



Türkiye Petrol Rafinerileri A.Ş.

MONITORING OF ESIA FOR TUPRAS RUP

ANNUAL REPORT

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Submitted by:

ICC

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- b) Save for the Client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.
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- d) Work carried out in preparing this report is based upon, ICC's professional knowledge and understanding of the current, relevant Turkish, IFC and European Union:
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 - technology;
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- f) The content of this report represents the professional opinion of experienced environmental consultant. ICC does not provide specialist legal advice and the advice of lawyers will be required.
- g) In the Findings and Conclusions sections of this report, ICC has set out its key findings and provided an overview and therefore any advice, opinions or recommendations set out in the Findings and Conclusions sections ought not to be relied upon until considered in the context of the whole report.

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ABBREVIATIONS

ACM	Asbestos Containing Material
CEMs	Continuous Emission Measurements
DSI	State Hydraulic Works
EFQM	European Foundation for Quality Management
EIA	Environmental Impact Assessment
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
EU	European Union
HSES-MP	Health, Safety, Environmental and Social Management Plan
ICC	International Consulting and Organization Corporation
IFC	International Finance Corporation
ISO	International Organization for Standardization
ISU	Kocaeli Metropolitan Municipality Water and Sewerage General Directorate
NGO	Non-Governmental Organizations
ODS	Ozone Depleting Substances
OHSAS	Occupational Health and Safety
OSAR	Incident Classification, Research, Reporting
PAH	Poly-Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Polyethylene
PM	Particulate Matter
PPE	Personnel Protection Equipment
PRD	Planning Research and Development Ltd.
PVC	Polyvinyl Chloride
RDT	Risk Assessment Table Guide
REMEN	Regulation on Evaluation and Management of Environmental Noise
RUP	Residuum Upgrading Project
SKHKKY	Regulation on Control of Air Pollution Arisen from Industry
TPH	Total Petroleum Hydrocarbons
TR	Técnicas Reunidas
TSE	Turkish Standards Institution
TUPRAS	Turkish Petroleum Refineries Corporation
VCM	Vinyl Chloride Monomer
VOC	Volatile Organic Compounds
WWTP	Wastewater Treatment Plant
WWTU	Wastewater Treatment Unit

CHAPTER 1 : INTRODUCTION

1.1. Objective

Tupras's Residuum Upgrading Project (RUP) (further referred to as 'the Project') has started its operation in May 2015. With the contract in April 2016 the Turkish Petroleum Refineries Corporation (Tupras) General Management commissioned the International Consultancy Company (ICC) to carry out the work of **"Monitoring of the ESIA for RUP of Tupras"** during the operational phase. According to the contract, this monitoring report shall be prepared and submitted to the Tupras once per year.

The objective of this monitoring report is to verify whether the mitigation measures, as laid down in the Environmental and Social Action Plan (part of the ESIA produced by ICC and Royal HaskoningDHV), have been applied in accordance with said standards during the operation phase.

This report describes the assessment of the RUP of Tupras performed from the beginning of operation activities till the end of March 2021 and includes all relevant data gathered during on-line meetings with the site representatives and the related staff, and during document audits/observations.

1.2. Methodology

The methodology to produce the annual monitoring reports is as follows:

1. Analysing the ESIA & ESAP reports
2. Analysing the relevant parts of the contract and their annexes with the financing institution.
3. Analysing the last annual monitoring report prepared for the operation phase.
4. On-line meetings within the reporting month.
5. Analyzing gathered data (including site photos and the reports by the third parties) with an office work.
6. Reporting
7. Delivering the draft report to Tupras
8. Revision due to the comments of Tupras, if necessary
9. Submission of Final Report

1.3. Work Done in this Reporting Phase

Due to the restrictions throughout the country caused by coronavirus, site visits could not be performed for this auditing period. Instead, on-line meetings were executed with site representatives. On-line meetings and studies for this assessment was carried out by Dr. Tamer Atabarut and Talha Adıyaman during April 2021. No sampling, testing, experimentation or other method of analysis were carried out.

The findings in the report mainly based on data provided by Tupras and the third party reports. The sources and material consulted, reviewed or examined in this assessment are given in Annex-1.

The project team of this study together with their tasks and responsibilities are given in Table 1.1.

Table 1.1: Project Team of ICC

Expert	Expertise Area	Company	Task
Ms.Tulin Secen, CMC	Business Administration	ICC	Project coordination and management
Dr. Tamer Atabarut	Civil and Environmental Engineer	ICC	Carrying out assessment study and reporting
Mr. Talha Adiyaman	Environmental Engineer	ICC	Carrying out assessment study and reporting

The site personnel given in Table 1.2 were present during the different stages of the meetings and contributed in the provision of information.

Table 1.2: Personnel of Tupras Interviewed

Name	Position
Mr. Erkan Modoğlu	Technical Safety & Environmental Manager
Mr. Ersoy Koca	Environmental Control Superintendent
Mr. Atakan Selçuk	Environmental Control Supervisor
Mr. Mertcan Bilgin	Environmental Control Supervisor

1.4. Structure of the Report

Following the introduction in Chapter 1, Chapter 2 describes the general environmental activities in Tupras Refineries. Chapter 3 gives information about the site structure and the project production phase with relevance to environmental and social impacts and the mitigation measures (see ESIA/ESAP) limited to the current reporting period.

In Chapter 4 all environmental and social impacts are described and linked to the mitigation measures. It includes;

- data collected in the reporting period
- issues/findings on environmental and social impacts and mitigation measures

Chapter 5 describes the risk ratings of the RUP during the Production Phase as of April 2021. The purpose of this task is rating the project in three risk classes (High, Moderate, Low) depending on the conditions from assessment work.

Finally recommendations and conclusions are given in Chapter 6 and 7, respectively.

CHAPTER 2 : GENERAL ENVIRONMENTAL WORKS IN TUPRAS REFINERIES

At Tupras Izmit Refinery the Corporate Practices of Quality Management System, Environmental Management System and OHSAS have been certified since 2002 and related standards and procedures were implemented. ISO 45001, a new ISO standard has been released to replace OHSAS 18001; has also been studied by Tüpras' management systems department and system integrations have been completed. This standard audit will be carried out in September 2021 and expected to be certified until the end of the year.

In addition to the health and safety practices implemented from the commissioning of the facilities, environmental standards and procedures have also been adopted. The new comprehensive environmental standards such as energy management system and procedures have been applied for all Refineries. ISO 50001 Energy Management Standard has been implemented since 04.12.2013, and also ISO/IEC 27001 Information Security Management Standard has been implemented since 23.12.2013. Environmental awareness and sensitivity has been internalized in all Tupras Refineries.

All the Incident Classification, Research, Reporting issues are followed via SAP System. The Risk Assessment Table Guide (RDT Rehberi) has been continuously implemented. According to this system, the health-safety-environment (HSE) criteria have been implemented properly.

Tupras's HSE Unit is carrying out routine audits to check the compliance of the subcontractors to relevant legislation and standards. The Subcontractor Management System has been launched for integrating subcontractors with Tupras HSE system. Accordingly, all subcontractors are being categorized upon scoring as per HSE requirements. A database has been established for the approved sub-contractors of Tupras. On the other hand, the works done by the sub-contractors are supervised by the staff responsible for environmental issues as much as OH&S matters.

Tupras environmental officers (as per regulation on Environmental Auditing) carry out internal environmental audits at the refineries every year. The internal audit for 2020 was carried out between 19-23 October. Each refinery has been audited by an auditor team generated from different refineries of Tupras. Positive improvements have been observed evidently at site and on documentation.

There is a great effort in Tupras Refineries to comply with Turkish and EU Environmental Regulations to obtain relevant permits/licenses and to employ required techniques, practices, measures and monitoring activities; and accordingly plan the proper investments. Environmental culture and responsibility have been improved significantly within the organization. Having through knowledge on national, international legislation and requirements, Tupras's environmental staff are high qualified and competent at their fields of activities. The Refinery has proactive approach for management of environmental risks and for taking necessary actions for compliance with the regulations. Due to their competence, Tupras's environmental staff contribute to the discussions on the newly planned national regulations.

Furthermore, the production techniques are being renewed in order to produce environmentally-friendly products in accordance with EU regulations.

In February 2016, Tüpraş became a member of the association A.SPIRE (Sustainable Process Industry through Resource and Energy Efficiency). It is the first Turkish company accepted to the General Assembly. With this membership; Tüpraş closely follows the works related to new and efficient energy and resource management, original and advanced energy systems, reducing greenhouse gas emissions, storage and reuse of energy, process monitoring, simulation, control and optimization, more efficient equipment and process research, which are on the European strategic agendas. It will ensure the continuity of improvement and development by creating strategic R & D partnerships with companies guiding on future technologies in the same platform. In the current situation TUPRAS continues its membership and closely follows developments about the sustainability and efficiency.

Since 2008, Tüpraş has been working towards the most efficient energy use target and got important results. Over the last 12 years, energy density has been decreased in refineries, while it leads to reduction in costs and environmental impacts.

