
# VERGO ENERJİ SİSTEMLERİ SAN. VE TİC. A.Ş.
# WASTE AND WASTEWATER MANAGEMENT PLAN
# OCTOBER 2023
# CNR-PLN-VRG-WWWMP-001
# (Rev.01)


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## LIST OF ABBREVIATIONS/DEFINITIONS

| | |
|---|---|
| **ÇINAR** | Çınar Engineering and Consultancy Incorporation |
| **E&S** | Environmental and Social |
| **EÇBS** | Integrated Environmental Information System (Entegre Çevre Bilgi Sistemi) |
| **EHS** | Environmental, Health, and Safety |
| **EIA** | Environmental Impact Assessment |
| **ESAP** | Environmental and Social Action Plan |
| **ESMP** | Environmental and Social Management Plan |
| **ESMS** | Environmental and Social Management Systems |
| **ESS** | Environmental and Social Standards |
| **Facility Owner** | VERGO Enerji Sistemleri San. Ve Tic. A.Ş. (VERGO) |
| **GIIP** | Good International Industrial Practices |
| **HR** | Human Resources |
| **IBC** | Intermediate Bulk Container |
| **IFC** | International Finance Corporation |
| **MoEUCC** | Ministry of Environment, Urbanization and Climate Change |
| **MoTAT** | Mobile Waste Tracking System |
| **MSDS** | Material Safety Data Sheets |
| **OHS** | Occupational Health and Safety |
| **OIZ** | Organized Industrial Zone |
| **PS** | Performance Standards |
| **TKYB** | Development and Investment Bank of Türkiye |
| **WB** | World Bank |
| **WBG** | World Bank Group |
| **WWWMP** | Waste and Wastewater Management Plan |

# 1. INTRODUCTION

VERGO Enerji Sistemleri San. ve Tic. A.Ş. ("VERGO"), which is one of the companies that produces and exports solar energy systems in Turkey, focuses on the production/manufacturing of solar panel carrier construction systems (steel) and offers design, projecting, production and on-site assembly services in line with the demands of the customers.

VERGO began its operations in 2015 in Organized Industrial Zone (OIZ) of Halilbeyli at Kemalpaşa district, İzmir province with total facility area of 16 decares. After signing the contract (23.12.2020 with no: 2020/0064/0) with Türkiye Kalkınma ve Yatırım Bankası (Development and Investment Bank of Türkiye – "TKYB") and getting the loan for the construction of new facility to be paid back until 22.06.2028, VERGO has purchased the new industrial area (which has total allocated area of 62,494.59 $m^2$ with 17,817 $m^2$ closed area) in Salihli Organized Industrial Zone (OIZ)/ Manisa. In January 2021, another consultant firm prepared Management Plans to cover the construction and operation phases of the project.

VERGO fully completed to moving process in August, 2021 from Kemalpaşa, İzmir to Salihli, Manisa. It continues to work in Salihli OIZ with NACE code of 28.99.90. In the facility, the steel rolls are subjected to slitting/cutting, punching (Press Line), bending (by means of press brake and roll form machines) and quality control processes in order to produce pipe&box, profile (C-U) and Wbeam.

Safeguard Corrective Action Plan (SCAP) has been prepared by VERGO upon the request of the World Bank after the successive occupational accidents that occurred within VERGO. In line with the improvements made within the scope of this document, TKYB has requested revision of Environmental and Social Management Plan (ESMP), Occupational Health and Safety (OHS) Management Plan and Emergency Preparedness and Response Plan documents. This situation revealed that other management plans also needed to be updated.

This Waste and Wastewater Management Plan (WWWMP) has been prepared to reflect the current situation of the company as a result of the developments in the company by ensuring sustainable management of waste and wastewater issues and to prevent and mitigate/minimize/manage potential environmental and social impacts associated with the facility's operations. This includes an evaluation in accordance with IFC Performance Standards (PSs), World Bank Group (WBG) General and Sector-specific Environmental Health and Safety (EHS) Guidelines, Good International Industry Practices (GIIP) together with national legislation and TKYB's Environmental and Social Policy. In order to carry out the revisions requested by TKYB, Çınar Engineering Consultancy Inc. (ÇINAR or Consultant) has been appointed as the consultant.

## 1.1 General Overview

### 1.1.1 Project Area

The facility is located in the Salihli OIZ, which is within the borders of Manisa Province, Salihli District, Torunlu Neighborhood.

On the other hand, 21,251.75 $m^2$ of land in the parcel adjacent to the existing facility in Salihli OIZ is allocated to VERGO, and it is planned to establish a Galvanizing Facility in this area that will enable galvanization of steel profile products with a hot-dip coating system. It has been declared that the financing and feasibility of the project has not been clarified yet. In addition, VERGO is in the process of establishing a new facility that will operate in the

production of solar energy panels carrier construction systems in Aliağa district of İzmir province. It was learned that some of the equipment and personnel have been moved to Aliağa. On the other hand, new machines located in S&D Line and Press Line has gotten into act recently in the facility at Salihli OIZ.

Location map of existing and planned facilities is given in Figure 1.

