Annex I

Environmental and Social Management Plan (ESMP) for the project

Greening the Scrap Metal Value Chain through the Promotion of BAT/BEP to reduce U-POPs Releases from Recycling Facilities
1. Purpose of the ESMP

Generally, the amount of substances used in foundries is too small to cause hazardous incidents. Certain amount of risk exists from storage and handling of flammable liquids or solids in the facilities and the concrete level of risk should be established through an on-going assessment process.

The purpose of the ESMP is to ensure that social and environmental impacts, risks and liabilities identified are effectively managed during the construction, operation and closure of the proposed project. The ESMP specifies the mitigation, adaptation, prevention and management measures to which the Proponent is committed and shows how the Project will mobilize organizational capacity and resources to account for the factors evaluated to implement the compiled measures. The ESMP also shows how mitigation and management measures will be scheduled.

Many workers can be exposed to the effects of dangerous environmental factors at the work place during their working life. The incidence of accidents at work and occupational diseases generally is too high. So, preventive measures must be introduced or improved without delay to safeguard the safety and health of workers and ensure a higher degree of protection.

By appropriate steps it must be ensured that only workers who have received adequate instructions may have access to areas where there is serious and specific danger. Each worker shall receive adequate instruction specific to his job and training on safety and health on recruitment and whenever there is a change in job or equipment. The employer has to decide on protective measures and, if necessary, on the personal protective equipment to be used.

There are principles which should be invariably observed:

- The scope of the risk assessment is geared to the operational requirements and circumstances. All foreseeable working sequences have to be considered. These also include events and tasks which take place outside "normal" operating conditions, such as maintenance work, start-ups and shut-downs, procedures to be adopted in the case of operational disturbances, cleaning, or secondary activities such as waste disposal.
- A systematical picture of the hazards in the establishment should be made. All identified dangers and hazards are investigated. Hazards due to working processes, working sequences, working times, inadequate qualification and instruction on the part of workers should be assessed.
- As soon as a hazard is discovered, elimination or reduction should be conducted.
- A risk assessment is necessary for every activity performed or every workplace where there are identical establishments, identical working processes and identical workplaces, the assessment of one workplace or one activity is sufficient.
- If, in the case of non-stationary workplaces, specific hazards arise from the local conditions, a workplace-related risk assessment must be conducted.

Within the context of his responsibilities, the employer shall take the measures necessary for the safety and health protection of workers, including prevention of occupational risks and
provision of information and training, as well as provision of the necessary organization and means.

The key objectives of the ESMP are:

- To outline mitigation measures against the possible degradation of the areas;
- To identify roles and responsibilities and the cost involved;
- To enhance positive aspects brought by the project;
- To ensure that the programme will comply with relevant environmental legislation of Thailand and other requirements throughout its pre-construction, construction, operation and decommissioning phases;
- To propose mechanisms for monitoring compliance;
- To provide adequate channels of input for the different stakeholders throughout the project activity; and
- To establish proven mechanisms to correct/adjust the findings resulting from the monitoring activity and to include the input received throughout the project activity.

The ESMP is a live document for project activities that will be updated as and when required. The ESMP acts as a quick guide for Contractors and project implementers to enhance positive impacts and eliminate or minimize the occurrence of negative impacts through proposed mitigations measures.

2. Project Description

Metals recycling is generally considered a “green” industry since it allows saving of natural resources (energy and raw materials). However, if not properly conducted, metal recycling processes are important sources of environmental pollution. Secondary steel production, secondary aluminum production, and secondary copper and copper alloy production are recognized as important sources of U-POPs (Annex C, Part II and Part III of the Stockholm Convention; Section V and Section VI of the BAT/BEP Guidance/Guidelines; and UNEP Dioxin Toolkit). Furthermore, secondary ferrous and non-ferrous metal production are also significant sources of other pollutants, such as particulate matter, organic compounds such as VOCs and PAHs, heavy metals and mercury, impacting on the worker’s health and the global environment.