The reductions in greenhouse gas emissions achieved by a number of the projects selected from energy efficiency projects carried out in refineries have been certified under ISO 14064-2 since 2018. In 2020, the greenhouse gas emissions of refineries for 2019 were calculated within the scope of ISO 14064-1 and verified by an independent auditor.

Tüpraş has also good practices in the waste and wastewater management issues. In 2018, a foyer was organized at the Tüpraş R & D Center within the scope of the "zero waste" project conducted by the Ministry of Environment and Urbanization. This project has been implemented as a pilot in the Directorate of R & D. The facility now has a "Zero Waste" certificate. Implementations have spread to all refineries. Basic Level Zero Waste Certification obtained for İzmit, İzmir, Kırıkkale and Batman refineries in 2020.

In İzmit Refinery, the effluent of WWTP unit has been recovered and used at fire water line and cooling systems. Tüpraş Management is highly appreciated for financial and organizational supports to Research and Development Projects in this respect.

Another example is the New Water Recovery Unit composed of pre-treatment and membrane reactor of Reverse Osmosis which is used for recycling of treated wastewater. Within the framework of this project developed together with Kocaeli Metropolitan Municipality Water and Sewerage (ISU) General Directorate, treated wastewater of Körfez region has been used at the refinery. The project was completed in May 2015. This recovery project has been rewarded with the second prize in 2018 within the scope of the Environment-Friendly Implementation Project Awards organized by the Ministry of Environment and Urbanization. It was also awarded with first prize in the category of Water Management in Sustainable Business Awards Turkey 2018.

Total capacity of this system is calculated as 1500 cubic meters of water per hour, and it means roughly 11 million tons of water recovery per a year. The total amount of wastewater discharged after the new technology has been reduced by 60%. The amount of municipal wastewater discharged to the receiving body was reduced from ~ 2,500 cubic meters per hour to 1,000 cubic meters. Although the recovery rates of 2020 have decreased due to Covid-19, it is expected that the numbers before the pandemic will be reached again in the near future.

On the other hand, the Control Building of the RUP Site was designed as a green building and was awarded with LEED Gold Certification (Annex-2). It is the first and only industrial control building in Turkey with this certification. In this context, it does not harm the environment and human health throughout the lifetime, uses energy and water efficiently, protects natural resources and contains many green strategies aimed at environmental protection. In this sense it reflects the sensitivity and awareness of Tüpraş for sustainability and the environment.

Tüpraş İzmit Refinery has been awarded on the category of Energy Efficiency Enhancement Project in the Industry organized by the Ministry of Energy and Natural Resources in 2019. Approximately 45 thousand tons reductions in CO₂ gas emissions have been achieved by the projects prepared within this scope. In 2020, a new one was added to these awards of the Refinery: "Jury Special Award". With energy consumption optimization studies in hydroprocess units, it saved 92.330 MW in energy consumption annually and reduced 20 thousand tons of carbon dioxide emission annually in greenhouse gas emissions.

The waste management standard has been continuously improved in general. Furthermore, the latest system, called 'SAP Waste Management System' enables proper recording of the waste inventory, tracking, and management. Tüpraş has also good practices in the waste management issues that awarded by the third parties before.

In the İzmit Refinery, "Industrial symbiosis", including the recycling of activated carbon with sending it to regeneration facilities abroad, and sending oil spillage waste to insulation and bitumen materials production facilities, has been established. İzmit Refinery was awarded in Waste Management category at the Sustainable Business Awards 2020 for its "Industrial Symbiosis Applications". Studies have been initiated to extend these practices to other refineries.

Tüpraş has been an active participant in the UN Conference of the Parties on Climate Change since 2015. In these conferences, the development of international climate policies, how national developments will be shaped and sectoral expectations are followed and Tüpraş's experiences are conveyed to international participants on appropriate platforms.

In 2020, the EFQM model was updated by taking into account global trends, the United Nations Sustainable Development Goals and the concept of the ecosystem and focusing on transformation. In the first half of March, when the first Covid-19 cases were officially announced across the country, the new version of the EFQM Model started to be used in Tüpraş. As the first company to implement this new version of the EFQM model in Turkey, Tüpraş's goal is to advance towards a sustainable performance in a changing world order by disseminating the culture of continuous improvement and the approaches contained in the model. Due to the pandemic, EFQM audits at Tüpraş were carried out in virtual environment and the certificate was obtained.

In addition to all these environmental studies, based on an audit conducted by the Turkish Standards Institution (TSE), TSE Covid-19 Safe Production Certificate has been obtained. This means that the Refinery fulfils the requirements of the TSE Covid-19 Hygiene, Infection Prevention and Control certification program.

Existing environmental management standards, which are valid in all Tüpräs Refineries including the RUP Site and still applied securely, are briefly summarized below:

Standard for Determination of Environmental Impacts and Aspects:

The purpose of this standard is to define environmental aspects of Tüpräs Refineries during normal, abnormal and emergency conditions via environmental assessments, identify the impacts of these aspects, to provide high level environmental protection, to meet the requirements of legislation and other standards, to prevent negative impacts to protect environment and company's reputation or identify the mitigation measures and responsibilities and methodologies.

Standard for Internal Audits:

The purpose of this standard is checking the activities of Tüpräs with the environmental regulations. Internal audits are performed to evaluate the effectiveness of the measures taken by the Environmental Management Unit. Audits are carried out with a specified scope and format to determine the responsibilities of environmental officer.

In each refinery, Internal Environmental Audit is done at least once a year by the Environmental Management Unit staff. Environmental officers from other refineries are ordered away to the refinery that will be audited.

Within the control dates determined by the Environmental Directorate of Tüpräs, site visit is carried out in whole refinery area with a checklist considering the applications according to environmental legislation. Findings and recommendations are reported and corrective and preventive actions are followed.

Standard for Corrective, Preventive and Improvement Actions:

This standard defines the required activities for potential or realised non compliances and the responsibilities. The standard covers all the processes Management Systems including;

- ISO 9001 Quality Management System Requirements,
- ISO 14001 Environmental Management System Requirements,
- OHSAS 18001 Occupational Health and Safety System Requirements (will be replaced with ISO 45001 at the end of the year 2021)
- ISO 50001 Energy Management System Requirements,
- ISO 27001 Information Security System Requirements,
- ISO 17025 General Conditions for the Competence of Testing and Calibration Laboratories.

Standard for Solid and Hazardous Waste Management:

The purpose of the standard is to identify the practices for effective implementation waste management system.

Each Refinery has specific Waste Management Plan including Waste Action plan for waste disposal, storage conditions, durations and periods conditions are specified for each type of generated wastes.

Drilling Standard:

The purpose of this standard is to define the principles and methodologies for preparation of drills and evaluate the effectiveness of these drills.



Standard for HSE Management System of Subcontractors:

This standard aims to ensure subcontractors to carry out their activities in accordance with Tupras's HSE policy. In this regard, the standard provides proper subcontractors to be selected and continuous improvement.

Standard for Fighting with Sea, River and Soil Pollution:

The purpose of this standard is to take necessary mitigation measures for potential pollution to sea, river, and soil in the vicinity of Tupras Refineries and at Tupras Refinery sites and to develop methodologies and establish teams, define the responsibilities to minimise the impacts of oil and chemical contamination.

Standard for Work-Hazard Analysis:

This Standard defines;

- when to be done
- which methodology to be used.

Work Hazard Analysis identifies high or moderate risks, potential risks and results of hazards, permanent mitigation measures.

The standard provides a proactive HSE approach by establishing a database for the future. The standard covers definition of hazards during activities of operation, maintenance, projects-investments etc. departments, mitigation measures and methods to minimize the impacts to acceptable levels (ALARP).

Standard for Disasters:

The purpose of this standard is to establish a temporary organisation in accordance with the Disaster Plan to minimize the hazard and losses, to prevent significant death and losses upon large industrial accidents in Tupras Refineries and in the vicinity. The standard defines the tasks and the responsibilities of the personnel in the organisation, mitigation measures to be taken to protect the environment, and external and internal communication lines and cooperation.

Standard for Stakeholder Communication Management:

The purpose of this standard is to identify the necessary basics for maintaining and evaluating the issues below in a systematic way;

- How to consider the feedbacks (complaints, satisfaction, desire, wish, etc.) coming from all stakeholders in relation to Tupras's activities;
- Who to notify;
- After examining the feedbacks, how the result of the solution will be forwarded to stakeholder

The scope of the standard includes recording, evaluation, solution, respond, analysis and reporting of all kinds of notifications coming from the communication channels of the company directly or indirectly.

The following chapters provide detailed information about the site characteristics and operations, and assessments of the current environmental progress and liabilities of the Refineries.

CHAPTER 3 : SITE DESCRIPTION

3.1. Site History

At the project site Korfez Petrochemical Plant and Refinery started operations in 1970 as a facility belonging to Petkim Holding Inc., a state-owned company, which was active in the petrochemical industry. The constructions were carried out between the years 1965 and 1970. In November 2001, Tupras acquired the Site from Petkim, in order to diversify its activities and acquire land for expansion.

The Site operations started in 1970 with five production units of:

- Ethylene;
- Chlor-Alkali;
- Vinyl Chloride Monomer (VCM);
- Polyvinyl Chloride (PVC);
- Low Density Polyethylene (PE);

and other utility units.