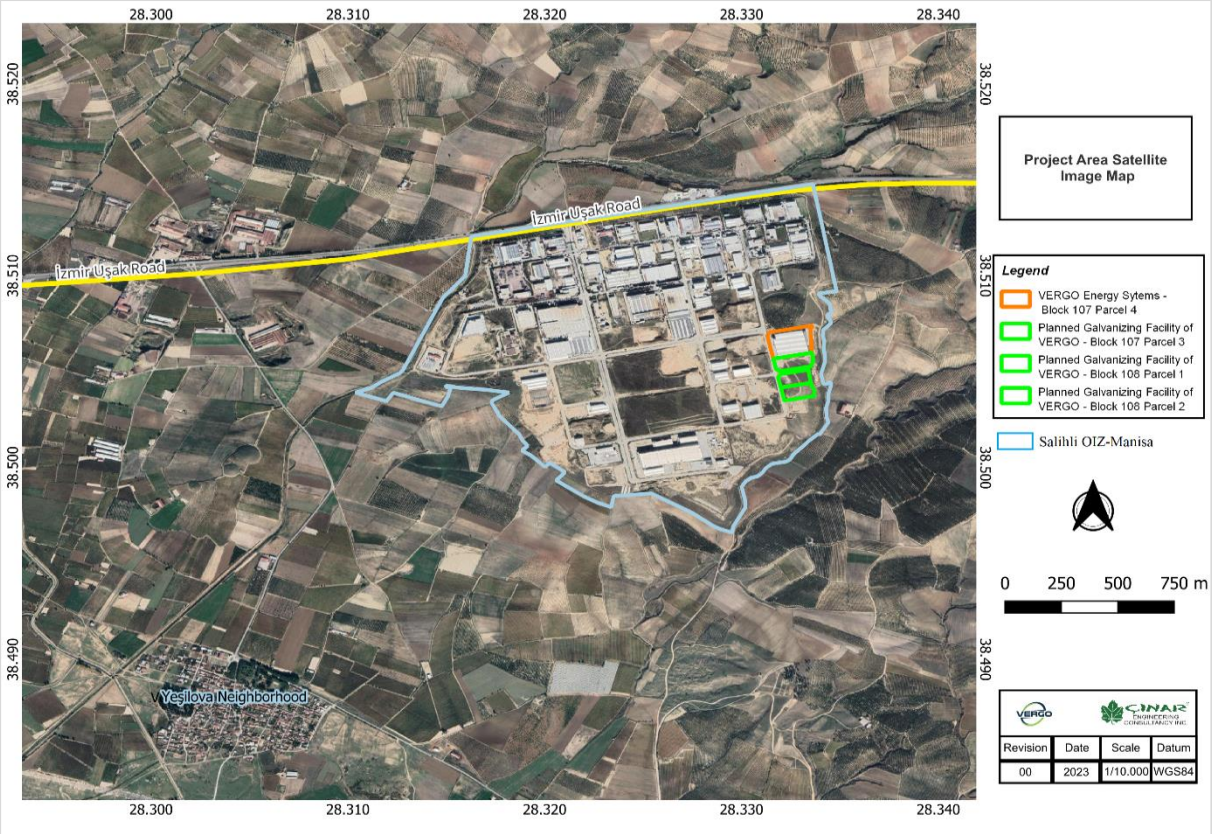


**Figure 1. Location of the Existing Facility and Planned Facility in Salihli OIZ**

### 1.1.2 Process Description

According to the Capacity Report prepared on 27.12.2022 and valid until 28.12.2024, VERGO has annual production capacities of:

- 114,716 tons for solar panel connection profile production,
- 86,301.350 tons for solar panel connection profile drilling production,
- 18,909.333 tons for solar panel connection pipe profile spinning and drilling production,
- 2,348.865 tons for PV panel integration and solar structural mechanics manufacturing support structure set (tracking support structure set-2,055 sets/year),
- 17,109.470 tons for PV panel integration and solar structural mechanics manufacturing support structure set (no tracking support structure set-10,627 sets/year),
- 3,616.452 tons for solar power system set (3,164 pcs/year).

Vergo produces solar panel rack systems of Solar Power Plants. The production activities continue along with has 14 Press counters, 5 Roll form counters, 2 Press Brake machines, 1 W-beam (H profile) production line, 1 Pipe plastering and drilling line, 2 saws (one small and

one big) and 1 Clamp production line. The raw materials used in the operation phase of the project are as follows:

- Steel Coil Sheet,
- Steel Coil Sheet,
- Aluminum profile,
- Steel Galvanized Pipe,
- Steel Rolled Profile,
- Highcool 1020 BF (Fully Synthetic Coolant),
- ISOLUBE V 73/5 (Solvent-Based Essential Oil),
- PETROGREASE SANUS 150 EP 0 (Grease Oil),
- PETROGREASE FORTIS 254 EP 2 (Grease Oil),
- 16-3601Q Methyl Ethyl Ketone,
- Composite Circle Buckle,
- Composite Circle.

***The Production Flow of Press and Roll Form Counters and Press Brake Machine***

The steel roll is brought as a raw material into the press counters which is consisted of an opener, a driver and a press. The steel roll is connected to the opener with the help of the operator. Then the steel roll is transferred from the opener by the carrier. The steel roll is taken to the press.

Then the programming of the product is made from the control panel of the machine and the first piece is produced to get the production approval. The control of process is checked by the quality control team. If the semi-finished product receives the approval, the production activity continues. If not, it is intervened and measured again. After intervention and re-measurement, the production activity carries on. After the approved product is completed, it is taken to the storage area for semi-finished products. For the bending process, the roll form or press brake machines are made necessary adjustments. Then the product is brought from the storage area for semi-finished products to the roll form or press brake counter. The product bending process is finished. The bending operation is completed over CANIAS ERP system, and the product is sent to the storage area for the shipment.

***W-beam Production Line and Pipe Coating Drilling Production Line Process Flow***

The raw material, which is brought to the W-beam Line, is loaded into the entrance of the line. All parameters of the relevant commands (slot holes, the measurements of galvanization and grounding holes) are entered in the control panel of the counter. As a result of the commands given from the control panel of the machine, loading magnets support the products into the production line. The raw material is transmitted to the molds with the help of a carrier magnet to punch slot holes. After the slot holes drilled in 2 steps, the output carrier magnet takes the raw material. It transmits to *Punch* for the drilling process of galvanized and / or grounded holes. The ready product is taken from the production line with the help of the exiting magnets. The product completed get the production completion approval via the CANIAS ERP system and sent to the storage area.

***Pipe Coating, Drilling Production Line Process Flow***

The raw material is brought to the relevant counter. The raw material, is given to the pipe coating and drilling line, is loaded at the entrance of the line. All parameters of the relevant commands are entered in the control panel of the counter. As a result of the commands given from the control panel of the machine; the pipes, which are to be coated, are supplied into the production line. The pipe whose coating process is completed, is transmitted to the drilling line with the help of the automation-controlled chains. The holes to be drilled in

accordance with the technical drawing, is drilled through the punch line then the product is branded. The process controls for the first product are carried out by the line operator and then by the quality control personnel. If approval is given, production starts. If not, it is intervened and re-measured again. After intervention and re-measurement, the production activity carries on. The product completed, gets the production completion approval via the CANIAS ERP system and sent to the storage area.

Following figures summarize the workflow in the facility.