Secondary metal production in Thailand is based on domestic and imported scrap. Scraps are qualified according to different criteria (e.g. size, weight, chemical composition, degree of cleanliness). In Thailand, there is actually a network of collectors which collect scrap metal from manufacturers (i.e. off-cuts from the automotive industry) or from the municipal waste stream (end-of-life products, sometimes referred to as urban mines). Small collectors, which represent the majority of registered companies in this sector, are mainly specialized in the collection of old scrap (i.e. post-consumer scrap from end-of-life products or construction and demolition metal scrap consisting of the scrap generated during the construction, renovation, and demolition of buildings, roads, and bridges). The different kinds of scrap are often stored outside on unpaved and uncovered stockyards. Leachable compounds such as oil/emulsions or other residual materials can contaminate the soil and the groundwater through the runoff water.
Taking into account the magnitude of the U-POPs problem and given the absence of appropriate countermeasures, the releases to the environment of U-POPs and other pollutants of concerns from the secondary metallurgical industry is expected to increase substantially in the future. As a consequence of the expected increase of secondary metals production, the Government of Thailand places priority to the implementation of BAT/BEP measures to reduce U-POPs releases from the national metallurgical industry in order to reduce possible negative impacts of the sector.

The project is designed for Thailand to meet its obligations under the SC and for the implementation of the identified priority action plans in its NIP that need urgent actions. The project, in general, seeks to abate serious environmental threats caused by U-POPs releases from the metallurgical sector. It aims to assess in-depth the scrap metal value chain from generators, collectors and users and provide measures that would make the processes involved in each link more environmentally-compliant and sustainable.

As core activity, the proposed project aims to identify, implement and demonstrate state-of-the-art technologies for reducing U-POPs releases from scrap metal recycling in the metallurgical industry according to the obligations of the Stockholm Convention and to promote and introduce BAT/BEP measures to reduce U-POPs emissions in SMEs and large enterprises involved in metallurgical processes.

The goal of the proposed project is to bring four demonstration facilities from the current, baseline technology level to a BAT-based level. In the language of the UNEP Dioxin Toolkit, this means to bring the selected facilities from the class to which the existing facilities belongs (supposed to be Class 1) to or close to a higher class number (Class 3). The facilities are located in the Rayong province and represent the ferrous and non-ferrous metal processing industries.

2.1 Environmental and Social Risk Screening

The project is classified as Category B for environment in accordance with the UNIDO Environmental and Social Policies and Procedures (ESPP). Thus, an ESMP is required to ensure that environmental and social impacts are identified and assessed, and that appropriate mitigation, management, and monitoring measures are incorporated and applied in implementation to achieve the desired environmental and social sustainability outcomes. It sets out the institutional and organizational arrangements, procedures, and implementation arrangements for identification, management and monitoring of environmental and social impacts and mitigating measures. It addresses mechanisms for public consultation, participation, and disclosure of project documents as well as for redress of possible grievances and management of project-related issues, which may arise during implementation.

As all project activities are limited to the pilot demonstration facilities, the project will not concern protection of natural habits, involuntary resettlement, indigenous people, physical cultural resource, safety of dams and pest management.

Through the ESS, the project activities may cause some health and safety issues during the conduct of the BAT/BEP demonstration interventions. However, the project is expected to
have very little adverse impact and would be site specific. In most cases, safeguards and mitigation measures will be put in place to ensure that impacts are avoided or further minimized.

3. Compliance with local, national and international laws

The relevant national policy, legal, and administrative framework which could define/help shape issues/risks that need to be included into the EMSP. The key national policies relevant for implementation of ESMP is Notification of the Ministry of Natural Resources and Environment which was announced on 24 April B.E. 2555 (2012) to define type, size and procedure for Project or Activity which may affect community severely in respect of both the quality of Environment, Natural Resources and Health that Government agency, State Enterprise Or Private Sector should prepare environmental impact assessment report as mentioned in its Annex.

There are 2 types of Project or Activity listed as the following:

- Ironworks and Steelworks Industry, with an output capacity of 100 ton per day or more, should submit an EIA submitted for construction’s permission, operational permission.
- Mineral Smelting industry, Mineral Dressing Industry, Metal Casting Industry except Iron or steel with quantity of output of more than 50 ton per day should obtain construction and operational permits.

Significant environmental impacts with proposed reduction and preventive measures and inspection and review programs shall be reported in Form S.P. 1 for the associated industries. The relevant form is shown below:
In cases where process modification is implemented, a process modification report shall be submitted to the licensing government agency, the Department of Primary Industries and Mines, which may recommend EIA as further action depending on the degree of modification.

4. Environmental and Social Risks and Mitigation Measures

Social and Environmental Assessment of the project determined that the project will have limited impact on the environment and rather, positive long-term improvements, under various mitigation actions, such as U-POPs reduction, energy savings, etc...