Between the years 1972 and 1976 Carbon Black (CB), Styrene, Polystyrene (PS), Lab (DDB), 1,3-Butadiene Extraction (BDX), Styrene-Butadiene Rubber (SBR), CIS-Butadiene Rubber (CBR) and Caprolactam units were added and the Petrochemical Complex was completed.

The Site performed the maximum production between the years 1987 and 1990. After the 1991 crisis, however, some of the production units were stopped. Between the years of 1990-1995 Chlor-Alkali, Ethylene, Styrene, DDB and Caprolactam units were stopped and dismantled. PE, PVC and VCM units were stopped in 2001.

PVC and Polyethylene were removed during 2006. PS Unit was removed in 2007. BDX (Butadiene Extraction) and Ammonium Sulphate Storage building and Chlorine Alkaline Unit were removed in 2008. The operations of the Styrene-Butadiene Rubber (SBR) and CIS-Butadiene Rubber (CBR) were terminated in 2007 and dismantled in 2009.

3.2. Past Activities in the Vicinity of the Site

The main development of the industrial area of Korfez, Izmit started in the late 1950s and early 1960s. The area was previously undeveloped land. The first construction activity in the area was probably connected with the Izmit Refinery development.

At the south of the project area, there was a Gas Instruments Plant named GAZAL, which was moved more than sixteen years ago. There is a decommissioned industrial area (ceramic plant) to the southwest of the Site.

At the west side of the plant, an area has been used as a vehicle storage area by OMSAN. A jetty construction has been done by a partnership of Dubai Port and ERDEMIR (Eregli Iron and Steel Inc.).

3.3. Residuum Upgrading Project (RUP)

The Residuum Upgrading Project (RUP) is a part of the Izmit Refinery and has been established within the boundaries of the Korfez Municipality, Kocaeli Province in the Marmara Region of Turkey.

The site preparation and the excavation activities were contracted out by TUPRAS to a number of reputable local subcontractors. Then the main construction activities were contracted to the contractor UTE Tecnicas Reunidas RUP which started working on November 14, 2011. The production at the RUP has been started on March 16, 2015, while the associated units had been started operation before.

By means of the RUP, the atmospheric residue of the refinery has started to be converted to cleaner products like LPG, gasoline, jet fuel, diesel fuel and also to petroleum coke which is an imported product widely used by the cement industry. The operation phase called the production process are active for about 5 years.

The brief process flow-diagram is shown in Figure 3.1 and the units of RUP and roughly their capacities are given in Table 3.1. The general production flow-chart of the whole Refinery including both Izmit Refinery and the RUP site is given in Annex-3.

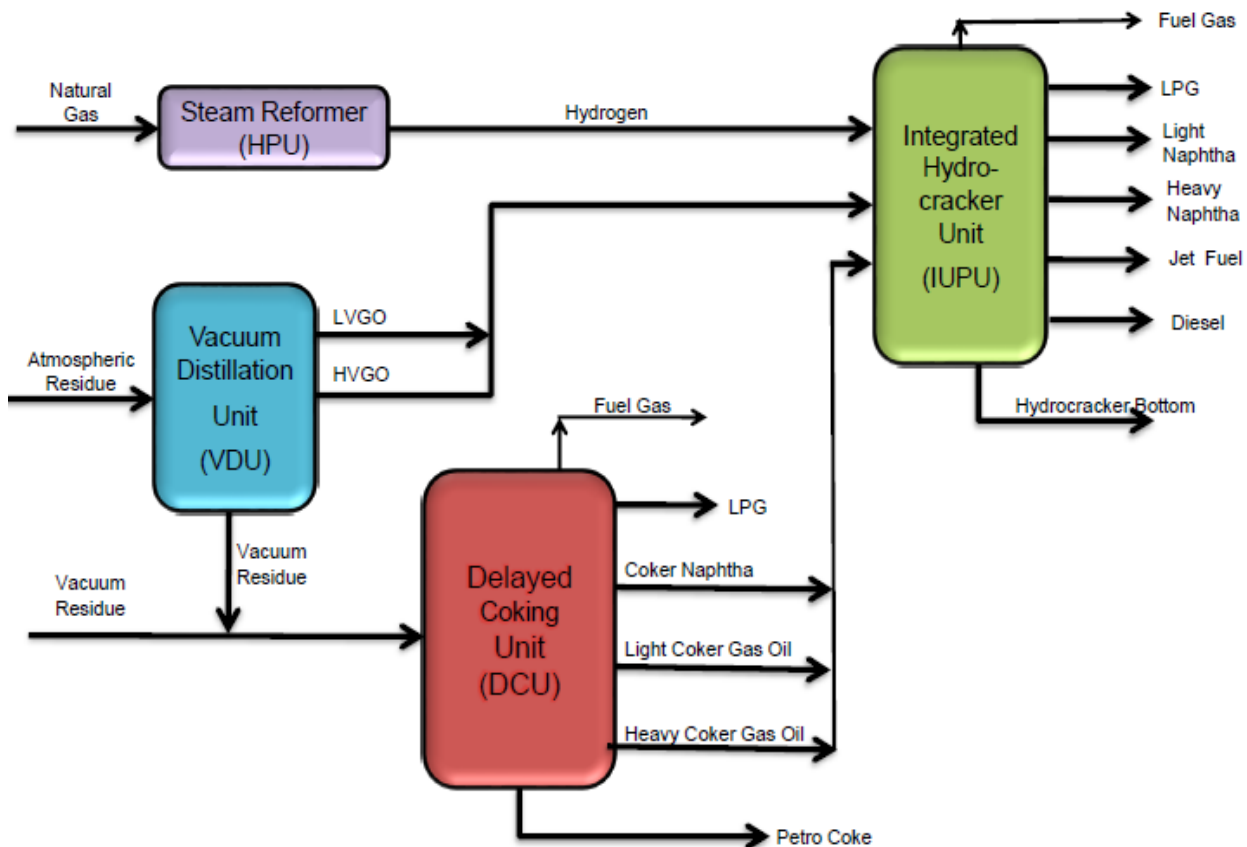


Figure 3.1: RUP Brief Process Flow Diagram

Table 3.1: The Units of the RUP and Their Capacities

UNITS	CAPACITY
Vacuum Distillation Unit	7500 m ³ /day
Delayed Coking Unit	8200 m ³ /day
Hydrocracker Unit	8000 m ³ /day
Naphtha Hydrogenation	1200 m ³ /day
Diesel Desulfurization	4000 m ³ /day
Hydrogen Unit	160.000 Nm ³ /s
Sulphur Recovery Unit	420 ton/day sulphur
Electricity Production (2 GT + 1 ST)	120 MW
Cooling Tower (4 cell)	12.000 m ³ /hr
Wastewater Treatment Unit	12.000 m ³ /day
Sour Water Stripper (2 trains)	3.033 m ³ /day
Amine Regeneration Units (2 trains)	26.400 m ³ /day

Photographs showing the general activities are given in Annex-4.

CHAPTER 4 : FINDINGS

For all impacts identified in the ESAP, specific mitigation measures were defined for each project phase (construction, operation, and decommissioning). The impacts and the mitigation measures for operation phase and the current situation concerning action plans are given in Annex-5.

The findings on the impacts and mitigation measures are based on the documentation provided by Tupras and interviews with project personnel.

4.1 Water Use

Potable and fire water supply systems are available for sanitary and daily needs of the personnel, cleaning and firefighting. Water for human consumption and process related uses were obtained from existing water network supplied by a pipeline from the Sapanca Lake. In addition, drinking and food preparation water for the employees has been supplied with bottled water.

Separate water meters to measure the amount of water used both for Izmit Refinery Site and the RUP Site had been installed before at the relevant lines. Currently water usage is monitored daily and reported monthly.

Water wastage and spillage have been inspected regularly by the HSE of Tupras. Within this period no major incident was recorded.

As previously reported, Tupras has built a “Water Treatment Unit” in Izmit Refinery, in order to decrease consumption of natural resources and use the water resources effectively because of the risks created by global climate change. The water treated by this unit is re-used both for production processes and fire water systems in emergency.

The Water Treatment Unit is composed of pre-treatment and membrane reactor of Reverse Osmosis used for recycling of treated wastewater. The total investment amount is roughly 50 million Turkish liras. As a result of this investment, the abstracted water from Sapanca Lake has been reduced to a minimum level.

Within the framework of the project developed with Kocaeli Metropolitan Municipality Water and Sewerage (ISU) General Directorate, municipal wastewater is being recovered at this unit and used at the refinery. Total production capacity of this system is 1500 cubic meters of water per hour, and it means roughly 11 million tons of water recovery per a year.