**Figure 2. General View of the Workflow**

**Figure 3. Steel Rolls/Coils as Raw Materials**


**Figure 4. Slitting Line and Sliced Roll Sheet**

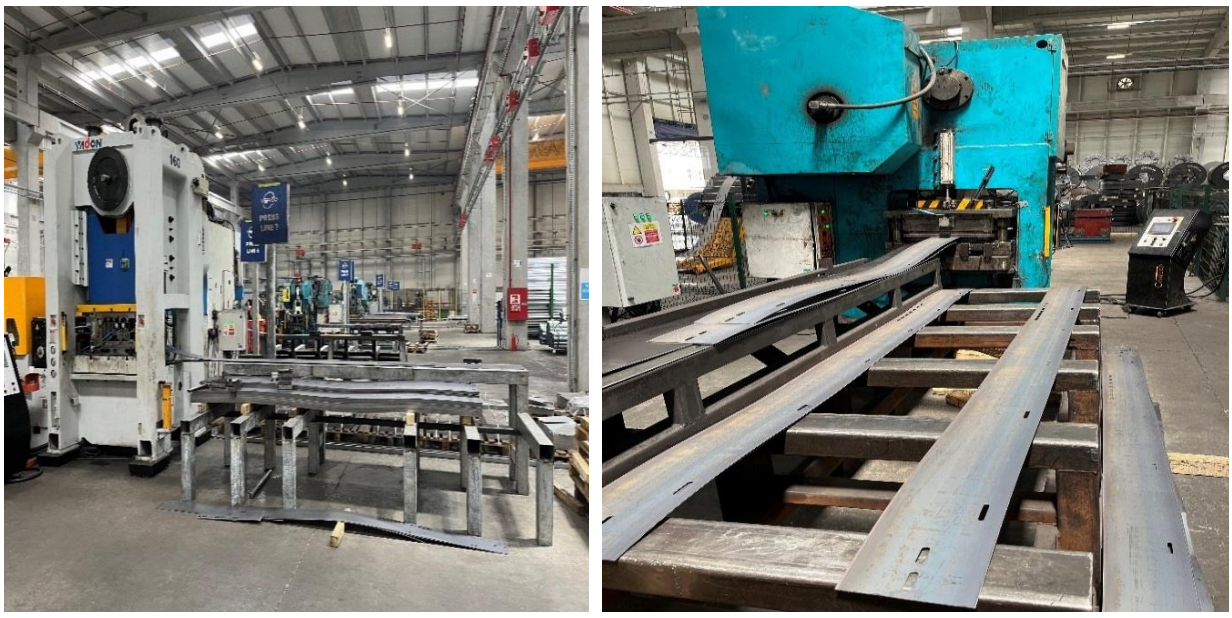

**Figure 5. Press Line for Drilling of Sliced Steel Plate**

**Figure 6. Press Brake and Rollform for Steel Plate Bending**

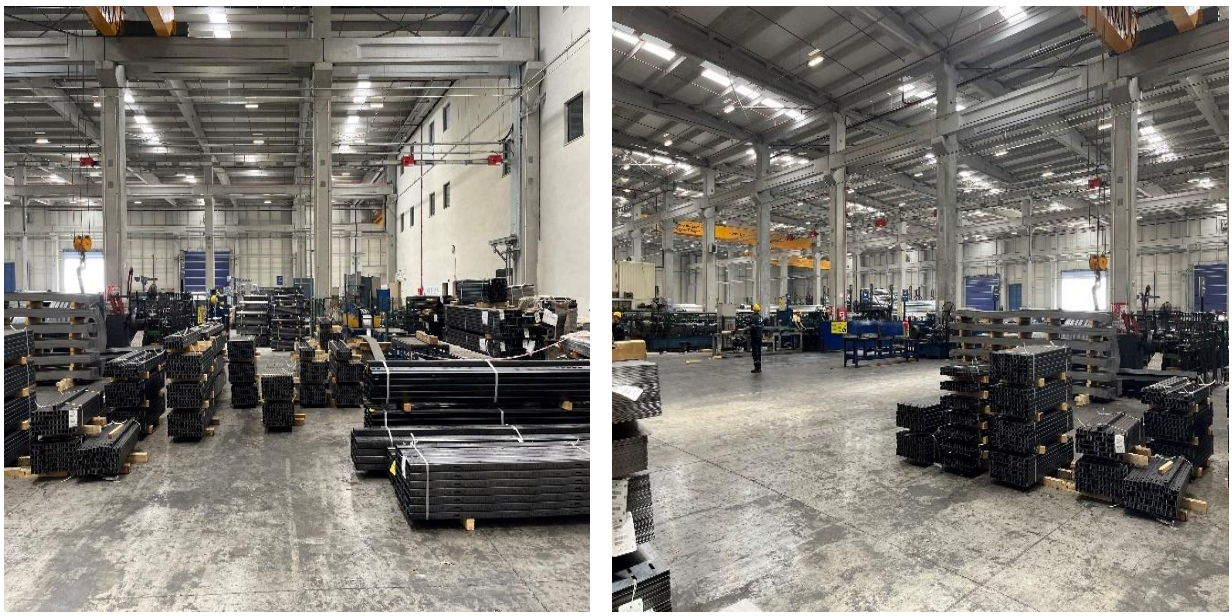

**Figure 7. Intermediate Product Storage**

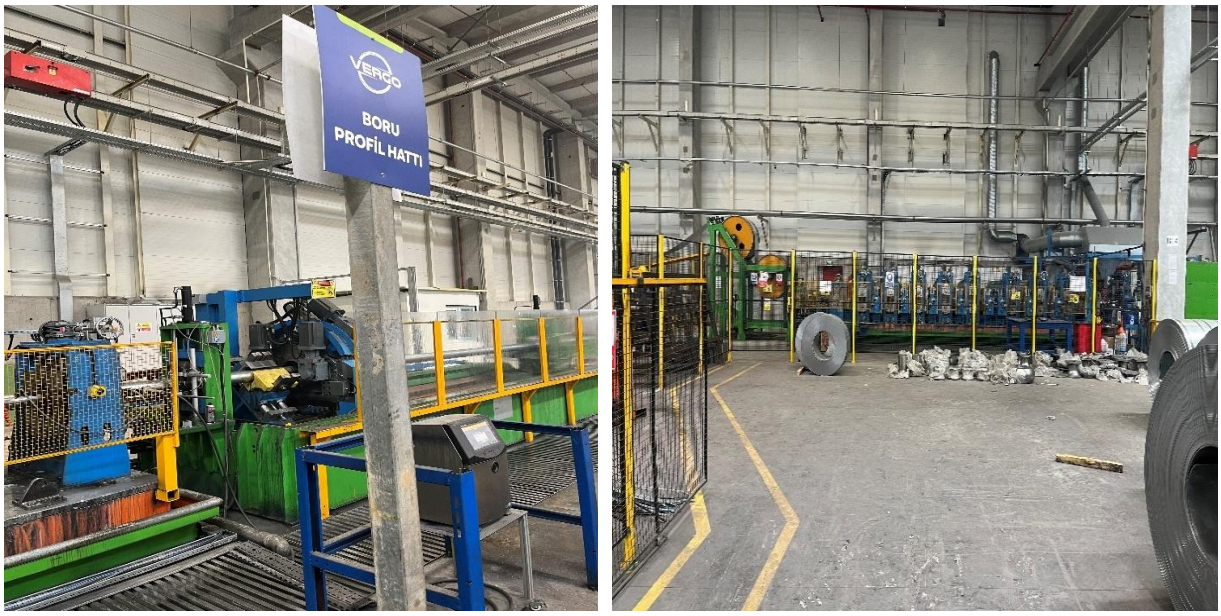


**Figure 8. Pipe Profile Production Line**


**Figure 9. S&D Line for Spinning and Drilling of Pipes**


**Figure 10. Chamfering Line for Pipes**

**Figure 11. Final Products Ready for Shipment**

## 1.2 Objectives and Scope

The primary objective of the Waste and Wastewater Management Plan (WWWMP) is to identify hazardous and non-hazardous waste generated from the project's operational activities and to determine measures and managerial practices that will prevent or minimize the risks and impacts arising from the formation of these wastes, as well as to provide effective management of wastewater originated from personnel and industrial activities. This plan contributes that all practices are in compliance with Project Standards.

Specifically, the goals of this Plan are as follows:

- To define the waste hierarchy,
- To define principles and guidelines for the collection, separation by categories, temporary storage, control, transfer to licensed waste facilities, and disposal/recycling/reuse of wastes generated from project activities,
- To define effective management of wastewater,
- To mitigate the impacts of wastes through the implementation of this Plan,
- To define applicable Project Standards related to the Waste and Wastewater Management Plan,
- To define roles and responsibilities within the scope of the Plan,
- To outline monitoring and reporting procedures, including key performance indicators,
- To define training requirements.

