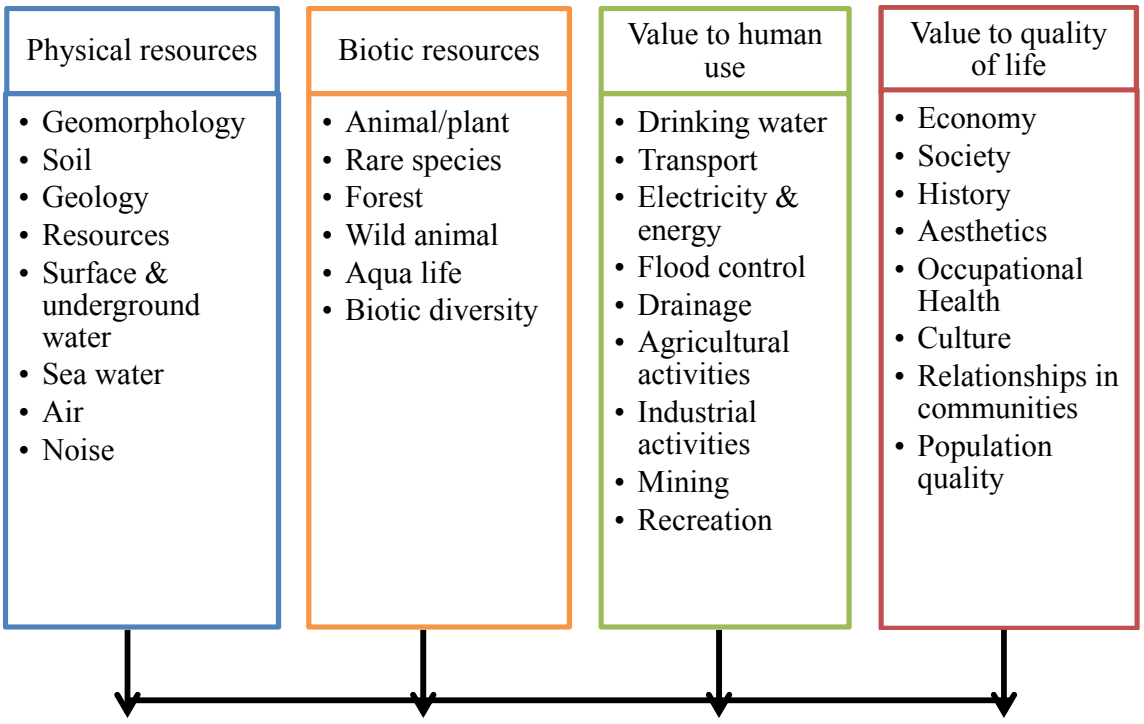
Any project and activity that may seriously affect the quality of the environment, natural resources and biological diversity shall not be permitted, unless its impacts on the quality of the environment and on health of the people in the communities have been studied and evaluated and

consultation with the public and interested parties have been organized, and the opinion of an independent organization have been obtained prior to the operation of such project to activity. By virtue of such Article, the Ministry of Natural Resources and Environment by the approval of the Cabinet and the National Environment Board (NEB) has announced a list of 11 industrial activities (see Pages 29 to 31) that potentially could create severe impact to local communities in terms of natural resources, environment and health and for which environmental and health impact assessments must be conducted.



Overall, there are 6 components to the E/HIA: Screening, Public Scoping, Appraisal, Public Review, Decision Making and Monitoring. All the sections allow for greater participation by both stakeholders and concerned parties than a standard EIA study. Additionally, a comprehensive EIA report should address the severity of the impact of any project/activity upon human habitat by taking into consideration each category identified below. It should include a review of both biotic and abiotic factors as well as their value to humans and their effect upon the quality of human life. Biotic refers to living things that shape an ecosystem, while abiotic are non-living resources of an organism's environment, such as soil, water, air, temperature, and sunlight.

Scale of an E/HIA Study



The scope of an E/HIA study depends on the degree of potential impacts of the proposed project/activity and considers the following factors:

1) Threats to human health and livelihood
2) Degradation of natural resources and environment
3) Impact on the senses of humans
4) Effects on the physical well-being of people
5) Health consequences for surrounding communities
6) Costs to society and life

C. Comparison between EIA and E/HIA

Report	Preparing Report	Reviewing Report
1. EIA	**Studying scopes:** 1) Physical resources 2) Biotic resources 3) Value to Human use 4) Value to the Quality of Life	1) ONEP and permitting agency examines EIA reports (15 days) and gives preliminary comment (15 days); then ERC takes 45 days to review for first review or 30 days for second review. 2) If ERC approved, ONEP will pass to permitting agency for approval.
2. EHIA	**Studying 4 scopes of EIA with these differences:** 1) Focus on health impact assessment and related factors 2) Focus on public hearings for all stages (Kor 1, Kor 2, and Kor 3)	1) ONEP and permitting agency examines EIA reports (15 days) and gives preliminary comment (15 days); then ERC takes 45 days to review for first review or 30 days for second review. 2) The ONEP will pass the approved EHIA report to Independent Commission on Environment and Health for opinion within 60 days; then submit to permitting agency to organize public hearing. 3) If the report is approved, the permitting agency has to publish reason of decision on the website.

Source: Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment

D. IEE (Initial Environmental Examination)

An IEE is the preliminary study for forecasting the environmental impacts of a planned project or activity. The IEE normally uses primary data or available data. In Thailand, the IEE is used for projects situated in Environmentally Protected Areas such as national parks, wildlife reserves, cultural/tourism sites, coastal zones or territorial waters in provinces like Chonburi, Phuket, Phetchaburi, Prachuap Khiri Khan, Surat Thani, Krabi, and Phang Nga. To be more precise, projects that require an IEE are as follows:

1) Dam or reservoir within a national forest conservation area that encompasses between 50 to 500 rai of land.

2) Hydro power plant project dam type and weir type (non-reservoir) that generates between 200 kilowatts to 10 megawatts of electricity.

3) Transmission line project or radial expansion in a national forest conservation area.

4) Road construction or expansion project and construction in a national forest conservation area that covers over 5 square kilometers.

5) Pipe construction project or irrigation system project in a national forest conservation area that covers over 5 square kilometers.

6) Mineral survey project, according to the Mineral Act.

7) Mining project in the case of a concession extension, according to the Mineral Act.

8) Construction of a water airport.

9) Other mining projects according to the Mineral Act, except those activities specifically mentioned by categories 1.1, 1.2, 1.3 and 1.4 in the EIA's listing of 35 Project Types and Sizes.

10) Projects that fall under the second category of the Factory Act.

The IEE is prepared to assess initially potential impacts likely to occur from the project's entire life cycle on the local environmental quality and communities. The study also comes up with a set of mitigation measures as well as monitoring programs for the project to pursue in order to ensure minimal adverse effects on the environment and communities nearby. Once completed the IEE is to submitted to the Department of Industrial Works for review and consideration.

Projects that are to be situated in Environmentally Protected Areas require an IEE and an EIA, while for projects in Forest Conservation Areas an IEE, EIA and an Environmental Checklist must be compiled.

Guidelines for the preparing the IEE report are listed below:

1. Standard elements

1.1 Introduction: Background, objective and justification of the project, including aims, scope and methodology of the EIA report.

1.2 Site of the project: Photos and maps of the site in appropriate scale showing environmental surroundings that may be affected by the project must be shown.

1.3 Alternative options of the project site and the project implementation methodology (reasons and justifications).

1.4 Project details: Overview of the project such as type and size of the project, project implementation methodology, or related activities, as well as a layout of land utilization of the project shown in appropriate scale and direction.

1.5 Current environmental condition: Presentation of detailed photos of natural resources and environment illustrating both physical and biological aspects by classifying their rehabilitative and non-rehabilitative capacities; human use value; quality of life value; as well as identifying existing problems around the site through photos of the surrounding area; and utilization of land around the site and other areas that may be affected by the project both in the short term and the long term.

1.6 Major environmental impact: Evaluation of initial environmental impact of the project shall be conducted by focusing on both the direct and indirect impact of the project upon the site's natural resources and environment and all related values mentioned previously.

1.7 Mitigation and compensation measures: details of mitigation measures in case there is an adverse environmental impact caused by the project and compensation measures in case of unavoidable damages.

1.8 Environmental quality monitoring measures: post-project environmental monitoring and an evaluation plan shall be proposed.

1.9 Table summarizing important environmental impacts and mitigation measures.

The IEE report shall be conducted on the basis of public participation and social environmental impact assessment.

2. Documents to be submitted:

2.1 No fewer than 15 copies of the IEE report are to be produced

2.2 Front cover and title page shall be in line with the IEE report format as shown in Sor Por 7 Form (see *Annex II*)

2.3 Certified letter, as shown in Sor Por 8 Form (see *Annex II*)

2.4 List of the EIA study team, as shown in Sor Por 9 Form (see *Annex II*)

2.5 A copy of the license of those legitimate persons who conducted and compiled the EIA report

E. ESA (Environmental Safety Assessment)

An ESA is a report that summarizes a site visit and documents the review of a property and its surrounding area to determine if any additional environmental investigation is warranted to understand the liability risks associated with the identified property.

When deemed appropriate by the Thai authorities, a report on prevention and mitigation measures related to the impact of industrial activities upon environmental quality and safety is to be compiled, in accordance to Article 18 of the Ministerial Regulation No. 2 B.E. 2535 (1992), issued pursuant to the Factory Act B.E. 2535 (1992). It contains some provisions concerning the limitation of people's rights and liberties that is permissible under the provisions of Section 29, Section 33, Section 41 and Section 43 of the Constitution of the Kingdom of Thailand (2007). The Minister of Industry then announced on 29 September 2009 the following Ministerial Notification that covers the basic prerequisites for the application of the ESA:

Article 1: Anyone seeking to request a factory operation permit or a factory expansion permit, according to the factory types listing annexed with this Notification (see below), shall prepare a report on prevention and mitigation measures related to the impact of industrial activities upon environmental quality and safety. It is to be submitted together with the application form for a factory operation permit or a factory expansion permit as the case maybe. A factory located in Bangkok shall submit them to the Department of Industrial Works, while a factory situated in another province shall submit them to the Provincial Industrial Office of that locality.

Article 2: The study on prevention and mitigation measures related to the impact of industrial activities upon environmental quality and safety shall contain the following topics:

2.1 Environmental aspects

2.1.1 Project's detailed information, i.e. location, map, the project's plan, operating procedure, production process, water use and discharge system, energy system, communication system, uses of fuel, raw materials and chemicals.

2.1.2 Related current information of environmental conditions, i.e. air quality, surface soil quality, underground water quality, sea water quality, land utilization, and transportation.

2.1.3 Impact upon the environment and the severity of the factory's operation.

2.1.4 Prevention and mitigation measures to reduce the environmental impacts caused by 2.1.3

2.2 Safety aspects

2.2.1 Assessment and analysis of dangers that may occur from the factory's operation that involve storage, transfer and use of raw materials, fuel, chemicals, products, equipment as well as the production process and operation procedure.

2.2.2 Preparation of control, prevention or mitigation measures to reduce the impacts resulting from those dangers mentioned in 2.2.1, which may be harmful to life, cause disability, fire, explosion, or chemical leakage. In addition, a fire prevention and suppression system as well as an emergency plan shall be provided.

2.2.3 Safety administration and management system shall be established to prepare the plan and follow up concerning implementation.

Article 3: This Notification shall not be enforced upon a factory located within an industrial estate, in accordance to the Thailand Industrial Estate Authority Act, or upon a factory located within an investment promotion zone that already requires the preparation of an EIA report as called for by the Enhancement and Conservation of the National Environmental Quality Act, in accordance with the Investment Promotion Act.