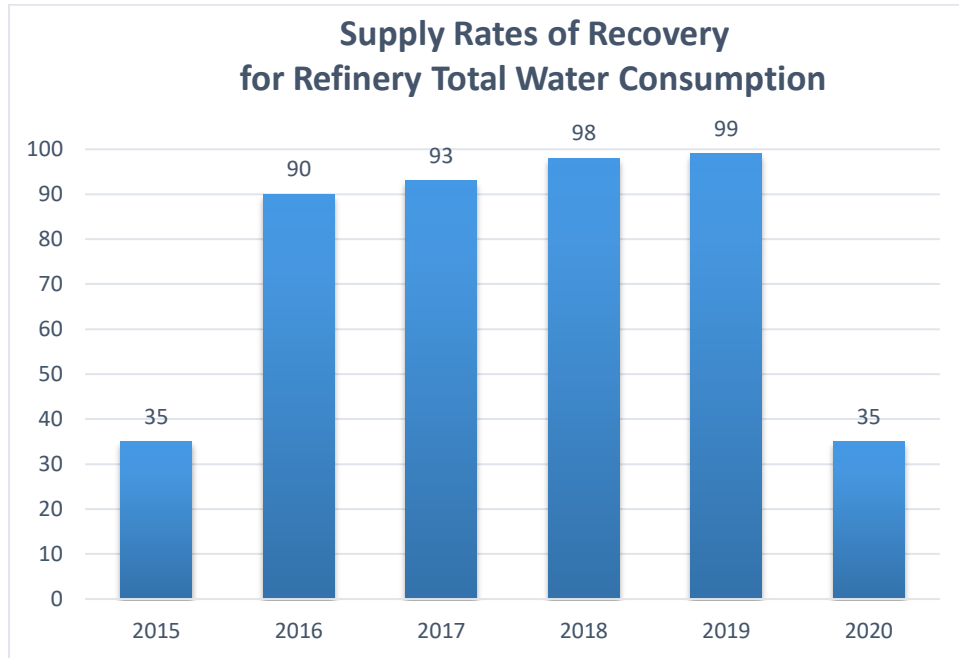
There is continuous need of high-quality water due to production activities of the Refinery. With this project the recycled water is used in the production of steam needed by the processing unit, for cooling water consumption and also in cases of emergency fire water system.

The total amount of wastewater discharged after the new technology has been reduced by 60%. On the other hand, after using this technology in Tupras, the amount of municipal wastewater discharged to receiving body was reduced from ~ 2,500 cubic meters per hour to 1,000 cubic meters. The benefits of the new technology are summarized in the following table;

Table 4.1: Changing Parameters

Changing Parameter	Δ (Change)
Raw water amount drawn for the facility	1.500 m ³ /hour (reduction)
Wastewater discharged from the municipality to receiving body	1.500 m ³ /hour (reduction)
Cost Savings	1.423.500 \$/year

Between the years 2015 and 2020, the supply rates of recovery for refinery total water consumption is shown in Figure 4.1 below;

**Figure 4.1:** Water Recoveries

This figure illustrates that, 99% of total water consumption was supplied by recovered water before the pandemic.

While the studies on the existence and effects of coronavirus in domestic wastewater were conducted, some measures have been implemented across the country in line with the measures taken by the General Directorate of Environmental Management, MOEU. Municipal wastewater could not be taken from the Körfez domestic wastewater treatment plant for a long time due to the pandemic risk. For this reason, recovered water amount was lower than in previous years. During this time, the maintenance works were carried out in the unit. Thus, the rate of recovery of wastewater used in processes has decreased. In this period, the water drawn from Lake Sapanca increased accordingly, however, Lake Level was not affected by this.

Although the water recovery rate of 2020 was decreased due to Covid-19, it is expected that this ratio will be reached before the pandemic again in the near future.

The residual impact of water use is minor in the reporting period.

4.2 Air Emissions and Odour

Emission sources are places where air contaminants spread from plant to atmosphere. Facility that gives its emission to atmosphere via a flue stacks is considered as point source, pollutant sources that are given to the atmosphere from outside of flue or many small flue area are considered as area source and moving polluting sources are considered as line source.

Mass flow of emissions is the average hourly mass (kg/hour) flow of air pollutants that are given to the open atmosphere from emission sources in operational conditions. If there are decreasing or increasing oscillations in the mass flow of emissions in periods less than an hour, average of these oscillations are designated as hourly mass flow. Mass flow of facilities that give their emissions from places different from flues and facilities that will just be established is found by using emission factors.

The air emissions during the operation phase are from various process units, utilities and storage facilities. The impacts of air emissions during the operation phase have a high likelihood and great consequences. Thus the mitigation measures taken by Tupras include:

- Provision of ultralow NO_x burners for boilers and heaters, proper stack heights for major emission sources including flare, specifications on floating roof tanks and controls for fugitive emissions including process wastewater treatment plant.
- Formalize and follow operation and maintenance (O&M) procedures for boilers, heaters.
- Provision of emission control equipment to ensure efficient operations and prevent upsets.
- Implementing ambient air quality monitoring station, continuous emission monitoring for major sources and routine emission monitoring for other sources to track emissions and compliance with applicable standards.

Therefore the impacts on ambient air quality are not significant or are within acceptable limits with these proper mitigation measures.

At Tupaş Refinery, ambient air quality measurements are carried out once every 2 years. The measurements for 2021 continue as of April. The results are expected to be reported in June and evaluated in the next auditing period.

Most recent emission measurements in the existing facilities were measured by ARTEK Mühendislik Çevre Ölçüm ve Danışmanlık Hizm. Tic. A.Ş., which is an accredited firm by the Ministry of Environment and Urbanization, within the dates of; 07.02.2019, 22.02.2019, 09.03.2019, 10.03.2019, 22.03.2019 - 26.03.2019, 28.03.2019, 24.03.2019, 25.04.2019, 30.04.2019 – 03.05.2019. Results of air emission measurements for each plant are given in detail in Annex 6.

The results of the SO₂, NO₂, CO and PM₁₀ emissions measurements are given in Table 4.2 as average basis for the year of 2019. Limit values based on emission source for these parameters that are valid as of 8/6/2019 are given on Table 4.3 below. Results also indicate that there is not any incompliance within the RUP Site.

Table 4.2: SO₂, NO₂, CO and PM₁₀ Emissions Results

Emission Results for the Entire Plant	CO (mg/Nm ³)	NO ₂ (mg/Nm ³)	SO ₂ (mg/Nm ³)	PM ₁₀ (mg/Nm ³)
Plt 9 Power Plant	2,08	297,77	150,48	1,04
Plt 9 Cogeneration	6,25	67,29	2,86	-
Plt 10 Power Plant	23,33	145,67	124,76	0,77
Plt 5 Crude Oil	15,83	167,02	224,76	1,05
Plt 25 Crude Oil	67,92	164,29	120,00	0,85
Plt 47 47F-201 Hydrogen	1,25	73,45	2,86	0,48
Plt 63 Unifier Platformer	1,25	80,02	12,38	0,55
Plt 126 126F-1 Vacuum Distillation	1,25	75,02	20,00	0,94
Plt 177 101 Delayed Coking	1,25	88,51	2,86	0,70
Plt 177 102 Delayed Coking	1,25	81,87	2,86	0,67
Plt 147HPU Hydrogen	1,25	98,57	2,86	0,22
Plt 147 IUPU	1,25	37,58	2,86	0,15
Plt 109 109F-262 Cogeneration	1,25	35,18	2,86	-
Plt 109 109F-272 Cogeneration	1,25	35,32	2,86	-

Table 4.3: Limit Values of SO₂, NO₂, CO and PM₁₀ Emissions

Emission Source	Limit Values and Parameters as of 08/06/2019 (mg/Nm ³)			
	SO ₂	NO _x	CO	PM ₁₀
9F-1A/1B/1C/1D	1700	450	150	50
9F-701_HRSG	-	75	100	-
10F-103A/104A/105A/201	1700	450	150	50
2F-1/2	1700	800	125	70
5F-1/101/3	1700	450	150	50
6F-1/2/101/102/103/104/201/202	35	300	100	5
25F-1/2	1700	450	125.5	50
47F-201A/B	35	300	100	5
63F-100/101/102/103/104/1/2	35	300	100	5
147F-001 IUPU	35	300	100	5
177F-101 Delayed Coker	100	800	100	10
177F-201 Delayed Coker	100	800	100	10
147F-201 HPU	35	300	100	5
126F-1	35	300	100	5
109F-262	-	91.6	100	-
109F-272 Co-generation Unit	-	91.6	100	-

All measured parameters were evaluated according to the limit values given in the Regulation on Control of Air Pollution Arisen from Industry (SKHKKY). Results indicated that there was not any incompliance within the RUP Site for air emissions.

The region where Tupras is located has quite dense industrial facilities. According to the modeling measurements made by the accredited company, Tüpras' contribution value for PM10 concentration is 19% for short term and 6% for long term periods. Thus the results are compliant.

Comparison of the results are evaluated on Table 4.4, according to the limit values given in EU Directives and WHO Guidelines.

Table 4.4: Comparison of SO₂, NO₂ PM₁₀ Emissions

Parameter	Period	RUP Measured Values in 2019 (µg/m ³)	2008/50/EC Limit Values (µg/m ³)	Target Date of EU Directive for Turkey	WHO Ambient Air Quality Guidelines (µg/m ³)	Status	Details
SO ₂	Hourly	-	350	2019	-	Compliant	-
	Short term	10,34	125	2019	20	Compliant	-
NO ₂	Hourly	-	200	2024	200	Compliant	Instead of hourly value, short term value of 300 µg/m ³ is actually governing acc. to Turkish legislation. This is complied.
	Long term	5,75	40	2024	40	Compliant	-
PM ₁₀	Short term	15,0	50	2019	50	Compliant	-
	Long term	12,5	40	2019	20	Compliant	In WHO AQG, interim targets (IT) are also given as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high. The IT-3 is set at 30 µg/m ³ .