The measures, practices, administrative procedures, and applications outlined in this plan are applicable to the company, contractor, subcontractors, and service providers employed during the operational phase of the project, as well as to all project employees and visitors. Additionally, this plan includes mitigating measures and managerial actions required to ensure that hazardous and non-hazardous waste along with wastewater generated does not harm employees, the environment, and community health. All contractors and subcontractors will adhere to the requirements of this plan.

The WWWMP is comprised of a combination of "Project Standards," which includes the IFC Performance Standards, national legislation/regulatory frameworks, DBG General and Sectoral EHS Guidelines, good international industry practices currently in use, and TKYB's Environment and Social Policies. It defines roles and responsibilities for plan implementation, impact-reducing measures, and managerial actions related to waste & wastewater managements, as well as monitoring, reporting, and training requirements. This WWWMP has been prepared for the facility during the operation period.

The WWWMP should be evaluated in an integrated manner with other relevant management plans/procedures prepared within the scope of the Project.

## 1.3 Applicable Environmental and Social Standards

### 1.3.1 National Legislation

The regulations that come into prominence in the project management, especially contained within the Environment Law No. 2872, the Labor Law No. 4857, the OHS Law No. 6331, the OIZ Law No. 4562, the Law on Right to Information (No. 4982) and the Public Health Law No. 1593 are summarized below.

**Table 1. Prominent Regulations Covered by National Legislation**

| Regulation | Official Gazette Date | Official Gazette Number |
|---|---|---|
| Regulation on Environmental Impact Assessment | 29.07.2022 | 31907 |
| Regulation on Environmental Permit and License | 10.09.2014 | 29115 |
| Regulation on Organized Industrial Zones Implementation | 02.02.2019 | 30674 |
| **WASTES** | | |
| Regulation on Waste Management | 02.04.2015 | 29314 |
| Regulation on Waste Oil Management | 21.12.2019 | 30985 |
| Regulation on Packaging Waste Control | 26.06.2021 | 31523 |
| Regulation on Landfilling of Wastes | 26.03.2010 | 27533 |
| Regulation on Control of Waste Vegetable Oils | 06.06.2015 | 29378 |
| Regulation on Control of Waste Batteries and Accumulators | 31.08.2004 | 25569 |
| Regulation on Control of End-of-Life Tires | 25.11.2006 | 26357 |
| Regulation on Zero Waste | 12.07.2019 | 30829 |
| Regulation on Control of Medical Wastes | 25.01.2017 | 29959 |
| **AIR** | | |
| Regulation on Industrial Air Pollution Control | 03.07.2009 | 27277 |
| Regulation on Air Quality Assessment and Management | 06.06.2008 | 26898 |
| Regulation on the Monitoring of Greenhouse Gas Emissions | 17.05.2014 | 29003 |
| Regulation on Exhaust Gas Emission Control | 11.03.2017 | 30004 |
| **SOIL** | | |
| Regulation on Control of Soil Pollution and Point Source Contaminated Sites | 08.06.2010 | 27605 |
| **NOISE** | | |
| Regulation on Environmental Noise Control | 30.11.2022 | 32029 |
| **WATER** | | |
| Regulation on Water Pollution Control | 31.12.2004 | 25687 |
| Regulation on Surface Water Quality | 30.11.2012 | 28483 |
| Regulation on the Quality and Treatment of Drinking Water Supply | 06.07.2019 | 30823 |
| Regulation on Water Intended for Human Consumption | 17.02.2005 | 25730 |
| Regulation on the Protection of Groundwater against Pollution and Deterioration | 07.04.2012 | 28257 |
| Regulation on the Procedures and Principles to be Followed in Determining the Tariffs of Wastewater Infrastructure and Domestic Solid Waste Disposal Facilities | 27.10.2010 | 27742 |
| **OHS** | | |
| Regulation on Occupational Health and Safety Risk Assessment | 29.12.2012 | 28512 |

| Regulation | Official Gazette Date | Official Gazette Number |
|---|---|---|
| Regulation on Emergencies at Workplaces | 18.06.2013 | 28681 |
| Regulation on Occupational Health and Safety Services | 29.12.2012 | 28512 |
| Regulation on Health and Safety Conditions in the Use of Work Equipment | 25.04.2013 | 28628 |
| Regulation on Health and Safety Signs | 11.09.2013 | 28762 |
| Regulation on Occupational Hygiene Measurement, Test and Analysis | 27.01.2023 | 32086 |
| Regulation on the Vocational Training of Persons to be Employed in the Hazardous and Very Hazardous Classes | 13.07.2013 | 28706 |
| Regulation on Duties, Authorities, Responsibilities and Trainings of Occupational Physicians and Other Health Personnel | 20.07.2013 | 28713 |
| Regulation on the Procedures and Principles of Employing Child and Young Workers | 06.04.2004 | 25425 |
| Regulation on Preventing Major Industrial Accidents and Reducing Their Effects | 02.03.2019 | 30702 |
| Regulation on Contractors and Sub-contractors | 27.09.2008 | 27010 |

### 1.3.2 International Standards

Since the TKYB is the lender, the activities of the facility must be in compliance with good international industrial practices including IFC PSs, WBG EHS Guidelines, TKYB's E&S Policy and best practices documents alongside the National EHS Legislation.

IFC has established Environmental and Social Performance Standards to define its customers' responsibilities for managing their environmental and social risks. During the investment and operation periods, the borrower must comply with these standards. IFC Performance Standards (2012) ("IFC PSs") are listed below:

- PS1: Assessment and Management of Environmental and Social Risks and Impacts
- PS2: Labor and Working Conditions
- PS3: Resource Efficiency and Pollution prevention
- PS4: Community Health, Safety, and Security
- PS5: Land Acquisition and Involuntary Resettlement
- PS6: Biodiversity Conservation and Sustainable Management of Living and Natural Resources
- PS7: Indigenous Peoples
- PS8: Cultural Heritage

Moreover, in August 2016, the new environmental and social policies called the Environmental and Social Framework (ESF) has been adopted by the World Bank. The ESF enhances the World Bank's commitment to sustainable development through ten (10) Environmental and Social Standards (ESSs) that are designed to support Borrowers' E&S risk management. The ESF enables Borrowers to better manage project risks as well as improve environmental and social performance, consistent with good international practices[1]. The ESSs, which are similar with the IFC's PSs, are listed below:

- ESS1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS2: Labor and Working Conditions
- ESS3: Resource Efficiency and Pollution Prevention and Management

1 Environmental and Social Framework, retriewed 07.06.2023 from the official web site of the World Bank https://www.worldbank.org/en/projects-operations/environmental-and-social-framework

- ESS4: Community Health and Safety
- ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities
- ESS8: Cultural Heritage
- ESS9: Financial Intermediaries
- ESS10: Stakeholder Engagement and Information Disclosure

Other guidelines and principles are as follows:

- WBG General EHS Guidelines (2007)
- WBG EHS Guidelines: Metal Plastic and Rubber Products Manufacturing (2007)
- Equator Principles IV (2020).

Moreover, TKYB announced its perspective on the continuation of environmental and social sustainability and reducing and managing the negative effects and risks arising from its activities, with the TKYB Environment and Social Policy dated January 2020. The policy is based on this policy in all services and activities financed by the Bank. In addition, the “Environmental and Social Risk Assessment Procedure in the Lending Process”, which was prepared to evaluate the environmental and social risks of the requested loans and to ensure that the issue is managed effectively in line with the Bank's strategy, is applied for each project.