Type of factories that require an Environmental Safety Assessment as listed in the Ministerial Regulation B.E.2552 (2009):

No.	Type of factory	Condition
1	Distilleries or liquor blending houses (16)	Every size of factory
2	Factories producing ethyl alcohol (excluded production from extracted sulfide from pulp mill) (17)	Every size of factory
3	Fermenting, carbonizing, untangling, combing, pressing, spinning, drying, stranding, winding, texturizing, bleaching, or dyeing fiber (22(1))	Work relating to bleaching or dyeing of yarn or fiber and generating wastewater of at least 500m^3 per day
4	Weaving or preparing warp-threads for weaving (22(2))	Work relating to bleaching or dyeing of yarn, fiber, or printing textiles and generating wastewater of at least 500m^3 per day
5	Bleaching and dyeing or finishing of yarn or textiles (22(3))	Work relating to bleaching or dyeing of yarn, fiber, or printing textiles and generating wastewater of at least 500m^3 per day

6	Printing textiles (22(4))	Work relating to bleaching or dyeing of yarn, fiber, or printing textiles and generating wastewater of at least 500m^3 per day
7	Weaving fabric, lace or apparel with yarn or fiber, or bleaching and dyeing or finishing of fabric, lace or apparel woven with yarn or fiber	Work relating to bleaching, dyeing, or finishing of lace or apparel woven with yarn or fiber and generating wastewater of at least 500m^3 per day
8	Making oilcloth or leatherette that is not purely made from plastic (27(2))	Every size of factory
9	Fermenting, eviscerating, roasting, pulverizing or grinding, tanning, polishing, and finishing, embossing, or paint-coating of animal hides (29)	Work relating to fermenting and polishing and generating wastewater more than 50m^3 per day
10	Combing, cleaning, bleaching, dyeing, polishing, or dressing of fur (30)	Generating wastewater more than 50m^3 per day
11	Carpets or utensils from leather or fur (31)	Work relating to fermenting and polishing and generating wastewater more than 50m^3 per day
12	Manufacturing products or parts of products other than apparel or shoes from fiber glass (32(2))	Every size of factory
13	Making pulps from wood or other materials (38(1))	With production capacity lower than 50 tons per day
14	Producing paper, paperboard, or paper for construction work made from fiber or fiberboard (38(2))	Generating wastewater more than 50m^3 per day
15	Insulation products (related to plastic products) (53(6))	Every type of foam insulation products
16	Smelting, melting, casting, rolling, drawing, or producing of basic iron and steel (59)	With production capacity of at least 50 tons but not more than 100 tons per day
17	Smelting, melting, casting, rolling, drawing, or producing of non-ferrous metals (60)	With production capacity of at least 25 tons but not more than 50 tons per day
18	Business related to ship (75)	Work relating to metal finishing or spray painting only

19	Factories related to trains, streetcars, or cable cars (76)	Work relating to metal finishing or spray painting only
20	Manufacture of motorcycles, tricycles, or bicycles (78)	Work relating to metal finishing or spray painting only
21	Producing, transmitting, or distributing electrical power (88)	With production capacity of at least 5.0 megawatts but not more than 10.0 megawatts
22	Laundering, dry-cleaning, cleaning, ironing, pressing, or dyeing of apparel, carpet, or fur (98)	Generating wastewater more than 500m^3 per day
23	Generating or distributing stream (102)	With (stream) production rate of at least 10 tons per hour and use biomass fuel and/or charcoal to process
24	Sorting or landfilling trash or waste having characteristics or properties as set forth in the Ministerial Regulation No. 2 B.E. 2535 (1992) in pursuant to the Factory Act B.E. 2535 (1992) (105)	Hazardous waste only
25	Recycling of industrial waste or junks via an industrial production method (106)	Hazardous waste only

The purpose of an Environmental Safety Assessment is to use a consistent systematic approach to identify any existing or potential environmental conditions that may be present or affect real estate property.

III. *BoI Environmental Regulations*

The Board of Investment (BOI) is focused primarily on the development and growth of the Thai economy by drawing in foreign companies as well as by facilitating the expansion of domestic industries through the offering of incentives and benefits. Furthermore, the BOI recognizes the importance for businesses to adhere to those laws and directives that deal with corporate responsibility regarding the conservation and protection of the country's natural environment.

Recently, the BOI announced new investment promotion policies and criteria to respond to current and future global business trends that are in line with the direction of Thailand's development under the 11th National Economic and Social Development Plan. Such a course of action is essential in order to enhance the country's competitiveness and attraction as a foreign investment center.

Concerning the environment, the following points would serve as the new parameters for the BOI when processing investment applications commencing on 1 January 2015:

1.1 Environmental protection

1.1.1 Adequate and efficient guidelines and measures to protect environmental quality and to reduce environmental impact must be installed. The Board will give special consideration to the location and pollution treatment of a project with potential environmental impact.

1.1.2 Projects or activities with type and size that are required to submit environmental impact assessment reports must comply with the related environmental laws and regulations or Cabinet resolutions.

1.1.3 Projects located in Rayong must comply with the Office of the Board of Investment Announcement No. Por 1/2554, dated 2 May 2011 on Industrial Promotion Policy in Rayong Area.

Source: Announcement of the Board of Investment No. 2 /2557: Policies and Criteria for Investment Promotion, dated 3 December 2557 (2014).

A. Types of Activities that Require Environmental Protection Plans

Activities that are eligible for promotion require to submit a Preliminary Environmental Impact Evaluation Form (F PA PP 15 Form) if the factory is established outside promoted industrial estates or industrial zones. There is no need to submit a form if the projects are established in the promoted industrial estates or industrial zones.

Activities listed below necessitate an F PA PP 15 Form (see *Annex III*), according to the Board of Investment Announcement No. 2 / 2557 (see http://www.boi.go.th/upload/content/newpolicy-announcement_63297.pdf). A table has been inserted to illustrate the revisions that were made to the original BOI proclamation, Announcement No. 10 / 2552.

BOI Announcement 10/2552 (10/2009)	**BOI Announcement 12/2557 (12/2014)**
1.5.2 Aquatic (except shrimp)	1.5.2 Livestock husbandry or aquaculture (except for shrimp)
1.6 Manufacture of animal feed or mixes for animal feed	1.6 Slaughtering
1.9 Slaughtering	1.9 Manufacture of modified starch or starch made from plants that have special properties
1.10 Tanneries, leather finishing, or fur dressing	1.10 Manufacture of oil or fat from plants or animals (except for soybean oil)
1.11 Manufacture or preservation of food or food ingredients, using modern technology (except drinking water and ice cream)	
1.12 Manufacture of oil or fat from plants or animals	

	1.13 Tanneries or leather finishing
	1.14 Manufacture of natural rubber products (except for rubber bands, rubber balloons and rubber rings)
	1.15 Manufacture of products from agricultural by-products or agricultural waste (except for those with uncomplicated production processes, e.g. drying, dehydration)
1.16 Manufacture of natural rubber products	1.16 Manufacture of fuel from agricultural products, including agricultural scrap or garbage or waste
1.17 Manufacture of products from agricultural by-products or waste	1.17 Manufacture or preservation of food, beverages, food additives or food ingredients using modern technology (except for drinking water, ice cream, candy, chocolate, gum, sugar, carbonated soft drinks, alcoholic beverages, caffeinated beverages and flour or starch made from plants, bakery products, instant noodles, essence of chicken and bird's nest)
1.18 Manufacture of alcohol or fuel from agricultural products, including scrap, garbage and/or waste	
	2.2 Potash mining and/or dressing
2.7 Manufacture of fire-resistant materials or heat insulation (except lightweight brick, lightweight concrete block and aerated concrete block)	2.7 Manufacture of up-stream steel, i.e. Hot Metal, Pig Iron, Sponge Iron, Direct Reduction Iron: DRI) and Hot Briquetted Iron (HBI)
	2.8 Manufacture of intermediate steel, i.e. Slab, Billet and Bloom
	2.9 Manufacture of down-stream steel
	2.10 Manufacture of steel pipes or stainless steel pipes
	2.11 Manufacture of metal powder (except Shot Blasting)
	2.12 Manufacture of ferro-alloy
	2.13 Manufacture of cast iron/steel parts
	2.14 Manufacture of forged iron/steel parts
	2.15 Rolling, drawing, casting or forging of non-ferrous metals
3.1 Manufacture of textile products or parts	3.1 Manufacture of textile products or parts
	4.2 Surface treatment or anodized surface treatment (except surface treatment or anodized surface treatment or color treatment for decoration purpose)

	4.3 Heat Treatment
4.4 Surface treatment or anodized surface treatment	
	4.9 Building or repair of ships
	5.2.5 Manufacture of batteries or dry batteries
5.3.2 Manufacture of batteries or dry batteries	
	5.4.2 Manufacture of solar cells and/or raw materials for solar cells
	5.5 Manufacture of material for microelectronics
6.1 Manufacture of chemicals	6.1 Manufacture of industrial chemicals
6.2 Manufacture of industrial chemicals	6.2 Manufacture of eco-friendly chemicals or polymers or products from eco-friendly polymers
	6.3 Oil refinery
	6.4 Manufacture of petrochemicals
	6.5 Manufacture of specialty polymers or specialty chemicals
	6.8 Manufacture of plastic products from recycled plastic
6.8.1 Dye and dyestuff 6.8.2 Pigment	
	6.9 Active pharmaceutical ingredients
	6.10 Manufacture of medicine
6.11 Manufacture of petrochemicals	6.11 Manufacture of chemical fundamental fertilizers
	6.12 Manufacture of pulp or paper
6.13 Manufacture of pulp	
6.14 Manufacture of paper	
	7.1.1 Production of electricity or steam
	7.16 Products sterilization services
	7.17 Recycling and reuse of unwanted materials
	7.18 Waste treatment or disposal

B. Promoted Activities that Require an EIA and EIA Approval (after the issuance of BOI Certification)

An EIA is an important environmental management tool used in project decision making. It is applied especially to some activities listed under particular ministerial directives. The main purpose of an EIA in Thailand is to prevent environmental problems from major industrial projects in order to reach sustainable development goals.

No.	Type of Project/Activity	Size	Criteria, Procedure, Regulation
1	Mining as defined by the Mineral Act		
	1.1 Mining as follows:		
	1.1.1 Coal mining	All sizes	Submit when applying for a concession
	1.1.2 Potash mining	All sizes	Submit when applying for a concession
	1.1.3 Rock salt mining	All sizes	Submit when applying for a concession
	1.1.4 Limestone mining for cement Industry	All sizes	Submit when applying for a concession
	1.1.5 All types of metal ore mining	All sizes	Submit when applying for a concession
	1.2 Underground mining	All sizes	Submit when applying for a concession
	1.3 All mining projects located in the following areas:		
	1.3.1 Watershed area that is Class 1 by a Cabinet resolution	All sizes	Submit when applying for a concession

	1.3.2 Reserved forest added by a Cabinet resolution	All sizes	Submit when applying for a concession
	1.3.3 Wetland, internationally recognized	All sizes	Submit when applying for a concession
	1.3.4 Areas adjacent within 2 km. to ancient site, archeological site, historical site or historical park defined by laws related with historical site and object, artifact, and national museum, and world heritage site registered according to the world heritage convention.	All sizes	Submit when applying for a concession
	1.4 Mining that uses explosives	All sizes	Submit when applying for a concession
	1.5 Other mining projects according to The Mineral Act, except 1.1, 1.2, 1.3, 1.4	All sizes	Submit when applying for a concession
2.	Petroleum development		
	2.1 Petroleum exploration by geophysical drilling	All sizes	Submit when applying for an approval or permission from a competent office or an authority that grants a permit according to the petroleum law.
	2.2 Petroleum production	All sizes	
3.	Petroleum and oil transportation via pipeline	All sizes	Submit when applying for a license or for an approval from a competent office.
4.	Industrial estate as defined by the industrial estate laws; or other projects with similar features of industrial estate; or land development for industry project	All sizes	Submit when applying for approval or permission of the project.
5.	Petrochemical industry having chemical process	Production capacity of ≥100 ton/day	Submit when applying for permission for construction or operation, as the case maybe.
6.	Oil refinery	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
7.	Natural gas separation or processing	All sizes	Submit when applying for permission for construction or operation, as the case maybe.

8.	Chlor-alkaline Industry using sodium chloride (NaCl) as a raw material for the production of sodium carbonate (Na2Co3), sodium hydroxide (NaOH), hydrochloric acid (HCl), chlorine (Cl2), sodium hypochlorite (NaOCl) and bleaching powder	Production capacity of each or combined products ≥100 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
9.	Cement production	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
10.	Pulp production	Production capacity of ≥50 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
11.	Pesticide Industry or industry producing active ingredient by chemical process	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
12.	Chemical fertilizer industry by chemical process	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
13.	Sugar industry as follows:		
	13.1 Producing raw sugar, white sugar, refined sugar	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
	13.2 producing glucose, dextrose, fructose or others similar	Production capacity of ≥20 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
14.	Iron or steel industry	Production capacity of ≥100 tons/day	Submit when applying for permission for construction or operation, as the case maybe.
15.	Ore or metal smelting, other than iron and steel industry	Production capacity of ≥50 tons/day	Submit when applying for permission for construction or operation, as the case maybe.

16.	Liquor, alcohol, including beer and wine production		
	16.1 Liquor and alcohol production	≥40,000 L/month (calculated at 28 degrees)	Submit when applying for permission for construction or operation, as the case maybe.
	16.2 Wine production	≥600,000 L/month	Submit when applying for permission for construction or operation, as the case maybe.
	16.3 Beer production	≥600,000 L/month	Submit when applying for permission for construction or operation, as the case maybe.
17.	Central waste treatment plant according to the Factory Act	All sizes	Submit when applying for permission for construction or operation, as the case maybe.
18.	Thermal power plant	≥10 MW	Submit when applying for permission for construction or operation, as the case maybe.
19.	Expressway as defined by the Expressway and Rapid Transit Authority of Thailand Act or other projects alike	All sizes	Submit when applying for project approval or permission.