The project is expected to have little or no adverse effects, as it utilizes inputs with no negative effects on the environment and the planned infrastructures will not disrupt the flow of surface water routes. Environmental issues are integrated into all activities and at all stages of the project cycle, particularly in the specification of works and arrangements which will include an environmental review and mitigation of negative effects.

a. Preconstruction Phase

No negative impacts are expected during the preconstruction phase. Preconstruction activities include the acquisition of required permits, definition of alignments, and layout of construction limits, location and establishment of equipment storage of staging areas.

b. Construction Phase

The activities expected in this phase include installation of systems in 4 locations.
• The first location (BISW) will install the Scrap Processing System (Plan B1), Rapid Waste Gas Quenching System with Vapor (Plan B2), Adsorbent Injection (Plan B3) and Waste Gases Collecting System (Plan B4).
• The second location (Daiki) will install the Aluminum Scrap Processing System (Plan D1), Preheat Scrap by Heat Recovery System (Plan D2), Post Combustion System (Plan D3).
• The third location (N.T.S) will focus on the installation and integration of a new Steel Scrap Processing (Plan N1) and Absorption Chiller (Plan N2).
• The fourth location (Thai Metal) will install the Regenerative Burner (Plan T1), Improvement of Aluminum Billet Heater System (Plan T2), Improvement of Aluminum Coating System (Plan T3) and Ambient Vaporizer System (Plan T4).

The projected impacts and risks during this phase are expected to be limited in scope but may include:
- Air quality problems: emissions from the use of machines and dust production while grading excavating could result in annoyance to nearby residents and pedestrians and/or disturb nearby activities.
- Noise generation: the use of construction equipment could potentially impact on workers and neighborhood residents.
- Construction Safety: Excavations and other construction site activities must be effectively managed to prevent injury to workers and disruption of the project.
- Temporary difficulties of access: during construction and installation of equipment, access may be limited to the adjacent buildings and some disturbance of the neighboring residents and users. This is unlikely to be for an extended period.

c. Operation phase
There are no projected major negative environmental impacts during the operation phase. The project is instead geared towards reducing air pollution, particularly U-POPs and improving the energy efficiency of the facilities. The potential negative impacts are projected to be minor, most of which can be readily mitigated. Any negative impacts would be related to inappropriate maintenance of established equipment/facilities and the operation of the facilities themselves.

The management committees of facilities will be involved in managing the implementation of the identified measures.

The program will fund training that will focus on the sustainable consumption and production by application of BAT/BEP in the process and compliance with environmental management standards.

5. Institutional Strengthening
Implementation of, and adherence to ESMP, is the responsibility of every member of the project team. All project personnel will be provided the requisite training and orientation/induction to enable their active and informed participation in the ESMP. Capacity building activities will be conducted to ensure that stakeholders involved in developing and implementing the various ESMP components have the technical, management and other skills to fulfill their roles. The key focus areas for capacity building will be:
An intensive one-day training/orientation for Project Team on ESMP Process, Public Communication and Consultation, compliance with relevant policies and guidelines. The Site manager shall ensure that all workers have been made aware of the ESMP. The Site Manager shall regularly monitor that occupational health and safety requirements are implemented. The Environmental and Social Consultant shall audit that all requirements are met. Where occupational health and safety requirements are not being implemented relevant workers shall immediately be trained and instructed to implement these requirements.

To ensure the sustainability of the project interventions, the following items were integrated into the formulation of the project:

1) Promotion of BAT/BEP and U-POPs knowledge transferring.
2) Development of guidance that improve energy consumption and ensure sustainable investments.
3) Establishment of activities on environmental protection and the use of less polluting processes.

The project includes mitigation of impacts including:

1) The promotion of energy efficiency;
2) Measures to raise awareness and education on environmental issues and risk reduction from U-POPs release;

6. Public Relation and Corporate Social Responsibility

This modality will mitigate the public pressure from the local community surrounding the pilot facilities to wider scale - provincial, national, regional and international level - including academia and other scrap recycling facilities. The facilities involved may serve as a learning hub and may organize an annual onsite learning activity for those who are interested. Awareness raising on the concepts of BAT/BEP and POPs, in general, will be integrated in this modality.

7. Monitoring plan

The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that they are effective. Environmental and social monitoring will also enable response to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the ESMP.