## 2. ROLES AND RESPONSIBILITIES

The general organizational structure for Implementation of the Plan is shown as follows.

**Table 2. General Organization Structure for Implementation of the Plan**

| Roles | Responsibilities |
|---|---|
| **General Manager** | • Overall responsibility for the implementation,<br>• Ensure that the facility complies with the provisions of International Finance Institutions described in the Plan. |
| **Facility Manager** | • Ensure that the provisions are implemented to mitigate environmental and social impacts,<br>• Undertake monitor of the implementation of the Plan,<br>• Prepare quarterly or semi-annual environmental and social monitoring reports for submission to the Lenders. |
| **Human Resources Department** | • Ensure that all workers, participate in training sessions. Maintain a record of training and conduct of awareness sessions for staff to ensure compliance with environmental and safety commitments stated in the Plan,<br>• Recording and addressing internal and external complaints. |
| **Quality Engineer for Environmental, Health, and Safety**<br>**Environmental Officer** | • Oversee and monitor adherence to, and implementation of the Plan to ensure that an environmental management system is set up and functions properly,<br>• Ensure that the facility specifications adequately reflect the recommendations of the Plan,<br>• Responsible for the implementation of appropriate control procedures, the keeping of records, and the conduct of necessary audits, as well as the identification of relevant non-conformities and the implementation of corrective actions,<br>• Responsible for the preparation, implementation, and, when necessary, renewal of the documentation required to be prepared and implemented within the scope of national regulations. |
| **Waste Site Supervisor** | • Responsible for ensuring compliance with the requirements mentioned in this Plan related to the waste disposal area and, in parallel, within the scope of national legislation and international standards, and reporting to the Environmental Officer and Facility Manager when deficiencies are identified,<br>• Should provide support to the Environmental Officer in implementing the Plan,<br>• Should act as a deputy in the absence of the Environmental Officer at the facility. |
| **Project Workers** | • Attend induction training that is provided to introduce the environmental duties within the scope of the Plan |

# 3. WASTE MANAGEMENT

## 3.1 Waste Management Hierarchy

Activities of the facilities result in generation of a wide range of wastes that require an adequate planning to be in compliance with the Applicable E&S Standards. Accordingly, in order to manage wastes effectively, internationally well accepted "Waste Management Hierarchy" shall be used with a focus on waste prevention, and then a decreasing focus on waste reuse, recycling, recovery, and disposal as it can be seen from the Figure 12.

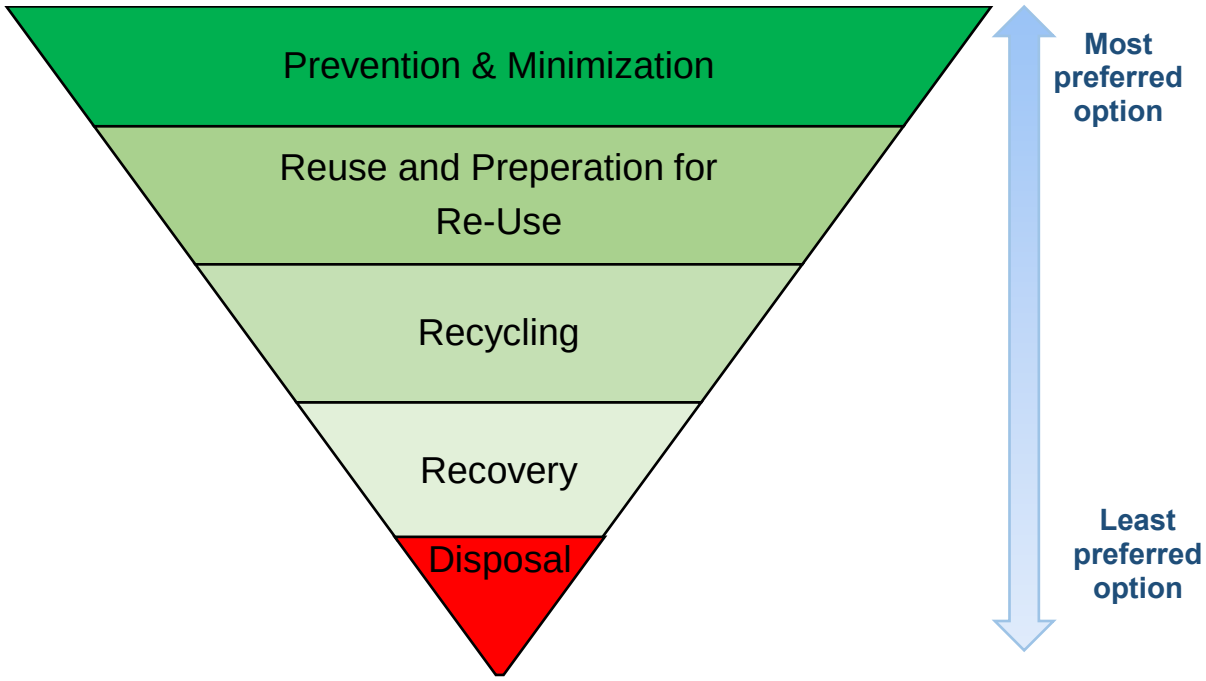


**Figure 12. Waste Management Hierarchy**

Definitions of the hierarchical steps presented above are given below:

- As the option with the highest priority, generation of wastes shall be prevented / minimized as much as possible by implementation of practical and/or embedded measures, for instance design measures of manufacturing processes,
- As the option with secondary priority, generated wastes shall be re-used or prepared for re-use without any treatment,
- The wastes which could not be re-used, shall be recycled,
- Recovery options, such as energy recovery, shall be evaluated as the quaternary priority, and
- As the option with lowest priority, after evaluation and implementation of all above steps, remaining wastes shall be sent to final disposal, such as landfilling, incineration without energy recovery etc.

## 3.2 Waste Generation and Classification in the Operation Phase

Wastes to be generated within the Facility consist of domestic wastes, packaging wastes (paper, plastic, glass, metal, etc.), process wastes, and hazardous wastes generated by the workers who work during the operation phase and as a result of the operational activities (see Table 3).