20.	Highway or road as defined by the Highway Act, passing through following areas:		
	20.1 Wildlife sanctuaries and wildlife non-hunting areas as defined by the Wildlife Conservation and Protection Act	All sizes	Submit when applying for project approval or permission.
	20.2 National park as defined by the National Park Act	All sizes	Submit when applying for project approval or permission.
	20.3 Watershed area that is Class 2 as approved by a Cabinet resolution	All sizes	Submit when applying for project approval or permission.
	20.4 Mangrove forests designated as a national forest reserve	All sizes	Submit when applying for project approval or permission.
	20.5 Coastal area within 50 meters of high tide level	All sizes	Submit when applying for project approval or permission.
	20.6 Area adjacent within 2 km to the internationally recognized watershed area or world heritage site registered according to the World Heritage Convention.	All sizes	Submit when applying for project approval or permission.
	20.7 Areas adjacent within 2 km to ancient site, archeological site, historical site or historical park defined by laws related with historical site and object, artifact, and national museum.	All sizes	Submit when applying for project approval or permission.
21.	Mass transportation system by rail	All sizes	Submit when applying for project approval or permission.
22.	Port	Accommodation capacity of ≥500 ton gross Ship or port width ≥100 m or Total port area ≥ 1,000 m2	Submit when applying for project approval or permission.
23.	Port for cruise and sport ship	Accommodation of ≥50 ships or ≥ 1,000 m2	Submit when applying for project approval or permission.
24.	Land reclamation	All sizes	Submit when applying for project approval or permission.

25.	Construction or expansion of a structure both onshore and offshore		
	25.1 Sea wall next to coastline	≥200 m	Submit when applying for project approval or permission.
	25.2 Groin, training jetty, training wall	All sizes	Submit when applying for project approval or permission.
	25.3 Offshore breakwater	All sizes	Submit when applying for project approval or permission.
26.	Air transportation system		
	26.1 Construction or expansion of commercial airport or temporary take off and landing strip	Runway ≥1,100 m	Submit when applying for project approval or permission.
	26.2 Water airport	All sizes	Submit when applying for establishment or permission of taking off and landing.
27.	Building, as defined by the building control law, having located at or its purpose of utilization as follows:		
	27.1 Adjacent to river, sea, lake, beach, national park or historical park, which may cause impact to environmental quality of those areas	Height ≥ 23 m or Total floor area or individual floor area of ≥ 10,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
	27.2 Building used for retail or wholesale business	Height ≥ 23 m or Total floor area or individual floor area of ≥ 10,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
	27.3 Office building	Height ≥ 23 m or Total floor area or individual floor area of ≥ 10,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.

28.	Land development for residential or commercial purpose according to the land development law	≥500 land plots or Area >100 rai	Submit when applying for land development permit according to the Land Development Act.
29.	Hospital or health facility according to the health facility law as follows:		
	29.1 Adjacent within 50 m to river, seashore, lake or beach	In-patient beds ≥30	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
	29.2 Others not specified in 29.1	In-patient beds ≥60	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
30.	Hotel or resort as defined by the Hotel Act	Rooms ≥80 or Total area ≥4,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
31.	Residential building as defined by the building control law	Rooms ≥80 or Total area ≥4,000 m2	Submit when applying for a construction permit or when reporting to the local officer according to the Building Control Act in case of not applying for a construction permit.
32.	Irrigation	Irrigated area ≥ 80,000 rai	Submit when applying for project approval or permission.
33.	All types of projects located in areas approved by the Cabinet as Class 1 watershed areas	All sizes	Submit when applying for project approval or permission.
34.	Inter-basin water diversion as follows:		
	34.1 Diversion across main river basins, except in a disaster case or for national security, which is temporarily implemented.	All sizes	Submit when applying for project approval or permission.
	34.2 International water diversion, except in a disaster case or for national security, which is a temporarily implemented.		
35.	Sluice in the main river	All sizes	Submit when applying for project approval or permission.

C. Promoted Activities that Require an E/HIA and E/HIA Approval (before the issuance of BOI Certification)

An E/HIA is a process that seeks to predict the impact of a project before the activity's proposal has been approved, so that negative impacts can be reduced or avoided, while positive effects can be enhanced and the probability of sustainable development increased. The Health Impact Assessment segment was added into the overall EIA procedure under the core concept of community rights and public participation. ONEP launched the E/HIA in 2009.

Item	Type of Project or Activity	Size	Criteria, Implementation Procedure
1.	Land reclamation from the sea or lake off the external existing coastline, except land claimed for beach rehabilitation.	300 rai	To be submitted during the project approval or permission process.
2.	Mining as defined by the Mineral Act:		
	2.1 Underground mining which the structure has been specifically designed for subsidence after stopping operation without being suspended or without refilling substituted material to avoid subsidence	All sizes	To be submitted with the application during the mining permit process.
	2.2 Lead mine, Zinc mine or other metal which used Cyanide or Mercury or Lead Nitrate in production process or other metal mine which used Arsenopyrite as associated mineral.	All sizes	To be submitted with the application during the mining permit process.
	2.3 Coal mining which is specifically loaded coal from the area by trucks.	≥ 200,000 tons/month or ≥ 2,400,000 tons/year	To be submitted with the application during the mining permit process.
	2.4 Marine mining	All sizes	To be submitted with the application during the mining permit process.
3.	Industrial Estate in accordance to the Industrial Estate Act or Project with identical characteristics of an Industrial Estate mentioned as follows:		
	3.1 Industrial Estate or Project with identical characteristics of Industrial Estate which is established to support petrochemical industry described in 4 or ironworks industry that described in 5.1 or 5.2 more than 1 factory.	All sizes	To be submitted during the project approval or permission process.

	3.2 Industrial Estate or Project with identical characteristics of Industrial Estate which is expanding area to support petrochemical industry described in 4 or ironworks industry that described in 5.1 or 5.2.	All sizes	To be submitted during the project approval or permission process.
4.	Petrochemical Industry: 4.1 Upstream Petrochemical Industry	All sizes or production capacity is expanded by ≥ 35%	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	4.2 Intermediate Petrochemical Industry which is mentioned as follow:		
	4.2.1 Intermediate Petrochemical Industry which is manufactured chemical substance or used chemical substances which are Cancer stimulant group 1 as raw material	Production capacity of ≥100 tons/day or Total expansion of ≥ 100 tons/day per day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	4.2.2 Intermediate Petrochemical Industry which is manufactured chemical substance or used chemical substances which are Cancer stimulant group 2A as raw material	Production capacity of ≥700 tons/day or Total expansion of ≥ 700 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
5.	Mineral Smelting Industry or Melting Metal Industry which is mentioned in the following: 5.1 Ironworks Industry	Having input capacity of ≥ 5,000 tons/day or Having total input ≥ 5,000 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.

	5.2 Ironworks Industry which is manufactured Coke Coal or provided with sintering process	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	5.3 Mineral Smelting Industry of Copper, Gold or Zinc	Having input capacity of ≥ 1,000 tons/day or Having total input ≥ 1,000 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.4 Smelting Lead Ore	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	5.5 Melting Metal (except Iron and Aluminum) Industry	Having capacity of ≥ 50 tons/day or Having total capacity of ≥ 50 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
	5.6 Melting Lead Industry	Having capacity of ≥ 10 tons/day or having total capacity of ≥ 10 tons/day	To be submitted with the application during the process for a construction permit or a factory operation permit, or a factory expansion permit, as the case maybe.
6.	Manufacturing, disposal or modification of radioactive substance	All sizes	To be submitted with the application during the process for a factory operation permit.
7.	Central Waste Treatment Plant or buried garbage or unused material manufacturer as defined by the Factory Act which is burning or buried hazardous waste except burning in cement oven that used hazardous waste as substituted raw material or additional fuel.	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.

8.	Project of aviation transportation system	Runway is constructed or expanded ≥ 3,000m	To be submitted during the project approval or permission process.
9.	Port	1) With berth length of ≥ 300m or Port area ≥ 10,000 sqm; excluding port for daily use or tourism purposes	To be submitted during the project approval or permission process.
		2) With channel dredging of ≥ 100,000m³	To be submitted during the project approval or permission process.
		3) Where hazardous substances or hazardous wastes considered as Group 1 carcinogens is transshipped in total quantity of ≥ 25,000 tons/month or ≥ 250,000 tons/year	To be submitted during the project approval or permission process.
10.	Dam or reservoir	1) Storage volume of ≥ 100 million m³, or	To be submitted during the project approval or permission process.
		2) Storage area of ≥ 15 km²	To be submitted during the project approval or permission process.

11.	Thermal Power Plants as follows:		
	11.1 Electric Plant using coal as fuel	Total capacity of ≥ 100 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.2 Electric Plant using biomass fertilization as fuel	Total capacity of ≥ 150 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.3 Electric Plant that used natural gas as fuel which is co-thermal system of combined cycle or co-generation	Total capacity of ≥ 3,000 MW	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.
	11.4 Nuclear Power Plant	All sizes	To be submitted with the application during the process for a construction permit or a factory operation permit as the case maybe.

Source: Notification of the Ministry of Natural Resources and Environment – Subject: Type, size and implementing procedure of project or activity that may cause a severe impact on the quality of environment, natural resources, and health of a community that requires a government agency, a state enterprise, or a private enterprise to prepare an environmental impact assessment (2010).

D. Projects Located in the Chao Phraya River Basin that Require Factory Licensing (before the issuance of BOI Certification)

Setting up or extending factory located in the 9 provinces: Nakhon Sawan, Chai Nat, Singburi, Angthong, Ayutthaya, Pathum Thani, Nonthaburi, Samut Prakan, and Bangkok, where the river flow through must follow the Notification of the Ministry of Industry that was announced on 25 June B.E. 2551 (2007) to protect, preserve, and rehabilitate water quality of Chao Phraya River.

According to Section 39 of the Administrative Procedure Act B.E. 2539 (1996), the Permanent Secretary to the Ministry of Industry has authority as a "Grantor", as stipulated by Section 5 of the Factory Act B.E. 2535 (1992), to establish criteria for licensing a manufacturing project situated in the aforementioned provinces.

1) A factory that is newly established or expands its size and generates wastewater needs to install an efficient wastewater treatment, recycle and reuse system. Likewise, on-site facility treated wastewater should not seep into underground water sources or should not

be discharged either indirectly (into canals or watercourses) or directly into the Chao Phraya River.

2) A factory that does not comply with Article 1 will have its permit revoked.

3) The Grantor who is appointed by the Permanent Secretary to the Ministry of Industry should apply Article 1 as the principal guideline for issuing a factory permit.

Furthermore, manufacturing projects seeking promotional investment privileges either in Bangkok or in Samut Prakan must obtain a factory operation permit (Ror Ngor 4 Form - http://www.boi.go.th/english/download/law_regulations/287/No_Por_4_2544.pdf) before the BoI issues the appropriate certificate.

E. Regulation of Emissions (NO_x, SO_x, and VOCs) for Projects Located in Rayong

1) The following areas in Rayong Province are required to have special environmental controls:

- Map Ta Phut, Huai Pong, Neon Phra, and Thap Ma (sub-district) in Muang Rayong district
- Map Kha sub-district in Nikhom Phatthana district
- Ban Chang sub-district in Ban Chang district
- And coastal areas and industrial estates of IRPC Public Company Limited

Any projects not located in the above-mentioned areas do not need to comply with the requirements listed below:

2) Conditions for considering investment promotion:

2.1 Projects with non-emission of NO_x, SO_x and VOCs to be considered as general promotion

2.2 Projects with probable emission of NO_x and SO_x to be considered if the project complies with the conditions. All projects need to have a management plan to reduce adverse environmental impact in accordance with the Government's measures regarding the emission reduction of NO_x and SO_x

2.3 Projects with probable emission of three types of VOCs must comply with the following conditions:

- Operations must not release any additional emission above the existing overall emission
- Projects to use advanced technology (Best Available Technology/Best Practices) for mitigating environmental impact

2.4 Projects with probable emission of NO_x, SO_x, and three types of VOCs must have ESA / EIA / EHIA reports approved prior to the issuance of promotion certificates.