Additionally, requirements such as preparation of feasibility report and tracking of data transmission percentage within the scope of Continuous Emission Measurement System (CEMS) Communiqué are implemented in the facility. There are 7 stacks that should be monitored according to CEMS Communiqué. The feasibility reports prepared by Kocaeli University in compliance with the Communiqué were approved by MOEU (Annex-7).

Emissions have been monitored via CEMS directly by MoEU as of December 2015. These measurements are on-going in 2021 and the results are monitored online by Tupras and the Environmental Provincial Directorate.

In addition to the air emissions measured by Tupras within the framework of its legal obligations, hydrogen sulfide and sulfur dioxide measurements were performed in the vicinity of the facility by TUBITAK (The Scientific and Technological Research Council of Turkey) in March-July 2019. Air quality measurements were carried out on a monthly basis. The average of those analysis results for both measurement parameters remained below the limit values at all measurement points. The results obtained by TUBITAK for both parameters are given in detail in Annex 8.

Within the scope of the “Regulation on Monitoring of Greenhouse Gas Emissions”, the annual greenhouse gas emission reports of all refineries since 2015 have been verified by the relevant institutions authorized by the Ministry of Environment and Urbanization and by independent third parties within the scope of ISO 14064-1, which the company voluntarily prepares and are forwarded to the Ministry of Environment and Urbanization. The reductions in greenhouse gas emissions in refineries have been certified under ISO 14064-2 since 2018.

In 2020, the greenhouse gas emissions of refineries for 2019 were calculated within the scope of ISO 14064-1 and verified by an independent auditor (BSI, see Annex 9).

The greenhouse gas emissions of the RUP for 2020 have been verified by QSI Belgelendirme Muayene ve Test Hizmetleri. This verification process has been reported to the Ministry through the system and approved by the Ministry on 28.04.2021.

Odour episodes as a result of atmospheric emissions from the RUP are a recognised potential impact. Besides the stacks possible sources of odours from the plant are mainly from the storage tanks at the tank farm and the product loading racks. Odour may be generated from the combustion of fuel containing sulphur.

Other potential sources of odour are the wastewater treatment facility. Impacts from the wastewater treatment facility are expected to be negative, direct, but temporarily (only potential in the start-up phase) and limited in geographical extent and reversible.

It should be emphasised that this is considered to be a conservative assessment given the limited information on odour emissions from the RUP. Therefore, even the impact from the wastewater is rated as negligible, odour episodes may be negatively perceived by residents close to the RUP.

A better quantification indicating the spatial extent of odour episodes will determine whether or not the residential areas or indeed any other potential receptor would be subjected to odour episodes. If this proves to be the case mitigation may need to be investigated to reduce the likelihood/frequency of the same. On the other hand, the mitigation measures for air emissions have been also reducing the odour impacts.

Considering the mitigation measures implemented both for the air emissions and odour, the impact can be considered minor.

4.3 Noise

As a large industrial facility there are a number of noise sources in RUP operation. These sources include air blowers, pumps, compressors, turbines (on the power plant), agitators, motors, diesel generators, and movement of vehicles on the plant.

Noise generated by RUP activities would create a direct nuisance impact in the closest residential areas for the duration of the RUP operation. The impact would be of long term duration (noise will be generated for the life of the RUP).

The noise levels for daytime, evening and night are defined differently in the Regulation on Evaluation and Management of Environmental Noise (REMEN) for industrial facilities with respect to the location sensitivity as given in Table 4.5.

Table 4.5: Environmental Noise Level Limits and Noise Levels for RUP (REMEN, Table 4)

Location	L _{daytime} (dBA)	L _{evening} (dBA)	L _{night} (dBA)
Noise sensitivity areas i.e. training, cultural and health fields, and the densely summer and camping areas	60	55	50
Both noise sensitivity areas and commercial areas with the areas of dense housing areas	65	60	55
Both noise sensitivity areas and commercial areas with the areas of dense commercial areas	68	63	58
Facility in the Organized Industry Zone or Special Industry Zone	70	65	60

The likelihood of impact is deemed to be medium low probability, because of the distance to the residential areas. The significance rating of the impacts of noise generated during RUP activities is considered to be minor as a function of the considerable potential consequences of noise impacts and the medium low likelihood of occurrence.

Although there is an exemption on the environmental permit the Refinery is carrying out noise measurements performed by an independent, accredited institution once every 2 years. The measurements for the year 2021 is planned to be carried out in November 2021 and will be evaluated in the next auditing period.

The last Acoustic – Environmental Noise Measurements were performed by ARTEK Engineering Environment Measurement and Consultancy Services Trade Corporation between the dates of 16.12.2019 – 19.12.2019.

This report with the number of AGR 19 – 033 that was prepared for noise measurements conducted in Tupras is given in Annex-10. The L_{daytime} (L_d), L_{evening} (L_e), and L_{night} (L_n) noise maps are also available in this annex. Measurement points were specified according to the structure of the field and regarding the status of facility surrounding.

According to the results of the daytime measurements conducted at 3 receiving media closest to the facility, the noise levels were 55,1 dBA, 63,2 dBA, and 60,1 dBA, respectively. According to the regulations on assessment and management of environmental noise Annex VII Table 4, it was observed that the daytime threshold for "Industrial Sites", 70 dBA, was met.

According to the results of the evening measurements conducted at 3 receiving media closest to the facility, the noise levels were 54,2 dBA, 60,5 dBA, and 56,3 dBA, respectively. According to the regulations on assessment and management of environmental noise Annex VII Table 4, it was observed that the evening threshold for "Industrial Sites", 65 dBA, was met.

According to the report it is observed that all parameters of the day and evening measurements are below the limit values given in the Regulation on Assessment and Management of Environmental Noise. There is not any problem within the RUP Site for noise emissions at day and evening.

During the operational phase noise sources of the Refinery have been specified and necessary measurements have been taken and reported by the third party. The results of the critical units are given in Table 4.6. According to those results the measured values meet the noise levels given by the manufacturer.

Table 4.6: Noise Sources and Levels during Operation of RUP

Noise Source	Noise level (L_{eq}) (dB)
Transformers	67
Gas Turbines	76
Activated Carbon Filter	76
Knock Out Drum	79
Water Tower	77
Wastewater Treatment	68
Domestic Wastes	64
Ovens	81
LPG Area	79
Coker Tanks	74

In the following Figure 4.2, the noise measurements at the RUP Site are shown in two different maps (MAP-1 and MAP-2).

MAP-1 has been prepared on the basis of Assessment and Management of Environmental Noise Regulation. It is obtained by taking the long-term average volumes of daytime, evening and night measurements. It expresses the total daily discomforts according to impact level.

MAP-2 is a map based on the noise generated by the equipment and it is prepared by Técnicas Reunidas (the contractor).

When comparing those two figures; the values specified in the first map seems to be higher by about 5 to 10 dB (A). This is because it address all the refinery (A and B Site) noise map, whereas in the second map only RUP (B) site values are shown.