Environmental monitoring will be carried out to ensure that all project activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The overall monitoring plan is given in the Table below:
<table>
<thead>
<tr>
<th>Environmental and Social Impacts</th>
<th>Mitigating Measure</th>
<th>Technical details of the mitigation technology, process, equipment, design and operating procedures</th>
<th>Parameters to be measured</th>
<th>Monitoring methods and procedures used (e.g. sampling)</th>
<th>Timing/ Frequency of measurement</th>
<th>Detection limit</th>
<th>Responsibility</th>
<th>Cost of mitigation</th>
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</thead>
<tbody>
<tr>
<td>Risk of inappropriate maintenance and operation of established equipment/ facilities and technology failure, which will result in excessive discharge of pollutants and environmental pollution.</td>
<td>Strict implementation of the project management system</td>
<td>1. Strict implementation of the project management system including adequate and appropriate maintenance, strict implementation of the operating manual, training of personnel on safety and operations.</td>
<td>TBD during inception phase</td>
<td>Annual (PIR)</td>
<td>TBD during inception phase</td>
<td>IA, EA and pilot facility</td>
<td>$25,000 included in the cofinancing of the facilities and project partners</td>
<td></td>
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<tr>
<td>Implementation of existing/proven technologies</td>
<td>Logs of technology failures, interventions, and time before repair will be kept.</td>
<td>The concentration of pollutants discharged from equipment/ facilities</td>
<td>Sampling and analyze according to national guidelines</td>
<td>Monthly</td>
<td></td>
<td>IA and pilot facility</td>
<td>$10,000 included in the cofinancing of the pilot facilities and UNIDO</td>
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<td></td>
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<td>records of maintenance and operation of equipment and facility</td>
<td>Inspection</td>
<td>Daily</td>
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<td>Training of personnel on safety and operations</td>
<td>Logs of trainings of personnel on safety and operations will be kept</td>
<td>Percentage of personnel undergoing training on safety and operations</td>
<td>Q1 – Q12 Continuous</td>
<td>&lt; 100 % of technician personnel</td>
<td>IA, EA and pilot facilities</td>
<td>$5000 included in the cofinancing of pilot facilities</td>
<td></td>
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<tr>
<td>Waste Management</td>
<td>During the project there will be the provision of training on hazardous materials as well as adoption of official policies for dealing with disposal of materials and environmental pollution.</td>
<td>Percentage of potentially problematic waste which is not accounted for in reporting</td>
<td>Q1 – Q20 and post-project Continuous</td>
<td>&lt; 100 %</td>
<td>IA, EA and pilot facilities</td>
<td>$5000 included in the cofinancing of pilot facilities and project partners</td>
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<td>Emissions from the use of machines and dust production at replacing and updating phase, could result in annoyance to workers and pedestrians.</td>
<td>Noise generation from the use of machines and equipment could pose impact on workers and pedestrians.</td>
<td>The concentration of total suspended particles (TSP), NOx, non-methane hydrocarbon (NMHC)</td>
<td>The concentration of total suspended particles (TSP), NOx, non-methane hydrocarbon (NMHC)</td>
<td>Sampling and analyze according to national guidelines</td>
<td>Weekly</td>
<td>0.001 mg/m³ (TSP) 0.01 mg/m³ (NOx) 0.12 mg/m³ (NMHC) 0.2 mg/m³ (CO)</td>
<td>Pilot facilities</td>
<td>$5000 included in the cofinancing of pilot facilities</td>
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**Sampling and analyze according to national guidelines**

**Weekly**

- **0.001 mg/m³ (TSP)**
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**Pilot facilities**

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<td>Some replacing and updating activities such as the use of cranes, elevated working environments and machines might create health and safety risks for both workers and pedestrians for improper operation or accidents.</td>
<td>Monitoring to ensure proper use of cranes, elevated working environments and machines</td>
<td>Inspection and Risk assessment screening</td>
<td>Daily</td>
<td>/</td>
<td>Pilot facilities</td>
<td>$5000 included in the cofinancing of pilot facilities</td>
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<td>Women staff having no equal access to training and activities</td>
<td>Recruitment of gender specialist to Gender strategy</td>
<td>Operational support for economic empowerment and leadership; Awareness-raising and information activities</td>
<td></td>
<td>IA, EA</td>
<td>$10,000 from the GEF grant</td>
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<td>Low participation rates of females in project implementation</td>
<td>Gender is mainstreamed throughout the project design</td>
<td>This project will pursue thorough and gender responsive communication and ensure stakeholder involvement at all levels, with special regard to involving women and men, as well as civil society and non-governmental organizations promoting gender equality. This shall mitigate social and gender related risks, promote gender equality, create a culture of mutual acceptance, and maximize the potential contribution of the project to improving gender equality in the energy field.</td>
<td>Social diversity and gender</td>
<td>Survey</td>
<td>Q1-Q12 Annually</td>
<td>Percentage of female participants in capacity building events</td>
<td>&lt; 20 %</td>
<td>IA, EA</td>
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