III. *Auxiliary Environmental Laws and Regulations*

Thailand has enacted laws and announced numerous environmental regulations, many of which contain permit requirements, or are relevant to business operations. These include, among others:

- The National Environmental Quality Act (NEQA) of B.E. 2535 (1992) deals with wide-ranging issues related to the enhancement and conservation of Thailand's environment;

- ONEP's "Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality, 1997-2016" that involves a series of governmental guidelines stemming from the NEQA and deals specifically with water pollution, air pollution, noise and vibration pollution, pollution from solid waste and night soil, pollution from hazardous materials, and pollution from hazardous waste;

- Soil Quality Standards (2004);

- Air Quality and Noise Standards (2007);

- Water Quality Standards (2009);

- The Factory Act of B.E. 2535 (1992) delineates the rules for operating factories in Thailand and the regulations relative to the location of factories, the type and quality of machinery that is to be used, and the standards for measuring emissions that have a potential impact on the surrounding environment;

- Regulations issued by the Ministry of Industry state the permissible amounts of adulterated substances in factory air emissions and in the wastewater released by the factory;

- Announcements of the National Environment Board stipulate the zones that are specifically pollution control areas, including Pattaya and Phuket;

- Announcements of the former Ministry of Science, Technology and Environment list specific protected areas and measures to ensure protection of the environment, particularly in Pattaya, the Phi Phi Islands and Phuket;

- Sanitary regulations issued either by the Department of Industrial Works or the Pollution Control Department define the procedures for the disposal of refuse and garbage;

- Announcements of the National Environment Board Announcements specify the standard of quality for seawater, surface water and underground water; and

- Announcements of the Ministry of Natural Resources and Environment deal with standards for controlling wastewater drainage from development sites, from coastal fish hatcheries, and others.

The degree of government control required varies depending on the type of business. To ensure environmental safety, certain regulations are utilized on industrial sites likely to emit pollution. To find out which factory type requires licensing or notification read the Factory Act B.E. 2535 (1992) (see http://thailaws.com/law/t_laws/tlaw0100.pdf).

Business activities in Thailand must comply with environmental management criteria and conditions as set by the Thai government and its associated agencies. Strict compliance is enforced, particularly for companies operating in the following sectors: oil refinery, natural gas separation, power generation, chemicals and petrochemicals, minerals and base metals, etc. For more information on environmental regulations, please refer to the Pollution Control Department (www.pcd.go.th).

Other key legislation that deals with issues pertaining to the environment, pollution, and/or waste are as follows:

Navigation of Thai Waterways Act, B.E. 2546 (2003)
This Act appertains to control of internal water navigation, however, the 14th Amendment of this Act was introduced in B.E. 2535 (1992). Prohibits dumping of any refuse, including oil and chemicals, into rivers, canals, lakes or waterways that may pollute the environment or disrupt navigation in internationally recognized Thai waterways.

Fisheries Act, B.E. 2490 (1947) (amended in 1953 and 1985)
This Act appertains to fishing control and marine life conservation. Prohibits dumping or discharging of hazardous chemicals into water resources reserved for fishing.

National Executive Council Announcement No. 103, B.E. 2515 (1972)
This decree appertains to land allocation control. The Land Allocation Control Board has the power and authority to issue regulations involving land allocation. Under the amended directive involving land allocation (1992), drainage systems and wastewater treatment facilities have to be constructed by the applicant, on any plot that is to be developed for commercial use, for a land allocation license to be issued.

Building Control Act, B.E. 2522 (1979)
This Act appertains to building control. This Act authorizes the Minister of Interior and local officials to regulate building construction, alteration, removal, and usage. Under Ministerial Regulation No.3 (B.E. 2535), high rise buildings or spacious buildings must have both drainage and wastewater treatment systems.

Bangkok Metropolis Regulation on Drainage Control, B.E. 2534 (1991)
This decree appertains to effluence (solid and liquid) from buildings into drainage pipes and public waterworks. Buildings to be constructed must have both a drainage and wastewater treatment system in place.

Public Cleanliness and Orderliness Act, B.E. 2535 (1992)
This Act appertains to the control of public sanitation measures and garbage disposal throughout the country. It prohibits the dumping of refuse in public surface areas or waterways.

A. Water

Water contamination has taken a toll on all the species of the earth. Almost 60% of the planet's species live in bodies of water. It occurs due to several factors. Industrial waste dumped into rivers and oceans cause an imbalance in the water leading to its severe contamination and death of aquatic species. Also, spraying insecticides and pesticides on fields, crops, and plants pollutes the ground water system. Eutrophication is another big source; it occurs due to the washing of clothes or household utensils with heavy detergents in lakes, ponds or rivers. And lastly, water pollution not only harms aquatic life but it also contaminates the entire food chain thereby severely affecting human health.

Industrial Effluent Standards

Parameters	Standard Values	Method for Examination
1. pH value	5.5-9.0	pH Meter
2. Total Dissolved Solids (TDS)	Not more than 3,000 mg/l depending on receiving water or type of industry under consideration of PCC but not exceed 5,000 mg/l Not more than 5,000 mg/l exceed TDS of receiving water having salinity of more than 2,000 mg/l or TDS of sea if discharge to sea	Dry Evaporation 103-105 °C, 1 hour
3. Suspended solids (SS)	Not more than 50 mg/l depending on receiving water or type of industry or wastewater treatment system under consideration of PCC but not exceed 150 mg/l	Glass Fiber Filter Disc
4. Temperature	Not more than 40°C	Thermometer during the sampling
5. Color and Odor	Not objectionable	Not specified
6. Sulphide as H_2S	Not more than 1.0 mg/l	Titrate
7. Cyanide as HCN	Not more than 0.2 mg/l	Distillation and Pyridine Barbituric Acid Method
8. Fat, Oil & Grease (FOG)	Not more than 5.0 mg/l depending of receiving water or type of industry under consideration of PCC but not exceed 15.0 mg/l	Solvent Extraction by Weight
9. Formaldehyde	Not more than 1.0 mg/l	Spectrophotometry
10. Phenols	Not more than 1.0 mg/l	Distillation and 4-Aminoantipyrine Method
11. Free Chlorine	Not more than 1.0 mg/l	Iodometric Method
12. Pesticides	Not detectable	Gas-Chromatography
13. Biochemical Oxygen Demand (BOD)	Not more than 20 mg/l depending on receiving water or type of industry under consideration of PCC but not exceed 60 mg/l	-Azide Modification at 20 °C , 5 days
14. Total Kjedahl Nitrogen (TKN)	Not more than 100 mg/l depending on receiving water or type of industry under consideration of PCC but not exceed 200 mg/l	Kjeldahl
15. Chemical Oxygen Demand (COD)	Not more than 120 mg/l depending on receiving water of type of industry under consideration of PCC but not exceed 400 mg/l	Potassium Dichromate Digestion
16. Heavy metals		

1. Zinc (Zn)	Not more than 5.0 mg/l	Atomic Absorption Spectro- Photometry; Direct Aspiration or Plasma Emission Spectroscopy ; Inductively Coupled Plasma : ICP
2. Chromium (Hexavalent)	Not more than 0.25 mg/l	
3. Chromium (Trivalent)	Not more than 0.75 mg/l	
4. Copper (Cu)	Not more than 2.0 mg/l	
5. Cadmium (Cd)	Not more than 0.03 mg/l	
6. Barium (Ba)	Not more than 1.0 mg/l	
7. Lead (Pb)	Not more than 0.2 mg/l	
8. Nickel (Ni)	Not more than 1.0 mg/l	
9. Manganese (Mn)	Not more than 5.0 mg/l	
10. Arsenic (As)	Not more than 0.25 mg/l	Atomic Absorption Spectrophotometry; Hydride Generation, or Plasma Emission Spectroscopy; Inductively Coupled Plasma : ICP
11. Selenium (Se)	Not more than 0.02 mg/l	
12. Mercury (Hg)	Not more than 0.005 mg/l	Atomic Absorption Cold Vapor Technique

Remarks:

1. PCC Pollution Control Committee
2. The standards were summarized from the Notification of the Ministry of Science, Technology and Environment, No. 3, B.E. 2539 (1996) and it specifies that pollution sources that the above standards are to be applied are factories group II and III issues under the Factory Act B.E. 2535 (1992) and every kind of industrial estates.
3. Notification of the Pollution Control Committee, No. 3, B.E. 2539 (1996) dated 20 August B.E. 2539 (1996) has issued types of factories (category of factories issued under the Factory Act B.E. 2535 (1992) that are allowed to discharge effluent having different standards from the Ministerial Notification No. 3 above as follows:

    1) BOD up to 60 mg/l
        - Animal furnishing factories (Category 4 (1))
        - Starch factories (Category 9 (2))
        - Food from starch factories (Category 10)
        - Textile factories (Category 15)
        - Tanning factories (Category 22)
        - Pulp and paper factories (Category 29)
        - Chemical factories (Category 42)
        - Pharmaceutical factories (Category 46)
        - Frozen food factories (Category 92)

    2) COD up to 400 mg/l
        - Food furnishing factories (Category 13 (2))
        - Animal food factories (Category 15 (1))
        - Textile factories (Category 22)

3) TKN

- 100 mg/l – effective after 1 year from the date publish in the Royal Government Gazette of the Ministerial Notification No. 4
- 200 mg/l – effective after 2 year from the date publish in the Royal Government Gazette of the Ministerial Notification No. 4 for the following factories:

    1. Food furnishing factories (Category 13 (2))
    2. Animal food factories (Category 15 (1))

Source: Notification the Ministry of Science, Technology and Environment, No. 3, B.E. 2539 (1996) issued under the Enhancement and Conservation of the National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette, Vol. 113 Part 13D, dated 13 February B.E. 2539 (1996)

B. Soil

Soil contamination is caused by the presence of human-made chemical agents or waste in the earth. Typically, soil pollution is the result of industrial activity, agricultural production, or the improper disposal of waste. The most common chemicals involved are petroleum hydrocarbons, solvents, pesticides, lead, and other heavy metals. Indeed, there is a correlation between soil contamination with the degree of industrialization and the intensity of chemical usage by the general population. Polluted soil does affect human health through direct contact with the soil or via inhalation of contaminants that have vaporized; potentially greater threats are posed by the infiltration of soil pollutants into underground water supplies.

Soil Quality Standards for Habitat and Agriculture

Parameter	Unit	Standard Value	Analytical Methods
1. Volatile Organic Compound			
1) Benzene	mg/kg	Not exceed 6.5	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or other methods approved by PCD
2) Carbon Tetrachloride	"	Not exceed 2.5	"
3) 1,2-Dichloroethane	"	Not exceed 3.5	"
4) 1,1-Dichloroethylene	"	Not exceed 0.5	"
5) cis-1,2-Dichloroethylene	"	Not exceed 43	"
6) trans-1,2-Dichloroethylene	"	Not exceed 63	"
7) Dichloromethane	"	Not exceed 89	"
8) Ethylbenzene	"	Not exceed 230	"
9) Styrene	"	Not exceed 1,700	"
10) Tetrachloroethylene	"	Not exceed 57	"
11) Toluene	"	Not exceed 520	"
12) Trichloroethylene	"	Not exceed 28	"
13) 1,1,1-Trichloroethane	"	Not exceed 630	"
14) 1,1,2-Trichloroethane	"	Not exceed 8.4	"
15) Total Xylenes	"	Not exceed 210	"
2. Heavy metals			
1) Arsenic	mg/kg	Not exceed 3.9	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Furnace Technique or Atomic Absorption, Gaseous Hydride or Atomic Absorption, Borohydride Reduction or other Methods Approved by Pollution Control Department
2) Cadmium and compounds	"	Not exceed 37	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Technique or other Methods Approved

			by Pollution Control Department
3) Hexavalent Chromium	"	Not exceed 300	Co-precipitation or Colorimetric or Chelation/Extraction or other Methods Approved by Pollution Control Department
4) Lead	"	Not exceed 400	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Technique or other Methods Approved by Pollution Control Department
5) Manganese and compounds	"	Not exceed 1,800	"
6) Mercury and compounds	"	Not exceed 23	Cold-Vapor Technique or other Methods Approved by Pollution Control Department
7) Nickel, soluble salts	"	Not exceed 1,600	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Technique or other Methods Approved by Pollution Control Department
8) Selenium	"	Not exceed 390	Inductively Coupled Plasma-Atomic Emission Spectrometry or Atomic Absorption, Furnace Technique or Atomic Absorption, Gaseous Hydride or Atomic Absorption, Borohydride Reduction or other Methods Approved by Pollution Control Department
3. Pesticides			
1) Atrazine	mg/kg	Not exceed 22	Gas Chromatography or other Methods Approved by Pollution Control Department
2) Chlordane	"	Not exceed16	Gas Chromatography/Mass Spectrometry (GC/MS) or other Methods Approved by Pollution Control Department
3) 2,4-D	"	Not exceed 690	Gas Chromatography or High Performance Liquid Chromatography/Thermal Extraction/Gas Chromatography/Mass Spectrometry (TE/GC/MS) or other Methods Approved by Pollution Control Department
4) DDT	"	Not exceed 17	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or other Methods Approved by Pollution Control Department
5) Dieldrin	"	Not exceed 0.3	"
6) Heptachlor	"	Not exceed 1.1	"
7) Heptachlor Epoxide	"	Not exceed 0.5	"
8) Lindane	"	Not exceed 4.4	"
9) Pentachlorophenol	"	Not exceed 30	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or Gas Chromatography/Fourier Transform Infrared (GC/FT-IR) Spectrometry or other Methods Approved by Pollution Control Department
4. Other Chemicals			
1)Benzo (a) pyrene	mg/Kg	Not exceed 0.6	Gas Chromatography/Mass Spectrometry (GC/MS), or Thermal Extraction/Gas Chromatography/Mass Spectrometry (TE/GC/MS), or Gas Chromatography/Fourier Transform Infrared (GC/FT-IR) Spectrometry, or other Methods Approved by Pollution Control Department
2) Cyanide and	"	Not exceed 11	Total and Amenable Cyanide: Distillation, or Total

compounds			Amenable Cyanide (Automated Colorimetric, with off-line Distillation), or Cyanide Extraction Procedure for Solids and Oils or other Methods Approved by Pollution Control Department
3) PCBs	"	Not exceed 2.2	Gas Chromatography or other methods approved by PCD
4) Vinyl Chloride	"	Not exceed 1.5	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or other methods approved by PCD