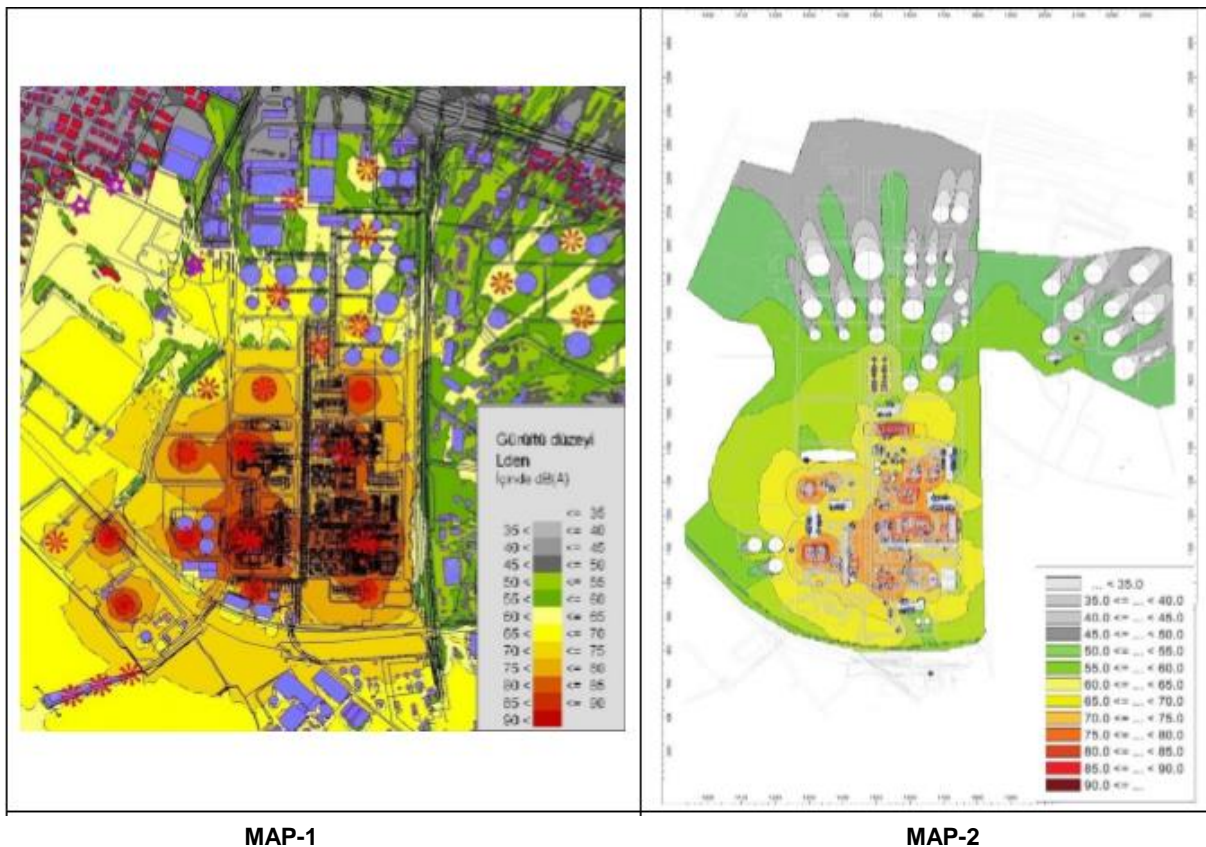


Figure 4.2: Noise Maps Displaying the RUP Site

On that basis taking into account the mitigation measures implemented and supported by the measurements made between the dates of 16.12.2019 – 19.12.2019 the residual impact is considered as minor.

4.4 Wastewater Management

The liquid effluents during the operation phase of the RUP and associated facilities include the following streams:

- Process effluents from various process units;
- Cooling water return;
- Oily water collected from tank bunds, kerbed equipment areas and tanker loading areas;
- Machinery washings, mobile equipment washing, vehicle washing
- Vessel / floor cleaning water from process and utility areas;
- Surface run-offs;
- Sanitary wastewater; and
- Seawater outfall.

In addition, water and water vapour used in refineries can be polluted as the result of the process and may contain hydrocarbon.

Potential pollutants of industrial wastewater to be generated in the operation phase are given in Table 4.7.

Table 4.7: Potential Pollutants during Operation Phase

Process	BOD	COD	Phenol	Sulphur	Oil	pH	Ammonium	Chloride	Alkalinity	SS
Vacuum Distillation				√	√		√			
Coking		√	√	√	√		√			√
Hydrocracking			√	√			√			
Reformer										
Naphtha Hydrogenation	√	√				√	√		√	
Diesel Desulphurization	√	√				√	√		√	

The routine operation and maintenance procedures for the existing WWTU have been applied as a practice of ISO 9001 Quality Management System and the WWTU effluent has been monitored daily in the scope of ISO 14001 Environmental Management System.

The new WWTU processes the effluent waters (process area, offsite area and utility/water system) which come from Residuuum Upgrading Project Unit (RUP) which includes Vacuum, Coker, Hydrocracker, Naphtha Hydrogenation, Diesel Desulphurization, Hydrogen Unit and the associated units.

Effluents treated at WWTU come from:

- Vacuum Distillation Unit
- Hydrogen Process Unit
- Integrated Unicracking Process Unit
- Sulphur Recovery Unit
- Amine Regeneration Unit
- Sour Water Stripping Unit
- Cooling Water System
- Co-generation System
- Power Unit
- Tank Farm
- Associated Units

Storm water effluents from process and non-process areas (paved areas and roads) are also treated in the appropriate section of WWTU. The three main streams treated at WWTU are:

General Surface Drainage: Cooling tower blowdowns, backwash sand filter and regeneration water from the de-mineralized water unit and storm water effluents from non-process areas.

Oily wastewater: Oily water from process units (Stream generator blowdown, equipment boots/drains, drainages from the tankage area and tank lips, wash water from process equipment, stripped sour water) and storm water effluents from process areas.

Domestic wastewater: generated by employees working in the existing and new building facilities.

After the adverse events caused by excessive rainfall in 2018, Tüpraş took a series of measures. It was decided to take some extra precautions listed below against excessive rains.

- Putting a level alarm to the emergency pool
- Placing a grease trap system to the existing discharge line
- Signing a sewage truck contract with the existing contractors for emergencies
- Preparing an instruction to be applied in extreme rainfall situations and publishing it in the QDMS system.

With these extra measures, the spill and the pollution of the sea have been prevented even in the case of heavy rain. During this inspection period, there was no water accident or overflow caused by rainwater reported. Additionally, Tüpraş has built a new “Water Treatment Unit” in İzmit Refinery in order to decrease consumption of natural resources and use the water resources effectively because of the risks created by global climate change. Details are given in “water use” section of this report. Verification Analysis Reports prepared by a third party “ENKA” of this unit is given in Annex-11.

According to internal documents and third party reports provided by Tüpraş it was seen that regular sampling and monitoring have been done properly. Daily monitoring is done according to Water Pollution Control Regulation by Tüpraş’s accredited laboratory (Annex-12). Results from the last two months are given in Table 4.8.

Table 4.8: Discharge Results for Measured Parameters

TABLE	PARAMETER	UNIT	COMPOSITE SAMPLE LIMIT VALUES	23.02.2021	20.03.2021
			2 HOURS	Effluent	Effluent
Table 11.1: Sector: Petroleum Industry	Suspended Solids	(mg/L)	120	17	15
	Oil and Grease	(mg/L)	20	0,3	0,0
	Ammonia Nitrogen (NH ₄ -N)	(mg/L)	40	0,00	0,22
	Hydrocarbons	(mg/L)	15	<6	<6
	Sulphur (S ⁻²)	(mg/L)	2	0,87	0,27
	Phenol	(mg/L)	2	0,002	0,002
	Chromium (Cr ⁺⁶)	(mg/L)	0.2	<0,01	<0,01
	Total Cyanide (CN ⁻)	(mg/L)	2	<0,024	<0,024
	pH	-	6-9	7,2	7,7
	COD (Table 11:2)	(mg/L)	400	58	50

As it is seen from the Table 4.8 , the results of analysed parameters are all below the limit values.

On the other hand, the results of third party (ENKA) analysis given in Annex-11 are compared to EU discharge values as seen in Table 4.9.

Table 4.9: Wastewater Discharge Limits

Pollutant	Unit	Discharge Permit Levels	Existing value measured for RUP (19.10.2020)	Austria (For the Production of Hydrocarbons)	Germany (For the Production of Hydrocarbons & Refineries)	Ireland	Italy
Oil	mg/l	20	<5,258			10	
COD	mg/l	400	89,4	75	80	≥91% total removal	160
BOD	mg/l	50	-	20	25	≥75% total removal	40
Ammonium Nitrogen	mg/l	40	<0,05	5	40	10	15
Suspended Solids	mg/l	120	37,5	30			80
Sulfide	mg/l	2	0,070	0,5	0,6		1
Phenol	mg/l	2	<0.141	0,2	0,15	1	0,5
pH		6-9	6,70	6,5-8,5		6-9	5,5-9,5
Hydrocarbon	mg/l	15	<10	5	2		5
Total Cyanide	mg/l	2	<0.021	0,1	0,1	0,2	0,5
Chromium +6	mg/l	0,2	<0.011			0,1	0,2

As it is seen from the table above, the results of analysed parameters are all below the limit values compared to some EU Countries.

Due to the implemented mitigation measures the measured parameters are below the limit values.

4.5 Soil and Groundwater

During RUP operations a range of crude oil, petroleum products and chemical products will be stored, handled and used. In the assessment that follows, these chemicals are described together with the associated potential impacts of their uncontrolled release. The handling and storage of hazardous materials during RUP operations will be at fixed stationary points where measures for spill prevention and control can be properly established together with a proper monitoring and inspection regime, and the immediate availability of spill recovery equipment.

An uncontrolled release of any of the materials described above would result in direct and indirect (soil contamination) negative impacts, that without rehabilitation and clean up would have a long term impact. The impacts could be localised or more regional depending on the magnitude of the release. A discharge that impacts on ground water could be irreversible and have downstream consequences.

Modern materials handling facilities include a number of measures to reduce or prevent the risk of accidental spillage/discharge. These are driven by the need to protect the environment but also because of the commercial implications of losing the product. The measures proposed for the RUP to reduce the risk of accidental release include the hard surfacing and bunding (containment) of the unloading facility so that spills will be captured and recovered. In addition the unloading facility will be covered so as to prevent the ingress of rain water and the associated risk of contaminated runoff.

In addition, the potential occupational health and safety risks of handling liquid chemicals and fuel dictate the implementation of rigorous controls that would have the effect of proving good spillage prevention and controls. On this basis the likelihood of an uncontrolled discharge of these materials into the environment is considered to be medium low. Due to the nature of the materials the intrinsic magnitude of the impact is considered to be high. Together with the medium sensitivity this implies potentially great consequences were there to be a large scale, uncontrolled release of hazardous materials into the environment.