**Table 3. Waste Types Generated and Their Management Methods**

| Waste Code | Waste Type | Description (-/ M /A) | Disposal Recovery Method |
|---|---|---|---|
| 20 03 01 | Mixed Municipal Waste | - | - |
| 20 01 01 | Paper and Cardboard | - | R12 |
| 20 01 39 | Plastics | - | R12 |
| 20 01 40 | Metals | - | R12 |
| 15 01 01 | Paper and cardboard packaging | - | R12 |
| 15 01 02 | Plastic packaging | - | R12 |
| 15 01 03 | Wooden packaging | - | R5 |
| 17 04 02 | Aluminum | - | R12 |
| 20 01 21* | Fluorescent lamps and other mercury-containing waste | A | R13 |
| 20 01 33* | Batteries and accumulators under 16 06 01, 16 06 02 or 16 06 03 and unclassified mixed batteries and accumulators containing these batteries | A | R13 |
| 20 01 35* | Discarded electrical and electronic equipment containing dangerous parts other than those mentioned in 20 01 21 and 20 01 23 | A | R13 |
| 18 01 03* | Wastes whose collection and disposal are subject to special treatment in order to prevent infection | A | D9 |
| 13 01 13* | Other hydraulic oils | A | R9 |
| 16 01 07* | Oil filters | A | R4 |
| 12 01 09* | Halogen-free processing and solutions | A | R2 |
| 12 01 18* | Metallic slurries containing oil (grinding, sharpening and milling residues) | M | R4 |
| 15 01 10* | Packaging containing residues of dangerous goods or contaminated with dangerous substances | A | R12 |
| 15 01 11* | Metallic packaging containing dangerous porous solids (e.g. asbestos), including | A | R4 |

| Waste Code | Waste Type | Description (-/ M /A) | Disposal Recovery Method |
|---|---|---|---|
| | empty pressure containers | | |
| 15 02 02* | Absorbents, filter materials (oil filters unless otherwise specified), cleaning cloths and protective clothing contaminated with dangerous substances | M | R12 |

***Mark (*):*** *Hazardous waste*
***Mark (A):*** *Indicates that the waste is a definite hazardous waste. Wastes marked in this way are classified as strictly hazardous without analysis.*
***Mark (M):*** *Indicates that the waste is a potentially hazardous waste. In order to determine whether the wastes marked in this way are dangerous or not, a study is carried out to determine the hazardous properties of the waste stipulated in Article 11 of the WMR.*
***Note:*** *This waste list will be updated if an unexpected waste occurs during the operation phase.*

Information on the process and activity in which waste is generated is presented in Table 4.

**Table 4. Waste Sources and Types**

| Fields of Activity | Activity/Operation | Wastes Generated |
|---|---|---|
| Administrative Building / Offices (Operation and Production) | Photocopy, fax, printer use | Toner Boxes, Cartridges, Papers |
| | Lighting system | Waste fluorescent and mercury bulbs |
| | Electrical Systems and Computers | Electronic waste, waste batteries |
| Infirmary | First aid activities | Medical wastes |
| Production Department | Processes/operations | Contaminated wastes, contaminated packaging, waste hydraulics oil, empty pressure vessels, fluorescent lamps.<br>Paper-cardboard and plastic packaging. Scrap metals. |

## 3.3 Mitigation Measures and Administrative Actions

In waste management, it is primarily aimed to prevent waste generation or to reduce it when it is not possible. Processes should be designed and operated in accordance with the WBG General EHS Guidelines to prevent or minimize the quantities of waste generated and the hazards associated with the waste generated. Accordingly, the actions to be taken for the wastes are listed below:

- Implement a manufacturing process that efficiently transforms materials, resulting in higher product output yields, including modification of process design, operating conditions, and process controls.
- Good cleaning and operating practices, including inventory control, should be established to reduce the amount of waste from materials that are outdated, contaminated, damaged or exceed facility requirements.
- Purchasing methods should be established that allow opportunities to return usable materials, such as containers, and prevent over-ordering of materials.
- Hazardous waste generation should be minimized by preventing the mixing of non-hazardous and hazardous wastes.

- Recyclable materials should be obtained by evaluating waste production processes.
- Wastes will be stored separately according to the classification, labels indicating the type of waste will be placed for each type of waste.
- Products that can be included in the production process at the facility should be identified and recycled.
- Targets for recycling should be determined, waste generation and recycling rates should be followed.
- Training covering waste generation according to the waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be provided for personnel to raise awareness.
- There will be enough space for the licensed waste transport vehicles to receive the waste.
- Wastes must be recycled or disposed of by licensed companies specialized in the field.
- Hazardous wastes and non-hazardous wastes should be stored separately from each other.
- Necessary physical spaces should be provided between containers to prevent leaks or spills.
- Adequate drainage system will be provided to collect any leakages.
- Hazardous wastes should be stored in closed containers where they will not be directly exposed to sunlight, rain and wind.
- Absorbents, firefighting equipment, etc. will be kept ready on site for immediate response, in case of an emergency such as spills and fires.
- Physical access restrictions will be applied at waste storage areas through use of gates, fences and locks; only authorized persons will be allowed in storage areas.
- Cautionary signage and boards with name and contact number of authorized personnel will be provided at the storage areas.
- Adequate ventilation should be provided in areas where volatile wastes are found.
- In order to continue the conformity of the requirements listed above, and the inappropriate ones to continue the control after the relevant actions are taken; Periodic checks will be carried out in the area; Corrective actions will be taken when any non-compliance is detected.

Mitigation measures and precautions for the operation phase of the project are listed in the below:

- Waste management activities will be conducted in compliance with the applicable Environmental and Social Standards.
- Official waste declarations for all waste generated will be submitted to the online system of MoEUCC (Integrated Environmental Information System/EÇBS).
- An Industrial Waste Management Plan will be prepared and submitted[2] to the relevant Provincial Directorate of MoEUCC as per the format defined by the MoEUCC.

[2] If the facility is not within the scope of Annex-1 of the Environmental Permit and License Regulation, it is sufficient to be present at the facility during inspections.

- Hazardous Materials and Hazardous Waste Compulsory Liability Insurance will be executed for the hazardous waste temporary storage area.
- The waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be followed during the operational activities.
- The wastes will be segregated (i.e. hazardous/non-hazardous, recyclable/non-recyclable) and stored temporarily in designated storage areas.
- There will not be any waste burning, disposing or burying activities under any circumstances.
- The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded.
- Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes.
- Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken.
- Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes.
- Regular on-site inspections of solid waste management will be performed.
- There will not be any waste burning, disposing or burying activities under any circumstances.
- The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded.
- Zero waste certification must be renewed when it expires.
- It will be ensured by trainings that wastes are not dumped at locations other than areas specifically designated for this purpose.

## 3.4 Collection, Classification and Temporary Storage of Wastes

**Non-Hazardous Wastes**

Non-hazardous wastes should be stored separately from hazardous wastes in the "Temporary Waste Storage Area". As stated in the Regulation on Waste Management, non-hazardous wastes should be stored temporarily in the temporary storage area for a maximum of one year. Packaging wastes and other non-hazardous wastes should be sent to recycling facilities licensed by the Ministry of Environment, Urbanization and Climate Change by licensed vehicles. Contracts regarding waste shipment should be made with the relevant companies, and the expired contracts should be renewed.

The process of separating and temporarily storing packaging waste from other wastes is detailed below:

- Paper & cardboard and plastic packages should be separated at the source and collected separately from other wastes in the Packaging Waste Collection Container. The container will be marked to indicate the type and code of the waste and will be kept closed when not in use to protect it from external factors, especially precipitation.

- Plastic, glass and metal packaging should be collected in recycling waste containers that will be placed in relevant places separated according to the color and types of packaging.
- Packaging wastes collected in the Packaging Waste Collection Container and smaller recycling waste containers placed in the relevant parts of the facility should be transported to the relevant reserved section of the Temporary Waste Storage Area as the containers are full.
- The relevant section of the Temporary Waste Storage Area will be divided according to the types of packaging (glass, metal, paper & cardboard and plastic) to determine only the area, and the packaging will be stored in these compartments.
- Packaging wastes will not be stored in the facility for more than one year.
- Appropriately labelled specific containers on site will be used for efficient separation and collection of all recyclable wastes, including packaging waste.