Remarks:

1. Test Methods of Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (United States Environmental Protection Agency)
2. Soil Sampling and Preservation Methods must be specified

Soil Quality Standards for Other Purposes

Parameter	Unit	Standard Value	Analytical Methods
1. Volatile Organic Compounds			
1) Benzene	mg/kg	Not exceed 15	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or other methods approved by PCD
2) Carbon Tetrachloride	"	Not exceed 5.3	"
3) 1,2-Dichloroethane	"	Not exceed 7.6	"
4) 1,1-Dichloroethylene	"	Not exceed 1.2	"
5) cis-1,2-Dichloroethylene	"	Not exceed 150	"
6) trans-1,2-Dichloroethylene	"	Not exceed 210	"
7) Dichloromethane	"	Not exceed 210	"
8) Ethylbenzene	"	Not exceed 230	"
9) Styrene	"	Not exceed 1,700	"
10) Tetrachloroethylene	"	Not exceed 190	"
11) Toluene	"	Not exceed 520	"
12) Trichloroethylene	"	Not exceed 61	"
13) 1,1,1-Trichloroethane	"	Not exceed 1,400	"
14) 1,1,2-Trichloroethane	"	Not exceed 19	"
15) Total Xylenes	"	Not exceed 210	"
2. Heavy metals			
1) Arsenic	mg/kg	Not exceed 27	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Furnace Technique or Atomic Absorption, Gaseous Hydride or Atomic Absorption, Borohydride Reduction or other methods approved by PCD
2) Cadmium and compounds	"	Not exceed 810	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Technique or other methods approved by PCD
3) Hexavalent Chromium	"	Not exceed 640	Co-precipitation or Colorimetric or Chelation/Extraction or other methods approved by PCD
4) Lead	"	Not exceed750	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Technique or other methods approved by PCD
5) Manganese and compounds	"	Not exceed 32,000	"
6) Mercury and compounds	"	Not exceed 610	Cold-Vapor Technique or other methods approved by PCD
7) Nickel, soluble salts	"	Not exceed 41,000	Inductively Coupled Plasma-Atomic Emission Spectrometry

			or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Technique or other methods approved by PCD
8) Selenium	"	Not exceed 10,000	Inductively Coupled Plasma-Atomic Emission Spectrometry or Atomic Absorption, Furnace Technique or Atomic Absorption, Gaseous Hydride or Atomic Absorption, Borohydride Reduction or other methods approved by PCD
3.Pesticides			
1) Atrazine	mg/kg	Not exceed 110	Gas Chromatography or other methods approved by PCD
2) Chlordane	"	Not exceed 110	Gas Chromatography/Mass Spectrometry (GC/MS) or other methods approved by PCD
3) 2,4-D	"	Not exceed 12,000	Gas Chromatography or High Performance Liquid Chromatography/Thermal Extraction/Gas Chromatography/Mass Spectrometry (TE/GC/MS) or other methods approved by PCD
4) DDT	"	Not exceed 120	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or other methods approved by PCD
5) Dieldrin	"	Not exceed 1.5	"
6) Heptachlor	"	Not exceed 5.5	"
7) Heptachlor Epoxide	"	Not exceed 2.7	"
8) Lindane	"	Not exceed 29	"
9) Pentachlorophenol	"	Not exceed 110	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or Gas Chromatography/Fourier Transform Infrared (GC/FT-IR) Spectrometry or other methods approved by PCD
4. Others			
1) Benzo (a) pyrene	mg/kg	Not exceed 2.9	Gas Chromatography/Mass Spectrometry (GC/MS) or Thermal Extraction/Gas Chromatography/Mass Spectrometry (TE/GC/MS) or Gas Chromatography/Fourier Transform Infrared (GC/FT-IR) Spectrometry or other methods approved by PCD
2) Cyanide and compounds	"	Not exceed 35	Total and Amenable Cyanide: Distillation or Total Amenable Cyanide (Automated Colorimetric, with off-line Distillation) or Cyanide Extraction Procedure for Solids and Oils or other methods approved by PCD
3) PCBs	"	Not exceed10	Gas Chromatography or other methods approved by PCD
4) Vinyl Chloride	"	Not exceed 8.3	Purge and Trap Gas Chromatography or Purge and Trap Gas Chromatography Mass Spectrometry or other methods approved by PCD

Remarks:

1. Test Methods of Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (United States Environmental Protection Agency)
2. Soil Sampling and Preservation Methods must be specified

Soil Sample Preservation Methods

Parameter	Container	Preservative	Holding Time
1. Volatile Organic Compounds	Glass	Fridge 4° ±2 °C	14 Days
2) Heavy metals (Except Hexavalent Chromium and Mercury and compounds)	Plastic/Glass	"	180 Days
3) Hexavalent Chromium	"	"	- 30 Days before sample preparation -4 Days after sample preparation
4) Mercury and compounds	"	"	28 Days
5) Pesticides	Glass	"	- 14 Days before sample preparation - 40 Days after sample preparation
6) Benzo (a) pyrene	"	"	- 14 Days before sample preparation - 40 Days after sample preparation
7) Cyanide and compounds	Plastic/Glass	"	14 Days before sample preparation
8) PCBs	Glass	"	- 14 Days before sample preparation - 40 Days after sample preparation
9) Vinyl Chloride	"	"	14 Days

Source: Notification of National Environmental Board No. 25, B.E. 2547 (2004) issued under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992) published in the Royal Government Gazette No. 121 Special Part 119D, dated 20 October B.E. 2547 (2004).

C. Air

Air contamination is the most prominent and dangerous form of pollution. It occurs due to many reasons. Excessive burning of fuel, which is a necessity in the daily lives of almost every single inhabitant on this planet for cooking, driving and other industrial activities; releases a huge amount of chemical substances in the environment everyday; making the air toxic to breathe. In fact, manufacturing plants release large amount of carbon monoxide, hydrocarbons, organic compounds, and chemicals into the air thereby depleting the quality of air. The release of sulphur dioxide and hazardous gases into the atmosphere causes damage to the planet's ecosystem as well as to the human body.

Ambient Air Standards			
Pollutants	average	Standard	Source
1. Carbonmonoxide (CO)	1 hr	Not exceed 30 ppm. (34.2 mg/m^3)	1
	8 hr	Not exceed 9 ppm. (10.26 mg/m^3)	
2. Nitrogen Dioxide (NO_2)	1 hr	Not exceed 0.17 ppm. (0.32 mg/m^3)	1,3,4
	1 year	Not exceed 0.03 ppm. (0.057 mg/m^3)	
3. Ozone (O_3)	1 hr	Not exceed 0.10 ppm. (0.20 mg/m^3)	1,3
	8 hr	Not exceed 0.07 ppm.(0.14 mg/m^3)	
4. Sulfur Dioxide (SO_2)	1 year	Not exceed 0.04 ppm. (0.10 mg/m^3)	1,2
	24 hr	Not exceed 0.12 ppm.(0.30 mg/m^3)	
	1 hr	Not exceed 0.3 ppm.(780 µg/m^3)	
5. Lead (Pb)	1 month	Not exceed 1.5 µg/m^3	1
6. TSP (Particulate Matter Ø < 100 µm)	24 hr	Not exceed 0.33 mg/m^3	1,2
	1 year	Not exceed 0.10 mg/m^3	
7. PM-10 (Particulate Matter Ø < 10 µm)	24 hr	Not exceed 0.12 mg/m^3	1,2
	1 year	Not exceed 0.05 mg/m^3	
8. PM-2.5 (Particulate Matter Ø < 2.5 µm)	24 hr	Not exceed 0.05 mg/m^3	5
	1 year	Not exceed 0.025 mg/m^3	

Remark : 1. Short term average standard (1, 8 and 24 hrs.) is to prevent acute effect on human health

2. Long term average standard (1 month and 1 year) is to prevent long term or chronic effect on human health.

Sources : 1. Notification of National Environmental Board No. 10, B.E 2538 (1995) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette No. 112 Part 52, dated 25 May B.E. 2538 (1995)

2. Notification of National Environmental Board No. 24, B.E. 2547 (2004) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette No. 121 Special Part 104 D, dated 22 September B.E. 2547 (2004)

3. Notification of National Environmental Board No. 28, B.E 2550 (2007) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette No. 124 Part 58, dated 14 May B.E. 2550 (2007)

4. Notification of National Environmental Board No. 33, B.E 2552 (2009) under the Enhancement

and Conservation of National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette No. 126 Part 114, dated 14 August B.E. 2552 (2009)

5. Notification of National Environmental Board No. 36, B.E 2553 (2010) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette No. 127 Part 37, dated 24 March B.E. 2553 (2010)

Sulfur Dioxide in Ambient Air Standards of Thailand		
Pollutant	Concentration/time/area	**Standard value**
Sulfur Dioxide (SO_2)	1 hr./area	Not exceed0.30 ppm (780 µg/m^3)

Source : 1. Notification of National Environmental Board No. 12 (1995) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992) published in the Royal Government Gazette No. 112 Special Part 27 D, dated 13 July B.E. 2538 (1995)

2. Notification of National Environmental Board No. 21 (2001) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992) published in the Royal Government Gazette No. 118 Special Part 39D, dated 30 April B.E. 2544 (2001)

Volatile Organic Compounds (VOCs) in Ambient Air Standards of Thailand	
Pollutants	Standard
1. Benzene	Not exceed 1.7 µg/m^3
2. Vinyl Chloride	Not exceed 10 µg/m^3
3. 1,2 - Dichloroethane	Not exceed 0.4 µg/m^3
4. Trichloroethylene	Not exceed 23 µg/m^3
5. Dichloromethane	Not exceed 22 µg/m^3
6. 1,2 - Dichloropropane	Not exceed 4 µg/m^3
7. Tetrachloroethylene	Not exceed 200 µg/m^3
8. Chloroform	Not exceed 0.43 µg/m^3
9. 1,3 - Butadiene	Not exceed 0.33 µg/m^3

Remark : 1. One year Volatile Organic Compounds (VOCs) in Ambient Air is determined from the Arithemetic Mean of VOCs analysis from continuously 24 hour ambient air sampling (at least once a month)

2. In case of the collected ambient air sample(s) was unable to be analyzed, the new sampling and analysis must be done within 30 days from the previous sampling date.

3. Reference Condition is 25 degree Celsius at 1 atm or 760 mmHg

Source : Notification of National Environmental Board No. 30, B.E 2550 (2007) under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), published in the Royal Government Gazette No. 124 Part 143, dated 14 September B.E. 2550 (2007)

D. Odors

Air quality is affected not only by conventional air pollutants but also by unpleasant odors. Usually, bad odors are considered a nuisance, but in cases that are more serious it may lead to feelings of nausea, the onset of chronic headaches, or to other symptoms that can impair normal bodily functions. With the pressures of population growth, industrialization and urbanization, the existence of foul odors in both public and private living spaces has been assuming greater importance for government authorities to take corrective measures. Indeed, the presence of unhealthy odors contributes to air quality concerns and affects daily human activity.

According to a ministerial regulation issued by the Ministry of Industry in 2005, "odor" is defined as air contaminants that can be detected by the human nose or analytical equipment. Meanwhile, "odor sample" means an air sample that is odorous at the source.