Given the medium low probability of the impact being manifest (as presented above) the impact significance terms of the threat of hazardous materials to soil and ground and surface water quality is considered to be moderate as a result of RUP operations.

The significance rating is based on the assumption that the controls described earlier to limit the probability of accidental discharge are implemented and that a strong environmental management function is maintained during RUP operations to maintain those controls and to provide an immediate and effective response in cleaning up and rehabilitating any kind of hazardous material spillage. Even with the controls described above the likelihood of an uncontrolled spill will likely remain of medium low probability and thus the significance of the residual impact will remain moderate.

External diversion trenches are built to prevent uncontaminated stormwater from entering the RUP. The mitigation required is to ensure that these diversion trenches are properly engineered, constructed and maintained and that this is carried through to closure of the facility. Both the domestic and industrial wastewater and sanitary wastes are collected and treated.

No significant road accident was observed or reported within the boundaries of the facility. Therefore, there is not any soil or groundwater pollution, due to any spill. There are certain traffic rules and signs on the roads used for traffic. Staff are informed and trained on the risks of accidents regularly. On the other hand, on 08.10.2020, Tüpräs wagon train accident happened at the outside of boundaries of the refinery. There was no loss of life or injury, but there was platformate spill. The spill was prevented from reaching the sea by building a set in the canal in the area where the train tracks are located. In addition, there was a guillotine valve in that canal before the sea. Only trace amount was reached the sea. As a precaution, a barrier was opened in the sea, in order to prevent sea pollution. The necessary actions were also taken, in order to control and mitigate soil pollution.

All waste materials have been properly segregated, and temporarily stored in containers, and then disposed of in a proper waste facility with respect to the waste type. No percolation was observed. Therefore, there is not any soil or groundwater pollution generated by waste.

In terms of national regulations; some amendments were done in the Regulation on Soil Pollution Control and Point Source Contaminated Sites that was published in the Official Gazette dated June 14, 2012. The implementations have just started to be active. The first responsibility of the facilities in this context is to prepare and send the "Prior Information Form of Activity" to the Ministry by using on-line web sites of the Ministry. Tüpräs has sent this Form via ministerial information system on the date of 18.06.2015 and it was approved by the Directorate. Since that date, no further progress has been made by the Ministry.

4.6 Waste Management

Solid wastes during the operation phase include hazardous and non-hazardous wastes. Non-hazardous solid wastes include packing materials, used electrical fittings, domestic waste from daily activities of the employees, cans, drums and containers of non-hazardous materials.

The solid hazardous wastes are mainly from various process units and include spent catalyst materials, spent treatment beds and packing, vessel / pipeline / boiler / storage tank cleanouts, oily sludge, treatment plant sludge, waste chemicals, containers of hazardous materials, used batteries, etc. Liquid hazardous wastes include waste oil / paints / solvents and chemicals.

Waste streams are segregated as a function of their category. Domestic and other wastes are handled separately. These wastes are stored at designated waste storage areas at the facility and finally disposed of at approved landfills, incinerated at Izaydas, or sold to potential buyers for recycling (e.g., waste paper, packing materials, metal scrap, catalysts and printer cartridges).

Tupras has a well-built waste management system for the existing refinery (Annex-13). There is an extensive solid and hazardous waste management plan including waste management methodology, waste inventory, waste hierarchy, waste classification and coding, waste separation, waste handling, waste collection, waste storage, waste disposal, etc. Tupras is the first company in Turkey using SAP systems for sustainable and efficient waste management. Therefore, the development and integration of the waste management for RUP is implemented systematically.

Zero Waste Regulation entered into force on 07.12.2019 date in Turkey. In this context, Tupaş was entitled to receive the Zero Waste Certificate by establishing the Zero Waste Management System (Annex-14).

According to internal documents and third party reports provided by Tupras, the hazardous wastes were temporarily stored at the dedicated storage area of Tupras Izmit refinery which was covered, paved, fenced and access was limited. It is not observed any improper conditions such as overloads. General approaches for waste management seems to be appropriate and successful. Additionally a third party known as Akademi Cevre is commissioned to control the relevant activities.

Waste consignment notes indicating source/dates/type have been recorded as a practice of SAP. Waste quantities and disposal methods have been recorded. Usage of SAP for hazardous waste labelling on site was observed. On the label the producer, production date, risk and safety numbers of the waste were given.

In 2020, a new temporary waste storage area was built, thereby reducing the load on the old site. The temporary storage area for hazardous waste is satisfactory. The site staff were trained about the implementation of good practices. Hazardous wastes are stored separately according to their types. The permit issued on 10.05.2010 for temporary hazardous waste storage area, and the permit issued on 16.12.2020 for the new temporary hazardous waste storage area are given in Annex-15.

Considering these measures as implemented, the residual impact is minor.

4.7 Occupational Health and Safety and Risk Management

Tupras is responsible for project activities, with some of the activities out-sourced to sub-contractors. Tupras has a special health, safety and environment unit and organization that deals with the prevention and minimisation of negative impacts to its surroundings, where the safety and health of the workers are of utmost importance.

There has been a systematic safety induction and HSE training program. There is a routine training program on emergency and first aid. To attend the safety induction sessions has been mandatory for all employees. No employee was permitted to work on site or allowed access to the site without first attending the Induction Session. The Safety Induction Sessions included:

- HSE Policy
- Emergency and First Aid procedures
- Project site rules of personal safety and conduct
- Working and safety procedures and Standards (PPE, inspections, meetings, work permits, lifting operations, cutting, grinding, chemicals, work at height, excavation)
- Fire prevention and protection.
- Use of Personal Protective Equipment and clothing requirements;
- Safety training observation program.
- Incident/ injury reporting
- Environmental protection and pollution prevention.

All employees were educated and trained in all the standard HSE topics of their activity. Additionally, regular refreshing courses have been organized. A matrix and schedule of training requirements were provided covering general, task-specific and HSE related training, frequency, etc. The qualifications, competency and training requirements for all personnel were specified. The employees were also provided with written instructions and sufficient equipment.

Including the lost-time accidents, all other types of accidents and incidents such as medical treatment case, first aid case, near miss and fire incident are recorded and reported by Tupras. Over the last year there is not any important accident within the borders of the RUP Site, however a wagon train accident happened outside the RUP site. Anyway, TUPRAS supported the control and mitigation activities of the spill. In the event of any serious accident, an investigation team consisting of members including from the headquarters is assigned, and detailed analysis is followed. Necessary measures are taken to avoid similar accident.

In order to minimize any possible accidents, fire, sabotage and other emergency situations that can take place in the facility, Emergency Action Plan prepared by taking Provincial Civil Defense Directorates and The Ministry of Environment and Urbanization as bases will be applied and coordinated work with Kocaeli Governorship, Provincial Civil Defence Directorate, Ministry of Environment and Urbanization and other organizations related to emergency situations will continue.

Besides a risk management plan, the emergency action plans were prepared and they are listed below:

- Emergency plan for fire cases in the facility
- Emergency plan for complications that may arise during ship loading and discharge
- Emergency plan for situations in which product is spilled into the sea
- Emergency plan for earthquakes
- Emergency plan for water floods
- Emergency plan for Terror-Sabotage-Bomb and Intimidation situations

“Coast Facility Emergency Action Plan and Risk Assessment Report“ has been prepared for the coastal facilities that will be used within the scope of the activity. This plan including the RUP side was approved on 20 May 2016 by the Ministry of Environment and Urbanization. In the report; an emergency situation action management system is planned to be adopted in order to minimize the risks imposed on the marine environment and employ the emergency situation action plan when faced with a possible emergency situation.

Warning signs has been placed in work areas. Personal protection equipment was distributed to the personnel in order to prevent all kinds of work accidents. The instruments and devices used were compatible with human anatomy and physiology, had ergonomic properties and necessary adjustments were made to decrease the vibration on instruments that contain vibrating parts. Proper isolation was provided on cables and connection points in electrical facilities and warning signs were placed where necessary.

The main methods that will be applied during emergency situations in the facility;

- The manpower and equipment necessary for the action will be kept ready
- A warning system that will warn the facility personnel and neighbour community at risk during accidents will be installed and tested occasionally
- During an accident, the person in charge of the facility will determine the nature of danger and immediately report to the people or organizations responsible for the accident intervention.
- The person in charge of the facility will provide the education of people responsible for the accident intervention.
- The person in charge of the facility will keep and provide the protective equipment to the people responsible for the accident intervention.
- All the necessary first aid and medical supplies will be provided in full.
- All the necessary equipment and supplies needed for the accident intervention will be provided in full.
- An up-to-date list of supplies will be kept and distributed to all accident intervention personnel.

According to the Regulation on Control of Major Industrial Accidents, which was issued on 18.08.2010 in parallel to SEVESO Directive (2003/105/EC), all Turkish Enterprises which have the hazardous substances should enter information about these substances into the web page of Ministry of Environment and Urbanization. Tüpras İzmit Refinery declared its hazardous chemicals into the system of the Ministry on 18th February 2011. As a result of this declaration, the Refinery was defined as Upper Level Establishment based on the regulation.