Within the scope of zero waste management system; Non-hazardous recyclable paper, glass, metal, plastic wastes originating from households or commercial, industrial enterprises and institutions that are similar in content or structure are collected in different collection equipment from other wastes and collected separately. Paper, glass, metal and plastic wastes can be collected in a single equipment or separately according to material types.

- If paper, glass, metal and plastic wastes are collected together, blue color is used, for other wastes dark grey color is used.
- In case of separate collection according to material types, blue is used for paper waste, yellow for plastic waste, green for glass waste, and light grey for metal waste.
- Brown color is used if these wastes are collected separately in cafeterias or food service and similar places where biodegradable wastes are intensely formed.
- White color is used for the collection equipment to be used for the collection of waste medicines; these equipment are made of stainless metal or high-density plastic material, with a lockable cover, without sharp edges that may cause damage or puncture of the bags during loading and unloading, easy to load, not allowing to be taken again after the waste is thrown into it, and there is a Waste Medicine label on the equipment.

Waste collection equipment coloring within the scope of zero waste management system is shown in Figure 13.


**Figure 13. Equipment Colors for Separate Collection[3]**

### Hazardous Wastes

Hazardous waste management should focus on the prevention of harm to health, safety, and the environment, according to the following additional principles:

- Hazardous wastes should always be segregated from non-hazardous wastes.
- Hazardous waste should be stored so as to prevent or control accidental releases to air, soil, and water resources in Temporary Waste Storage Area.
- All hazardous wastes should be stored separately from each other in waste collection equipment labelled according to waste type.
- Hazardous wastes will not be stored in the Temporary Hazardous Waste Storage Area for more than six months.
- Medical wastes should be collected separately and sent to a licensed medical waste disposal facility in accordance with the Regulation on the Control of Medical Waste. Medical waste is collected in medical waste containers for up to 48 hours, and the waiting period can be extended up to one week if the temperature is +4°C and the capacity is sufficient. In terms of medical waste, medical waste producers are responsible for having temporary medical waste containers if up to 50 kilograms of medical waste is generated daily. If up to one (1) kilogram of medical waste is generated daily, it is the responsibility of medical waste producers to either take them

[3]**Source:** Zero Waste Management System Implementation Guideline for OIZ and Industrial Facilities, http://zerowaste.gov.tr/en/zero-waste/guidelines#5621

to the nearest or most suitable temporary medical waste storage/container or hand them over to a medical waste transportation vehicle.
- Hazardous wastes should be sent to recycling facilities licensed by the Ministry of Environment, Urbanization and Climate Change by licensed vehicles. Contracts regarding waste shipment should be made with the relevant companies, and the expired contracts should be renewed.

### 3.4.1 Temporary Waste Storage Area Properties

Within the scope of the activities, the facility has a temporary waste storage area to store hazardous and non-hazardous wastes before they are given to licensed companies.

The actions to be taken in line with the requirements of the Temporary Waste Storage Area within the scope of the Applicable E&S Standards and legislation are listed below:

- The Temporary Waste Storage Area should be located separately from the facilities and buildings. Licensed vehicles should be able to pick up waste easily.
- Necessary measures should be taken against fires that may occur in the Temporary Waste Storage Area. In this context, portable fire extinguishers should be placed at an accessible point near the area. Periodic maintenance of fire extinguishers should be conducted regularly.
- Hazardous wastes and non-hazardous wastes should be stored separately from each other according to their types and their entrances should be different.
- The Temporary Waste Storage Area must be closed, lockable and the key must be in the waste storage area officer.
- It is important to have the drainage channel and the blind shaft where this channel will reach, in case the leakage and spillage that may occur. The Temporary Waste Storage Area should be designed in accordance with these requirements.
- The floor of the area should be covered with impermeable concrete.
- The area should be constructed with its top and four sides covered in order to be protected from external factors such as precipitation. The doors and front faces of the area will be covered with wire mesh or sheet metal. The waste area will be designed in such a way that it will not pass rainwater in any way.
- Materials such as absorbent sawdust or spill kits should be kept in the area for cases such as overflow, spillage and leakage.
- There should be a sign at the entrance of the Temporary Waste Storage Area containing the contact information of the waste area responsible.
- There should be warning signs regarding the waste area and waste.
- Wastes should be labelled with the waste code and description.

## 3.5 Transportation of Waste and Delivery to Licensed Waste Processing Facilities

Waste transportation should be done both on-site and off-site in order to avoid or reduce spills, releases, and public exposures.

Domestic wastes are taken from the field by the Salihli OIZ, other recyclable wastes such as packaging wastes will be delivered to licensed companies and sent for recycling, and this practice will be continued in accordance with the national legislation.

Contracts with companies licensed by the Ministry of Environment, Urbanization and Climate Change should be continued for the transport of hazardous and non-hazardous wastes to be generated within the scope of the project, and the wastes should be delivered to

recycling/disposal companies. Relevant contracts should be recorded and renewed when the contract period expires.

Waste transportation should be carried out under the leadership of the Environmental Officer of the facility, with the help of Waste Site Supervisor.

Integrated Environmental Information System /EÇBS (https://ecbs.cevre.gov.tr/), created by the Ministry of Environment, Urbanization and Climate Change, is the main entrance screen of environmental applications, including the “Waste Management Application”. Waste Management Application includes Waste Declaration System, MoTAT and Mass Balance System (KDS) applications. Transfer of hazardous wastes must be carried out through the MoTAT application. With the MoTAT system, all waste transportation processes are recorded and it is aimed to monitor and control the transported wastes at every point.

Detailed information on the use of the application can be accessed via the Waste Management Application, MoTAT User Guide published by the Ministry[4].

[4]**Source:** Waste Management Application, MoTAT User Guide
http://motatkds.cevre.gov.tr/MotatKDS_video/ATYONMoTATKullanimKilavuzu.pdf

# 4. WASTEWATER MANAGEMENT

Mains water provided by Salihli OIZ is used for the staff utilization. It is known that the drinking water analyzes are carried out once in every four (4) months by Salihli OIZ. Moreover, drinking water is provided from bottled water.

Daily water usage per capita is stated as 192 lt/person.day for the year of 2022.

There is no water use in the industrial processes. On the other hand, Boron oil is used as cooling liquid.

Wastewater generated only from the domestic activities is discharged to Salihli OIZ canal in line with the “Wastewater Connection Permit”. Throughout the OIZ, wastewater and rainwater are collected separately. There is a “Rainwater Discharge Connection Permit” of the facility.

The water requirement during operation phase of the project, the quantity of water usage&wastewater generated for the year of 2022 and the disposal methods are summarized in Table 5.