"Odor concentration" refers to the value indicating the dilution ratio of odorous air samples with fresh air.

"Industrial Zone" means the area where the land use is defined as industrial land under the town and country planning law; or an industrial estate under the Industrial Estate Authority of Thailand regulation; or an industrial land under the Factory Act.

"Off the industrial zone" refers to areas other than the industrial zone.

No factories shall discharge smelling air from the factories, unless a particular act or several acts have been committed. The method of diluting must not be used. The extent of discharged air does not have a concentration exceeding the prescribed value as follows:

Factory Location	Odor Concentration in Fence Area or within the Premises	Odor Concentration at Factory Air Vent
Industrial Zone	30	1,000
Off the Industrial Zone	15	300

For the odor concentration measurement, the American Society for Testing and Materials (ASTM) or the Japanese Industrial Standard (JIS) has prescribed or other processes prescribed by the Minister publishing in the government gazette.

An odor sample shall be measured at the downwind distance of 1 meter away from the factory fence or premises. Odor concentration at the stack shall follow the ASTM or JIS methods.

When receiving a complaint impacted by or having doubts whether the air odor discharged from the factories is exceeding the standard, the Department of Industrial Works shall carry out the odor concentration testing.

E. Noise

Like most fast-developing Southeast Asian countries, there is plenty of noise contamination in several of Thailand's urban centers due to traffic and construction. Past certain baseline decibel-levels, many kinds of noise tend to cause adverse health effects amongst the general population. These impairments include hearing loss and a range of stress-related ailments, such as sleep deprivation, aggressiveness, diminished cognitive performance, heart problems, etc. For these reasons, ambient noise is a significant public health risk that can affect a population's productivity and quality of life. In fact, the Pollution Control Department establishes general noise guidelines of less than 55 decibels as "good," 55-70 decibels as "moderate," and above 70 decibels as "unhealthful".

Ambient Noise Standards

Standard	Calculation
1. Maximum Sound Level (L_{max}) should not exceed 115 dB(A)	Equivalent Sound Level (L_{eq}) from Fluctuating Noise
2. A-weighted Equivalent Continuous Sound Level (L_{eq}) 24 hours should not exceed 70 dB(A)	Equivalent Sound Level (L_{eq}) from Steady Noise

Source: Notification of Environmental Board No. 15 B.E. 2540(1997) under the Conservation and Enhancement of National Environmental Quality Act B.E. 2535 (1992) dated 12 March B.E. 2540 (1997) and Notification of Pollution Control Department; Subject: Calculation of Noise Level, dated 11 August B.E. 2540 (1997).

Noise and Vibration Standard

1) Community Noise Standard

(1) Maximum Lmax is less than 115 dB(A) for Steady Noise by Calculation Method
(2) Leq 24 hr is less than 70 dB(A) for Fluctuation Noise by Calculation Method

Source: Notification of the National Environment Board, No.15, B.E. 2540 (1997), dated 12 March B.E. 2540 (1997), which was published in the Royal Government Gazette, Vol.114, Part 27D, dated 3 April B.E. 2540 (1997).

2) Annoyance Noise Standard

(1) The sound pressure level of annoyed sound is set at 10 dB(A).
(2) The sound is indicated to be annoyance provided that the calculated annoyance level is higher than 10 dB(A).

Sources: 1. Notification of the National Environment Board, No.29, B.E. 2550 (2007), dated 29 June B.E. 2550 (2007), which was published in the Royal Government Gazette, Vol.124, Part 98D, dated August B.E. 2550 (2007).

2. Notification of the Pollution Control Committee, dated 31 August B.E. 2550 (2007), which was published in the Royal Government Gazette Vol.124, Special Part 145D, dated 28 September B.E. 2550 (2007).

3) Noise from Mining and Quarry

(1) Maximum sound pressure level shall not exceed 115 dB(A).
(2) Weighted Equivalent Continuous Sound Level (Leq) for 8 hours shall not exceed 75 dB(A).
(3) Weighted Equivalent Continuous Sound Level (Leq) for 24 hours shall not exceed 70 dB(A).

Source: Notification of the Ministry of Natural Resources and Environment, B.E. 2548 (2005) dated 7 November B.E. 2548 (2005), which was published in the Royal Government Gazette, Vol. 122, Part 125D, dated 29 December B.E. 2548 (2005).

4) Noise from Plant Operation

(1) Annoyance sound level generated from plant operation shall not exceed 10 dB(A).
(2) Leq 24 hr (24 hour A-weighted Equivalent continuous Sound Level) generated from plant operation shall not exceed 70 dB(A).
(3) Maximum sound pressure level (L_{max}) generated from plant operation shall not exceed 115 dB(A).
(4) Measurement methods of annoyance noise level, 24 hours A-weighted equivalent continuous sound level (Leq 24 hr), and Maximum sound level (L_{max}) generated from plant operation are specified by the Department of Industrial Works

Remarks:

(1) "Annoyance Noise" means noise levels being measured outside the plant are generated from the operation of the plant with interference. The noise level is higher than the background noise level, and exceeds the value specified in this notification.

(2) "Background Noise Level" means sound level measured in the existing environment without interference from plant operation. It is 90 Percentile Level (L90).

(3) "90 Percentile Level (L90)" means the sound level which is exceeded for 90% of measurement time.

(4) "Specific Noise Level" means the sound level being measured or calculated from the operation of the plant during interference.

(5) "Level of interference" means the difference of specific noise level with background noise level.

(6) "24-hour average sound level" means the consistent sound level outside the plant with energy equivalent to the actual sound level, which is varied as time during 24 hours (24 hour A-

weighted Equivalent Continuous Sound Level). It is abbreviated as Leq 24 hr with the unit of decibels A or dB(A).

(7) "Maximum sound level" means the maximum noise level outside the plant, which occurs at any time during the measurement. It is measured as dB(A).

(8) "Sound level meter" means a sound level meter conforming with IEC 60804 or IEC 61672 standard of International Electro-technical Commission (IEC).

Sources: 1. Notification of the Ministry of Industry, B.E. 2548 (2005), dated 27 December B.E. 2548 (2005), which was published in the Royal Government Gazette, Vol.123, Part 11D, dated 25 January B.E. 2549 (2005).

2. Notification of the Department of Industrial Works, B.E. 2553 (2010), dated 20 December B.E. 2553 (2010), which was published in the Royal Government Gazette, Vol.128, Special Part 1D, dated 7 January B.E. 2554 (2011).

5) Vibration from Mining and Quarry Plants

Frequency (Hertz)	**Velocity (mm/s)**	**Displacement (mm)**
1	<4.7	0.75
2	<9.4	0.75
3	<12.7	0.67
4	<12.7	0.51
5	<12.7	0.40
6	<12.7	0.34
7	<12.7	0.29
8	<12.7	0.25
9	<12.7	0.23
10	<12.7	0.20
11	<13.8	0.20
12	<15.1	0.20
13	<16.3	0.20
14	<17.6	0.20
15	<18.8	0.20
16	<20.1	0.20
17	<21.4	0.20
18	<22.6	0.20
19	<23.9	0.20
20	<25.1	0.20

Frequency (Hertz)	**Velocity (mm/s)**	**Displacement (mm)**
21	<26.4	0.20
22	<27.6	0.20
23	<28.9	0.20
24	<30.2	0.20
25	<31.4	0.20
26	<32.7	0.20
27	<33.9	0.20
28	<35.2	0.20
29	<36.4	0.20
30	<37.7	0.20
31	<39.0	0.20
32	<40.2	0.20
33	<41.5	0.20
34	<42.7	0.20
35	<44.0	0.20
36	<45.2	0.20
37	<46.5	0.20
38	<47.8	0.20
39	<49.0	0.20
40 and up	<50.8	0.20

Source: Notification of the Ministry of Natural Resources and Environment, B.E. 2548 (2005), dated 7 November B.E. 2548 (2005), which was published in the Royal Government Gazette, Vol. 122, Part 125D, dated 29 December B.E. 2548 (2005).

6) Vibration Standards for Protect Impact on Building

Building Type	**Area**	**Frequency (Hertz)**	**Velocity (mm/s)**	
			Vibration Case 1	**Vibration Case 2**
1	1.1 Foundation or ground floor of building	$f \leq 10$	20	-
		$10 < f \leq 50$	$0.5f + 15$	
		$50 < f \leq 100$	$0.2f + 30$	
		$f > 100$	50	
	1.2 Top floor of building	Every	40*	10*
	1.3 Each building floor	Every	20**	10**
2	2.1 Foundation or ground floor of building	$f \leq 10$	5	-
		$10 < f \leq 50$	$0.25f + 2.5$	
		$50 < f \leq 100$	$0.1f + 10$	
		$f > 100$	20	
	2.2 Top floor of building	Every	15*	5*
	2.3 Each building floor	Every	20**	10**
3	3.1 Foundation or ground floor of building	$f \leq 10$	3	-
		$10 < f \leq 50$	$0.125f + 1.75$	
		$50 < f \leq 100$	$0.04f + 6$	
		$f > 100$	10	
	3.2 Top floor of building	Every	8*	2.5*
	3.3 Each building floor	Every	20**	10**

Remarks:

1. f = Frequency of vibration at the time of peak particle velocity is expressed as hertz.

2. * = Standards specified for peak particle velocity on the horizontal axis.

3. ** = Standards specified for peak particle velocity on the vertical axis.

4. Measurement of the maximum vibration of the second case according to Articles 1.2, 2.2 and 3.2 shall be conducted at the top floor of the building or another floor experiencing the maximum vibration.

5. Measurement of vibration in each building according to Articles 1.3, 2.3 and 3.3 shall be conducted at each building floor, except the foundation or the ground floor of the building.

6. "Building Type 1" means

   6.1 Building as factory by factory Regulation.

   6.2 Commercial building, Office building, Warehouse building, Special building and large building by Building Control Law.

6.3 Other buildings for the same use as those under 6.1 and 6.2.

7. "Building Type 2" means

7.1 Residential building, Apartment, Row house, Commercial building, Townhouse, Twin house by Building Control Law.

7.2 Condominiums by Condominiums Regulation.

7.3 Dormitory by dormitory Law.

7.4 Building used as a hospital by the law on hospital and buildings used as governmental hospitals.

7.5 Buildings used as academic places by the law on Private school, Buildings used as governmental schools, Buildings used as private university by the law on private universities and buildings used as governmental universities.

7.6 Building used for religious activities.

7.7 Other buildings for the same uses as those under 7.1, 7.2, 7.3, 7.4, 7.5 and 7.6.

8. "Building Type 3" means

8.1 Historic site by the Regulation on Historic Site, Antiquities, Artifact and National Museum.

8.2 Buildings or any construction work which are not so strong but have cultural value.

9. "Vibration Case 1" means the vibration not causing fatigue or resonance of the building.

10. "Vibration Case 2" means the vibration causing fatigue and resonance of the building.

Source: Notification of the National Environment Board, No.37, B.E. 2553 (2010), dated 26 April B.E. 2553 (2010), which was published in the Royal Government Gazette Vol.127 Special Part 69D, dated 2 June B.E. 2553 (2010).

F. Waste & Hazardous Waste

As defined by the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), waste refers to "refuse, garbage, filth, dirt, wastewater, polluted air, polluting substances or any other hazardous substances which are discharged or originated from point sources of pollution, including residues, sediments or remainders of such matters, either in the state of solid, liquid or gas".

There are several classifications of waste, such as municipal solid waste, industrial waste, e-waste, healthcare waste, and organic waste.

As an example, **municipal solid wa ste (MSW)** refers to the stream of garbage collected through community sanitation services. It includes wastes such as durable goods (e.g. tires, furniture), nondurable goods (e.g. newspapers, plastic plates/cups), containers and packaging (e.g. milk cartons, plastic wrap), and other wastes (e.g. yard trimmings, food). This category of waste generally refers to common household waste, as well as office and retail wastes, but excludes industrial, hazardous, and construction wastes.

Meanwhile, **industrial waste** means solid waste generated by manufacturing or industrial processes that is not considered to be hazardous waste under existing regulations. Such waste may include, but is not limited to, electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and transportation equipment; and water treatment.

Regarding the category of **hazardous waste**, it is waste that is recognized as being dangerous or potentially harmful to human health or the environment. Such waste can be classified as liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.

According to the Notification of the Ministry of Industry B.E. 2548 (2005) issued pursuant to the Factory Act B.E. 2535 (1992) on the Disposal of Wastes or Unusable Materials, factory operators having hazardous wastes which have such characteristics and properties as defined in the Notification must carry out the disposal of the wastes or unusable materials as follows:

- Wastes and unusable materials shall not be stored in the factory longer than 90 days without prior approval by the Department of Industrial Works (DIW). The storage of wastes and unusable materials in the factory shall comply with the provisions in the Notification of the Ministry of Industry B.E. 2547 (2004) on Manifest System.

- Wastes and unusable materials shall not be taken out of the factory except with prior approval from the Director-General of DIW or the person assigned by the Director-General to take them out to disposal or recovery by method and at the place according to the criterion and the method defined in Annex 4 of the Notification and only by the permitted waste collector, transporter, and processor. If the treatment and disposal of wastes and unusable materials within the factory shall comply with the provisions provided in Section 4, Article 17 and Articles 21 to 24 of the Notification; and

- Details on type, quantity, characteristics, properties and storing place of such hazardous wastes or unusable materials concerned as well as method of storage, detoxification, disposal, discarding, landfilling and transport according to "Form Sor Kor 3", attached to the notification must be yearly notified to the Department of Industrial Works by the third of March of the next calendar year.

Additionally, the separation, collection, transportation, treatment and disposal of infectious wastes generated from hospitals, clinics and health care service centers have been complied with the Regulation of the Ministry of Health on the Disposal of Infectious Waste B.E. 2545 (2002).

Legal Obligations on Hazardous Waste Handling

Waste Type	Key Legislation	Relevance	Authorities
Industrial Waste (Hazardous & Non-Hazardous Waste)	**Major Laws:** Factory Act (1992) Industrial Estate Authority Act (1992) Hazardous Substances Act (1992)	Empower both the Ministry of Industry and the Industrial Estate Authority of Thailand to set up and enforce criteria and standards for the control and management of hazardous waste	Ministry of Industry & Industrial Estate Authority of Thailand
	Relevant Laws: Enhancement and Conservation of National Environmental Quality Act (1992)	Establish the EIA system to be applied on high pollution industries and central treatment facilities as well as empower the Ministry of Natural Resources and Environment and the National Environment Board to set up ambient and emission standards	Ministry of Natural Resources and Environment
Infectious Waste (Generated from Hospitals and Clinics)	**Major Laws:** Public Health Act (1992) Determining Plans and Process of Decentralization Act (1999)	Specify the responsibilities of the Local Administrative Organizations to provide proper waste management services, including infectious waste and household hazardous waste	Ministry of Public Health & Local Administrative Organizations
	Relevant Laws: Enhancement and Conservation of National Environmental Quality Act (1992)	Establish emissions standards for infectious waste incinerators as a pollution point source	Ministry of Natural Resources and Environment
Radioactive Waste	**Major Laws:** Atomic Energy for Peace	Empower the Office of	Ministry of Science and

	Act (1961); Amended in 2008	Atoms for Peace and the National Committee on Atomic Energy for Peace to set up and enforce the criteria and standards for controlling nuclear and radioactive material as well as radioactive waste	Technology (Office of Atoms for Peace)
Laboratory Waste	**Major Laws:** Factory Act (1992)	Empower both the Ministry of Industry and the Industrial Estate Authority of Thailand to establish and enforce the criteria and standards for overseeing hazardous waste management Also, to set up a certification system for chemical laboratories that includes lab waste management	Ministry of Industry (Department of Industrial Works) & Industrial Estate Authority of Thailand
Hazardous Municipal Waste (From community including e-waste)	**Major Laws:** Public Health Act (1992) Determining Plans and Process of Decentralization Act (1999) for household hazardous waste, but no specific law for e-waste **Relevant Laws:** Hazardous Substances Act (1992)	Specify the responsibilities of the Local Administrative Organizations to provide proper waste management services, including infectious waste and household hazardous waste Establish criteria for controlling the import of used e-products and e-waste	Ministry of Public Health & Local Administrative Organizations Ministry of Natural Resources and Environment & Ministry of Industry

G. Indicators of Pollution

The National Environment Board, which operates with the Prime Minister as chair, is the government entity that considers whether a given site in Thailand should be characterized as a "Pollution Control Area". Presently, nine locations fall under the aforementioned designation. To be specific, they are Pattaya, Phuket, Hat Yai, Songkhla, Koh Phi Phi/Ao Nang/Mueang Krabi, Samut Prakan, BMA vicinity (Pathum Thani, Nonthaburi, Samut Sakhon, and Nakhon Pathom), Phetchaburi/Phrachuap Khiri Khan, and Na Phralan Chaloem Phra Kiat (in Saraburi).

Key pollution markers to be utilized when determining a pollution control area should be detectable or measurable with their quantifiable results able to identify the locale's pollution level. Those indicators include surface water, air pollution, noise, solid waste, hazardous

waste and contamination in the soil and groundwater. All of the aforementioned markers should be evaluated and scored according to the level of the problem.

Number	Indicators of Pollution	Consideration	Level of Pollution Problem/Scoring			
			Severe	Showing trend to be severe	moderate	trivial
1	Surface water	**A. Surface water** 1. Parameters - pH - Dissolved Oxygen (DO) - BOD - NH_3 - N - Fecal coli form bacterial - Zinc (Zn) - Copper (Cu) - Mercury (Hg) - Lead (Pb) 2. Objectives/Condition and Beneficial usage **B. Coastal water** 1. Parameters - pH - Dissolved Oxygen (DO) - BOD - NH_3 - N - Fecal coli form bacterial - Zinc (Zn) - Copper (Cu) - Mercury (Hg) - Lead (Pb) 2. Objectives/Condition and Beneficial usage	8	6	4	2
2	Air pollution	1. Concentration of Air Pollutants in Ambient Air Quality 2. Air pollution Caused by Vehicles 3. Number of Air polluting Factories 4. Generation Rates	8	6	4	2

3	Noise	1. Noise Level 2. Number of Registered Automotive Vehicles 3. Traffic Volume 4. Industrial Noise Source	4	3	2	1
4	Solid waste	1. Quantity of Solid waste 2. Collection Efficiency 3. Disposal Method	4	3	2	1
5	Hazardous waste	1. Total number of hazardous waste generating factories 2. Percentage of number of factories that have correct handling method for hazardous waste compared to total number of factories in the concerned locality 3. Percentage of hospitals that have correct handling method for infectious waste compared to total number of hospitals in the concerned locality	8	6	4	2
6	Soil and groundwater contamination criteria	Levels of concern for various pollutants in soils and groundwater.	8	6	4	2
Range of sore			>34	25-<34	16 -<25	<16

For any place in Thailand where all six indicators are present and a total score equals to or results in more than 25 points, that locality is to be recognized as a pollution control area. However, in those localities where groundwater is not utilized, groundwater quality should not be taken into consideration. In such cases, the 8 points indicator score should concern only soil contamination and the weight score of 2 points should be maintained with the same distribution of total scores. Additionally, surface water in some locations may be related to both coastal water and river water. In these cases, a water quality survey should be conducted for both sources and a weight score equally divided into 4 points for surface water that is affiliated with coastal and river waters.

H. Regulations of Industrial Pollution Control Facilities

In reference to Section 70 of the National Environmental Quality Act (1992), “The owner or possessor of the point source of pollution under Section 69 has the duty to construct, install or bring into operation an on-site facility for wastewater treatment or waste disposal as determined by the pollution control official. For this purpose, the pollution control official may also require that such owner or possessor commission a Monitoring Control Operator to control the wastewater treatment or waste disposal facility that shall be constructed, installed or brought into operation accordingly”.

An air or water pollution control facility covers any system, treatment works, or appliance used or placed in operation primarily for the purpose of reducing, controlling, or eliminating

both air or water pollution caused by either industrial or agricultural waste. Technology can prevent or limit the escape of pollution from industrial and commercial facilities. Regulatory agencies, like the Department of Industrial Works, have the authority to require facilities to install pollution control technologies or to change operating practices that contaminate the environment. Moreover, municipalities are encouraged to set up their own waste management action plans in line with the National Environmental Quality Act (1992) and the Decentralization Act (1999). Areas declared as environmental conservation or pollution control zones are managed rigorously.

Regulations of Industrial Pollution Control Facilities

1. The following industrial plants must have supervisors and machine operators take responsibility for the system of prevention of pollution. Qualifications for these individuals are specified in section 2 below.
    1. An industrial plant discharging waste water at a rate of more than 60 cubic meters/hour (with the exception of cooling water) or having a BOD load of influent higher than 100 kilograms/day.
    2. An industrial plant using heavy metals in its production process discharging wastewater at higher than 50 cubic meters/day and having a heavy metal content in the discharged waste water at the following values:
        - Zinc higher than 250,000 milligrams/day
        - Chromium higher than 25,000 milligrams/day
        - Arsenic higher than 12,500 milligrams/day
        - Copper higher than 50,000 milligrams/day
        - Mercury higher than 250 milligrams/day
        - Cadmium higher than 1,500 milligrams/day
        - Barium higher than 50,000 milligrams/day
        - Selenium higher than 1,000 milligrams/day
        - Lead higher than 10,000 milligrams/day
        - Manganese higher than 250,000 milligrams/day
    3. An industrial plant dealing with iron and steel:
        - Using dry furnaces or acids or other substances which may be polluting the environment in the production process with capacity of more than 100 tons/day.
        - Using steel smelters with the total capacity of 5 tons/batch.
    4. An industrial plant producing 100 tons/day petrochemicals from the raw materials obtained as by-products of the oil refinery in the production process.
    5. An industrial plant of any size separating or producing natural gas.
    6. An industrial plant producing chloralkali, using sodium chloride (NaCl) as a raw material in the production of soda ash (Na2CO3), caustic soda (NaOH), hydrochloric acid (HCl), chlorine (Cl2),and bleach (NaOCl) with separate or combined production more than 100 tons/day.
    7. An industrial plant of any size producing cement.
    8. An industrial plant engaged in ore smelting or production of metals with production of more than 50 tons/day.
    9. An industrial plant producing paper pulp with production more than 50 tons/day.
    10. An industrial plant of any size engaged in crude oil refining.

2. The supervisor and machine operators responsible for pollution control system shall meet the following qualifications:
    1. The supervisors must be holders of a bachelor degree in engineering or chemistry or other branches of study with experience in the the field of environment, and who has been approved by the Department of Industrial Works. In the case of an Engineering Consulting Firm, it must be operated by person(s) having the above qualifications.
    2. Machine operators must have a secondary education but can be lower than those in (a) above.
    3. The persons stated in (a) & (b) above must register themselves with the Department of Industrial Works and comply with all regulations and procedures of the Department of Industrial Works.

3. Factories mentioned in articles 1.1 to 1.10 above must arrange to create and submit every three months Poisonous Matter Analysis Reports to the Department of Industrial Works according to its standards. Analysis must be carried out by a government laboratory or in a private laboratory approved by the Department of Industrial Works.

Source : Notification of the Ministry of Industry, No. 13 B.E. 2525 (1982), as amended in No. 22 B.E. 2528 (1985), issued under the Factory Act B.E. 2512 (1969), published in the Royal Gazette, Vol. 99, Part 89, dated 29 June B.E. 2525 (1982).

IV. *Responsible Government Agencies*

A. Ministry of Natural Resources and Environment

Address: 92 Soi Phoholyothin 7, Phoholyothin Road, Samsennai, Phayathai District, Bangkok 10400 THAILAND
Telephone: 66 (02) 278-8500
Fax: 66 (02) 298-5735
Website: http://webeng.mnre.go.th/

- *Office of Natural Resources and Environmental Policy and Planning*

  Address: 60/1 Soi Pibunwattana 7, Rama 6 Road, Samsennai, Phayathai District Bangkok 10400 THAILAND
  Telephone: 66 (02) 265-6500
  Fax : 66 (02) 265-6511
  Website: http://www.onep.go.th/ (In Thai)

* The Office of Natural Resources and Environmental Policy and Planning (ONEP) assesses EIA and E/HIA reports from both the government and the private sector.

- *Pollution Control Department*

  Address: 92 Soi Phahonyothin 7, Phahonyothin Road, Samsennai, Phayathai District, Bangkok 10400 THAILAND
  Telephone: 66 (02) 298-2000
  Fax: 66 (02) 298-2002
  Website: www.pcd.go.th

B. Ministry of Industry

Address: 75/1 Rama VI Road, Thung Phayathai, Ratchathewi District, Bangkok 10400 THAILAND
Telephone: 66 (02) 202-3000
Fax: 66 (02) 202-3048
Website: www.industry.go.th (In Thai)

- *Department of Industrial Works*

  Address: 75/6 Rama VI Road, Ratchathewi District, Bangkok 10400 THAILAND
  Telephone: 66 (02) 202-4000 thru 4014
  Fax: 66 (02) 354-3390
  Website: www.diw.go.th (In Thai)

* The Department of Industrial Works assesses the IEE (for projects/activities situated in Environmentally Protected Areas) and ESA reports from both the government and the private sector.