**Table 5. Information on Wastewater Management**

| Period | Purpose of Use | Supply | Water Requirement ($m^3$/year) | Wastewater Generated ($m^3$/year) | Disposal |
|---|---|---|---|---|---|
| Operation | Domestic | Salihli OIZ | 11,978 $m^3$/year | 10,780 $m^3$/year | Wastewater generated only from domestic activities is discharged into Salihli OIZ canal in line with the “Wastewater Connection Permit”. |
| | Process | - | 0 | 0 | - |
| **Monthly Average** | | | **998 $m^3$/month** | **898,35 $m^3$/day** | |

## 4.1 Mitigation Measures and Administrative Actions

As mentioned in the previous section, wastewater generated from the facility is discharged into Salihli OIZ canal in line with the “Wastewater Connection Permit”.

The requirements of the provisions of the Salihli OIZ Wastewater Connection and Implementation Internal Regulation will be complied with and connection permits will be renewed before their validity period expires.

On the other hand, in addition to the standards to be determined by Salihli OIZ, Table 6 represents the wastewater discharge limit values to wastewater infrastructure facilities of the Water Pollution Control Regulation.

**Table 6. Wastewater Discharge Standard to Wastewater Infrastructure Facilities According to Water Pollution Control Regulation**

| Parameter | Sewage Systems Wastewater Infrastructure Facilities Resulting in Biological or Equivalent Treatment (2 Hour Composite Sample) |
|---|---|
| Temperature (˚C) | 40 |
| pH | 6 -10 |
| Total Suspended Solid (mg/L) | 500 |

| Parameter | Sewage Systems Wastewater Infrastructure Facilities Resulting in Biological or Equivalent Treatment (2 Hour Composite Sample) |
|---|---|
| Oil and grease (mg/L) | 150 |
| Tar and petroleum-based oils (mg/L) | 50 |
| Chemical Oxygen Demand (COD) (mg/L) | 1000 |
| Biochemical Oxygen Demand (BOD5) (mg/L) | - |
| Total Nitrogen (N) (mg/L) | 100* |
| Total Phosphorus (P) (mg/L) | 10* |
| Phenol (mg/L) | 20 |
| Sulfate ($SO_4^{=}$) (mg/L) | 1700 |
| Arsenic (As) (mg/L) | 3 |
| Total lead (Pb) (mg/L) | 3 |
| Total mercury (Hg) (mg/L) | 0.2 |
| Total cadmium (Cd) (mg/L) | 2 |
| Total cyanide ($CN^-$) (mg/L) | 10 |
| Total chrome (Cr) (mg/L) | 5 |
| Free chlorine (mg/L) | 5 |
| Total sulfur (S) (mg/L) | 2 |
| Total copper (Cu) (mg/L) | 2 |
| Total nickel (Ni) (mg/L) | 5 |
| Total zinc (Zn) (mg/L) | 10 |
| Total tin (Sn) (mg/L) | 5 |
| Total silver (Ag) (mg/L) | 5 |
| Chloride ($Cl^-$) (mg/L) | 10000 |
| Surfactants (MBAS) (mg/L) | Discharge of substances that do not comply with the standards of the Turkish Standards Institute (TSE) for biodegradation is prohibited. |

## 5. TRAINING

It is important for the personnel working during the operational phase to be directly or indirectly involved in waste and wastewater management. In this context, it is a significant duty for the personnel to reduce waste generation at the source and prevent the environmental and public health impacts originated from the waste&wastewater generated during the project.

The training provided within the Waste Management Plan includes the following:

- Training for parties responsible for the implementation of the plan, including their roles and responsibilities.
- Training for all personnel, especially on waste hierarchy, waste prevention and/or reduction, and the potential harm that waste can cause to receiving environments.
- Training for all personnel at a level that explains the impact and risks that the waste generated under the project may have on the environment and public health.

## 6. MONITORING ACTIVITIES

The Quality Engineer for Environmental, Health, and Safety are responsible for implementing this plan together with Environmental Officer and the Waste Site Supervisor. The monitoring and inspection activities to be carried out in this context are presented in Table 7.

**Table 7. Monitoring Activities**

| No | Necessity | Period | Monitoring Responsibility | Responsibility to Perform |
|---|---|---|---|---|
| WMP-1 | Separating hazardous and non-hazardous waste according to their types | Weekly | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP-2 | Separate storage of hazardous and non-hazardous wastes from each other | Weekly | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP-3 | Labeling of all waste containers appropriately | Weekly | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP -4 | Compliance of the Waste Temporary Storage Area with Project Standards and national legislation | Monthly | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP -5 | Disposal status of waste oils generated if maintenance-repair activities are carried out within the project area | Monthly | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP -6 | Transferring the wastes in accordance with the project standard and national legislation | Monthly | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP -7 | Ensuring the disposal of wastewater without any discharge to the receiving environment | Periodically | Quality Engineer for Environmental, Health, and Safety | Project Owner |
| WMP -8 | Follow-up of the trainings | Periodically | Quality Engineer for Environmental, Health, and Safety | Project Owner |

## 6.1 Key Performance Indicators

Table 8 presents the Key Performance Indicators (KPIs) that will be used to monitor the implementation performance of this Plan.

**Table 8. Key Performance Indicators**

| No | Topic/KPI | Target | Monitoring Method |
|---|---|---|---|
| WMP-KPI-01 | Waste Hierarchy | Zero waste (except medical waste) to landfill and/or incineration (i.e., without energy recovery) from all manufacturing and non-manufacturing activities / sites | Records of waste disposal |
| WMP-KPI-02 | Waste prevention and minimization | Reduce or at least maintain quarterly. | Waste generation records of each Internal Inspector / Group Leader |
| WMP-KPI -03 | Waste Prevention and Minimization | Obtaining Silver Zero Waste Certification and enhancing its level annually. | Waste records (for example: packaging wastes) |
| WMP-KPI -04 | Trainings | 100 % completion of each WMP training within their respective period | Records of trainings |
| WMP-KPI -05 | Inspection | Absence of any nonconformities | Records of on-site visual / documentation inspections |
| WMP-KPI -06 | Corrective and Preventative Actions | Closing 100 % within each quarter | Corrective & Preventative Action records |
| WMP-KPI -07 | The rate of sending waste to recycling | Periodic increase in six (6) months | Waste records |
| WMP-KPI -08 | Internal and external complaints related to the waste and wastewater management of the project | Periodic decrease in the number of complaints for three (3) months | Grievance records |
| WMP-KPI -09 | Wastewater Analysis | Compliance with discharge limits | Wastewater analysis |
| WMP-KPI -10 | Potable water analysis | Compliance with Regulation on Water Intended for Human Consumption and WHO limits | Potable water analysis |

## 7. REPORTING

After the internal monitoring activities, the reports/documents prepared by the Project Owner will be reviewed and evaluated within the scope of Environmental and Social Monitoring Studies by the Environmental Consulting Firm approved by TKYB. Subsequently, reporting to TKYB will be carried out at the intervals specified in the ESMP on the topics mentioned in Section 6.

## 8. REVIEW AND UPDATE

This Waste and Wastewater Management Plan is a living document and will be updated as needed in accordance with changes in national and international regulations, changes in the project activities, such as process modifications, capacity increases, and/or changes in the generated waste. Updates will be carried out in compliance with Project Standards.

Ensuring awareness of the content of this plan and ensuring its implementation through training for company personnel and all subcontractors are the responsibilities of the facility's Quality Engineer for Environmental, Health, and Safety / Environmental Officer.