- *Industrial Estate Authority of Thailand*

  Address: 618 Nikhom Makkasan Road, Makkasan, Ratchathewi District, Bangkok 10400 THAILAND
  Telephone: 66 (02) 253-0561
  Fax: 66 (02) 252-4086
  Website: www.ieat.go.th

ANNEX I

Qualifications of EIA specialist, rules and procedures to obtain EIA consultant license and control of licensee

Section 1

Qualified parties are

1.1 University Academic Institute, or Research Institute who is Thai juristic person.

1.2 Juristic person registered under Thai Laws

1.2.1 As all Thai partnership company.

1.2.2 As limited partnership with non limited liability Thai partner and not less than 51% of equity are held by ordinary Thai citizen, with Thai nationality.

1.2.3 As limited company with more than half of Board of Director comprised of Thai citizen and more than 51% of registered capital are held by ordinary Thai citizen.

1.3 As juristic person with foreign registration but working together with qualified organization as per 1.1 and 1.2 in submitting the report.

1.4 As State enterprise, established by a specific Act, to own enterprise.

1.5 As Mining Federation to serve members of the Federation.

Applicant for license as per 1.1 and 1.2 must have head offices or offices in Thailand.

Applicant as 1.2 and 1.3 must be in the business of research and technical consultation.

Application must not be have their licenses revoked in the past 3 years. (as per Section 13 (3) (4) (5) (6) (7))

Section 2

Application for EIA expert license registration form must be submitted to the Secretary of NEB or to authorized person, mentioning name, age, address, education and experience concerning environment conservation of expert and technical officer as required by Section 4.

Section 3

The format of the EIA license will be according to the attached format.

The License will be valid for 5 years from the date issued.

Upon issuing EIA license NEB may attach special conditions or directions to limit the size and kind of projects in the license.

Section 4

Licensee must arrange for following person to prepare EIA report, during the life of the license.

4.1 One full time expert who will take full responsibility for the report and will have following qualification.

4.1.1 University graduated or equivalent in one of the following subject.

- Environmental Science, Sanitation or Ecology

- Environment Engineering or Sanitary Engineering

- Environmental Economics

4.1.2 With experience in promoting and conserving environmental quality according to the standard laid out by NEB.

4.1.3 Does not have record in falsifying report during the last 3 years, from the date the license of participating body was withdrawn.

4.2 Three full time technical officers who have following qualifications.

4.2.1 University graduate or equivalent in Sciences, Engineering or Social Science.

4.2.2 Do not have report in participation to falsify report during the last 3 years.

NEB can exempt individual qualification requirement of experts as per 4.1

Section 5

If the licensed person lacks qualification as per Section 1, the licensee must stop operation until the situation is rectified.

The licensee must notify the secretary of NEB or authorized person within 15 days of the lack of qualification and must rectify the situation within 90 days of the event.

On special occasions, NEB may allow the licensee to continue to operate while the situation is being rectified under specific, special conditions.

Section 6

If the licensee wish to change the expert or the technical officer, the licensee must notify the Secretary of NEB, specifying name, address, education and experience of new expert within 90 days of the change.

Section 7

The EIA report must have signature of responsible expert as per 4.1 and three technical officers (4.2) who participated in preparation of report, with name & license number of the licensee.

Section 8

If the license certificate is destroyed, lost or damaged, causing it to be illegible, the licensee must apply for a replacement certificate directly to the Secretary of NEB, within 30 days of the known date of event with evidence.

Section 9

The replacement license certificate must be marked as "Replacement" in red ink with the date of issuance and the signature of the approving person.

Section 10

The license certificate must be displayed in the open area, in the licensee's office.

Section 11

In case of public complaint to the Secretary of NEB or when the Secretary notes that:

11.1 The licensee perform bad and may cause damage to the Thai Government

11.2 The licensee allows participation of expert or technical officers who have their licenses revoked because of falsification of report.

11.3 The licensee lack of quality as per Section 1.

11.4 The licensee does not have qualified person as per Section 4.

11.5 The information on the license application were false.

11.6 The license was suspended as per Section 12 by reason of 12.1 or 12.2 repeatedly.

11.7 The report was falsified.

11.8 The licensee violates of does not comply with the conditions as stated in the license.

The Secretary of NEB will submit request to NEB to suspend or withdraw the license as per Section 12 & Section 13.

***Section* 12**

NEB has authority to suspend license when

12.1 The report was prepared badly and may cause damage to Thailand Government.

12.2 The licensee allows participation of expert or technical officers who have their licenses revoked because of report falsification.

12.3 The licensee violates of does not comply with the conditions as laid out in the license.

The license may be suspended for at least 6 month, but not more than 12 months as per violation 12.1, and at least 3 months but not more than 6 months as Per 12.2 & 12.3.

The licensee must stop working on the date of notification.

***Section* 13**

NEB can revoke the license when it is apparent that:

13.1 The licensee lack qualification as Section 1.

13.2 The licensee does not have expert or technical officers as per Section 4.

13.3 The information of the license certificate application was not true.

13.4 The licensee repeats the offense as per 12.1, 12.2, 12.3.

13.5 The licensee falsify report.

13.6 The licensee does not comply with laws & regulation.

13.7 The licensee violates or does not follow the conditions, laid out in the license, which specifically will lead to withdrawing of license.

The licensee must stop working firm the date notified.

***Section* 14**

Before suspending or revoking license, NEB must investigate and give the licensee have a chance to know the complaint to supply explanation and evidence against the complaint. NEB in the mention may order suspension of licensee operation until officially ordered to resume or to suspense operation.

If the license is revoked as per 13.5 the name of expert and technical officers must be mentioned in the official order.

***Section* 15**

License fee

15.1 EIA consultant license application form 40 baht.

15.2 EIA consultant license fee 4,000 baht/year.

Source: Appendix VI, Environmental Impact Assessment in Thailand, Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, 2012.

ANNEX II

Sor Por 1 Form

Report Describing Important Impact to Environment,

Mitigation and Monitoring Measure

Environmental elements and values	Important impact to environment	Mitigation measure	Monitoring and Inspection
Physical resources Biological resources Human use value Quality of life value			

Sor Por 2 Form

Environmental Impact Assessment Report

Name of the Project …….

Site of the Project ……....

Project's Proponent ……....

Address ……....

Power of attorney

( ) The project's proponent hereby appoints ……..……..

as an attorney to submit the EIA report as evidence shown in the attached power of attorney.

( ) The project's owner does not give power of attorney to any person.

Prepared by

……

(Name of the legal entity that prepares this report)

Sor Por 3 Form

Certified Letter

Date……..Month…….Year

This is to certified that …….is responsible for

preparing the environmental impact assessment report of the project ……

…… for …….

……. for the purpose of …….

…… according to the application number ……..

The experts and responsible person for preparing this EIA report are as follows:

Expert	Signature
……..	……
Responsible person	Signature
……..	……
……	……
……	……

……..

(…….)

(Position) ……..

(Company seal)

Sor Por 5 Form

List of the EIA Study Team

Name/Education	EIA Study Topic	Current Office & Address	Proportion of the responsible part to the whole EIA report (%)	Signature

EIA Report Submission Form

Reason of EIA report submission

( ) This project is required to conduct the EIA according to the Notification of Ministry of Natural Resources and Environment regarding Type and Size of Project or Activity Required to Submit Environmental Impact Assessment Report; And Criteria, Procedure, Regulation and Guideline to Prepare Environmental Impact Assessment Report. Type of the project is ……

( ) This project is required to conduct the EIA due to the cabinet resolution on …….. Dated …….(please attached related cabinet resolution and document)

( ) This project is required to conduct the EIA due to a requirement of Office of the Board of Investment

( ) Others (specified) ……...

EIA commissioning date ……

Permission of the project

( ) This EIA report is prepared to apply for permission from…… (please specify a competent office) according to the ……. Act,Article/category/section/no.……

( ) This EIA report is prepared to apply for approval from the cabinet

( ) This project is not required to apply for permission from the government office and not required to get approval from the cabinet.

( ) Others (specified) ……..

Status of the Project (you can select more than 1 choice)

( ) Pre-feasibility study

( ) On feasibility study

( ) Not construct yet

( ) Being constructed (attach with photo specifying date of taking)

( ) Test running

( ) Start operation

This status is reported on date ……

Sor Por 7 Form

Initial Environmental Examination Report

Name of the Project …….

Site of the Project ……....

Project's Proponent ……....

Address ……....

Power of attorney

( ) The project's proponent hereby appoints ……..……..

as an attorney to submit the IEE report as evidence shown in the attached power of attorney.

( ) The project's owner does not give power of attorney to any person.

Prepared by

……

(Name of the legal entity that prepares this report)

Sor Por 8 Form

Certified Letter

Date……..Month…….Year

This is to certified that ……..is responsible for

preparing the initial environmental examination report of the project ……

…… for …….

……. for the purpose of …….

…… according to the application number ……..

The experts and responsible person for preparing this EIA report are as follows:

Expert	Signature
……..	……
Responsible person	Signature
……..	…….
…….	…….
…….	…….

……..

(…….)

(Position) ……..

(Company seal)

Sor Por 9 Form

List of the IEE Study Team

Name/Education	IEE Study Topic	Current Office & Address	Proportion of the responsible part to the whole EIA report (%)	Signature

Source: Notification of the Ministry of Natural Resources and Environment – Subject: Type and size of project or activity required to submit environmental impact assessment report; And criteria, procedures, regulations and guidelines to prepare environmental impact assessment report (2012).

ANNEX III

For Official Use
Ref. Application No. ……..… / ……...
Submitted Date ……../……./…….

Preliminary Environmental Impact Evaluation Form

1. This project locates …….. km from community area (Please attach a map indicating the project location)……..…. km from natural water resource (Name .....)
2. Investment in environmental protection measure
   - ☐ Air pollution/dust treatment system ..…….. Thousand baht
   - ☐ Waste water treatment system …… Thousand baht
   - ☐ Solid waste treatment expenditure ……..…… Thousand baht /month
3. Air pollution composes of ……..…… originates from……..……. process at the rate of ……. M^3/day
   The treatment system such…… are planed to be installed in order to treat the effluent to meet the Ministry of Industry's standard
4. Wastewater (W/W) from production process has effluent flux of …….. m^3 / day (In the case that effluent flux is more than 500 m^3 / day, source of water is …….. and please attach an opinion from the provincial industrial office in charge of the project location or other relevant governmental agencies.)
   - 4.1 W/W per Unit Product: …… m^3 / unit ……
   - 4.2 W/W Characteristic:
     - ☐ BOD: ……..…… mg/l COD: ……..…… mg/l pH Value: ……..…..
     - ☐ Includes heavy metal such as .....……..... originates from .....……..... process at the rate of ……. M^3/day
     - ☐ Includes other type of pollutes such as .....……..... originates from.....…..... process at the rate of ……. M^3/day
   - 4.3 W/W will be treated to meet the standard by ☐ Ministry of Industry ☐ Ministry of Science before release to ○ River .....…… ○ Stream .....…… ○ Public water path ○ Other (Please specify) …… ……
     using .....……..……..…… type (such as activated sludge system) W/W treatment facility with a capacity of ..... M^3/day, which will be
     ○ newly constructed ○ co-use with the existing project
   - 4.4 In the case of co-use, the existing project has W/W at effluent rate of …… M^3/day with
     - ○ Same characteristics as in the applying project
     - ○ Different characteristics in term of .....
       (The existing system needs to be sufficient to treat W/W from both the existing and expansion projects.)

Please attach the following items
- Flow chart, lay out, block diagram of the treatment facility with a list of equipment
- Detail calculations, criteria for design of the treatment facility as a document signed by engineer, who designed the facility, allowing the usage on the applying project with a copy of the engineer's professional license
- W/W quality test report, and treated W/W effluent record in the most recent 3 months

5. Solid waste characteristic:

☐ Solid waste from W/W treatment facility approximately .....kg/day will be treated by .....method conducted by ....., the industrial waste treatment license holder approved by the Department of Industrial Work

☐ Solid waste from ..... process approximately .....kg/day will be treated by .... method conducted by ....., the industrial waste treatment license holder approved by the Department of Industrial Work

(For expansion projects, please attach solid waste treatment records in the most recent 3 months.)

6. Expansion project obtained approval from the Department of Industrial Work (Please attach the license with approval.)

I hereby declare that the information contained herein is true and accurate and the estimates provided are, in my opinion, the most reasonable possible.

(Signature).....

(.....)

Date.....

Note: In case that company/co-operative/foundation was established, signature (s) of authorized person(s) affixed with company's seal is required.