As being an Upper Level Establishment, at the beginning of the year 2013, Tupras has made a plan to prepare a Safety Report to be shared with the Ministry. According to this plan all refineries including Izmit Refinery (now including the RUP Site) will carry out some detailed studies covering the following subjects;

- Policy to Prevent Large Accidents
- Organization and Personnel
- Identification and Evaluation of Large Accidents
- Processing Control
- Management of Change
- Emergency Preparedness
- Monitoring Performance
- Auditing and Assessment

Additionally; operation and maintenance procedures have been prepared, standards for emergency have been revised and auditing systems are ready to be performed.

Tupras prepared internal procedure to define the steps to be applied for Seveso compliance. According to the procedure, Tupras Refinery examines all process equipment with DOW FETI study to rate the possible hazardous equipment. After completion and definition of possible major accident equipment, Process Hazard Analysis, which contains HAZOP, FTA/ETA studies, have been performed. According to the scenarios results from ETA studies, past modelling is done to determine fire, explosion and toxic domains of these scenarios. These models are used to prepare internal emergency plans.

HAZOP study has been performed for the critical equipment including the RUP Site. According to the results Numerical Risk Assessment (Fault Tree & Event Tree) is carried out for the scenario causing loss of contents. Past modelling is done to determine fire, explosion and toxic domains of these scenarios.

Current status of the Seveso studies can be summarized as below;

- DOW FETI %100 completed,
- HAZOP studies %100 completed for all critical equipment,
- FTA/ETA and Past modelling studies %100 completed.

The safety report including action plans were presented to the ministry. Then revisions requested by the ministry have been made by Tupras. An on-site inspection of the ministry is expected to be scheduled by the ministerial authorities. In this context, Ministry inspections started at another refinery of Tupras. However, the RUP site has not been audited yet. It is expected to be executed in 2021. It was stated that all preparations were completed at the refinery.

Under the specific circumstances of COVID-19 virus, the communications and guidelines of the Ministry of Health and the international bodies have been seriously monitored and implemented. The specific measures for protecting workers from exposure to, and infection with the virus have been adopted. Those include infection identification and control strategies, safe work practices, routine health check-ups, trainings on elements of infection prevention and personal protective equipment (PPE) to prevent worker exposures. Based on an audit conducted by TSE, Covid-19 Safe Production Certificate has been obtained (Annex-16)

Implementing the above mitigation measures the residual impact rating to minor.



4.8 Social Management

The following categories of social impacts were identified in the ESIA report.

Demography and in-flux of outsiders

Tupras and the contractors have a recruitment policy mainly intended at maximizing benefits for locals and preventing, to the extent possible, a massive in-flux of outsiders to the project site. Another element for minimizing in-flux was no hiring policy at the project gate. In no instance applicants were encouraged to come to the project site for recruitment. At this stage of operation phase, the impact is considered minor.

Local economy

Employment

During the operation phase, the number of workers as of 2021 has approached 500 with support units of which a large proportion is skilled jobs. An adequate training policy is put in place to ensure that as many as possible of these jobs is taken by local people, quite a lot amount of training is given to these people.

Local procurement

Whilst most procurement has to be done outside of local communities, some activities are outsourced locally. These include:

- Security,
- Landscaping,
- Housekeeping, including cleaning and laundry,
- Catering.

If such services continues to be sub-contracted to local companies, which will hire local workers, then the project will also have positive impacts on local people.

Tupras management is very sensitive about supporting local companies and using local resources as much as possible. In the Table 4.10 below, some local firms currently serving in Tupras are indicated.

Table 4.10: Local Companies and Number of Employees

Company Name	Employee Number
Mimas Muhendislik	77
Alve Celik Konstruksiyon	13
Ercan Celik Makina	57
Akademi Cevre Entegre Atik Yonetimi	16
Sanel Endustriyel Tesisler	20
Atılım Mekanik	24

Community health

In addition to the hazards already described (influx of population, dust, noise etc.), majority of the health problems in refineries are caused due to air emissions of hydrocarbons. Now that workers in the refinery usually don't work in the open air, but control the system by computers, the risk is valid for the workers who deal with the repair and maintenance works and it is considered moderate.

Many workers in the Tupras Refinery don't have contact with products, however those who are believed to be under risk, are checked for accumulation of hydrocarbons in the liver and in blood by blood tests. If the level of hydrocarbons are found to be high, they are rested for certain periods. Urine samples are also sent to toxicology labs for control. PPE has been used, if necessary. Wastes were stored and disposed properly. In case of any emergency case, besides the ambulance service, the medical staff of Tupras is available in the refinery.

Community safety

In order to minimize the impacts, the mitigation measures were taken as follows:

- Signs in the premises of the RUP,
- Obeying the traffic rules; ensuring compliance with traffic signs by locating them to specific locations and making regular controls
- Speed bumps at critical locations,
- Effective management of all kinds of materials used and wastes produced.
- Compensation of any damages to the roads resulting from the activity,
- Action plan in case of any accident or spill.

As the above mitigation measures are implemented, the residual impact rating is minor.

Stakeholders

The Corporate Communications department of Tupras deals with social management issues. The stakeholders of this project defined in the ESIA have been informed about the RUP, its phases and its progress through press releases, newspaper articles, and web-site.

In order to ensure efficient communication between Tupras and stakeholders, Tupras has generated a standard named as "Stakeholder Communication Management Standard" defining a solid methodology, flow chart, roles and responsibilities (Annex-17). It has been observed that Tupras continues to implement the requirements of this standard.

Additionally, Tupras has a section in its website for the people who want to express their thoughts freely about the Tupras' activities including RUP Project. During this auditing period, there has been no complaint about the RUP taken on.

Just before the production activities, development of a variety of relationships with stakeholders has been observed;

- RUP project was introduced to oil company investors such as Opet, Shell, British Petroleum, Petrol Ofisi, Aygaz and Ipragaz with a presentation in Tupras.
- In order to inform relevant stakeholders the non-governmental organization meeting was carried out with the participation of 63 different NGOs. Ethical values of Tupras, importance of Environmental, Occupational Health and Safety issues for Tupras, and the presentation of the RUP Project were the outstanding issues at the meeting. Eventually a field trip to the RUP site was organized together.
- A commercial film describing the RUP Project was made by Tupras. It was published in most channels in Turkey. Advertisements were given to various magazines and newspapers. Thus, awareness about the project was realised throughout Turkey.
- General Manager and Chairman of Koç Energy Group had talked about a press conference in RUP field in order to increase awareness on the Project before the lancement.
- A lancement was organized by Tupras. Particularly including the president of the Republic of Turkey, many ministers, king representatives and politicians from Spain, governor protocols and local administrators, representatives of energy sector and district headmen from neighbourhoods were participated in this meeting. Views about the project from some selected officials have been taken. Some managers from Koç Holding Board briefed about the RUP to the incomings.

Although it was planned at the beginning of the operation phase, a disclosure meeting with local authorities of the neighbourhood community could not be performed. However, within the short-term operational phase newspapers were actively used as the communication way of Tupras to create awareness about the activities of the RUP project.

As part of stakeholder communication, Tupras RUP Refinery is constantly evolving in the press. Some of the recent news are shown in Annex-18.

4.9 Health, Safety, Environmental and Social (HSES) Management System

General HSE applications for all Tupras Refineries are applied now for the RUP Site since the RUP is located in the vicinity of the Izmit Refinery.

As part of Tupras's HSE system, there is a functioning health, safety, environmental and social management system developed and implemented for the RUP, which is applicable for the works conducted. The system was also adopted new measures after the outbreak of coronavirus.

An HSE Management Team is present, which is formally identified as having responsibility for supervision and coordination of health, safety and environmental issues at the RUP. On the other hand, the Corporate Communications department of Tupras deals with social management issues, since most of those issues are related to the activities of this department.

By establishing an internal control unit within the Tupras RUP Site, the firm is controlling both environmental and occupational health and safety issues in a daily basis. The HSE performance of the RUP is monitored by the HSE Department of Tupras. The performance monitoring consists firstly in a checking activity carried out by site personnel to measure, record, track and report HSE performance.

Furthermore, it pursues maintaining control of HSE-critical activities in order to check that works are being executed in compliance with health, safety and environmental standards.

A summary of the Key Performance Indicators prepared by Tupras for the year 2020 is illustrated in the Table 4.11 below. The information given in the table summarizes some of the most important OHS workings followed by HSE Team.

Table 4.11: 2020 HSE Follow – Up Parameters

Follow Up Parameters	Year 2020
Percentage of appropriate equipment for the control of work equipment	93 %
Percentage of safety tours made on time	41 %
Contractor inspection plan realization percentage	100 %
Percentage of security monitoring notifications completed	75 %
Timelapse Closure Percentage of OHS events (work accident, minor intervention, etc.) corrective preventive action	90 %
Percentage of research performed on time for OHS event (work accident, minor intervention, etc.)	60 %

4.10 Other Issues

4.10.1. Deleterious Materials

It was stated by the Site representatives that, no asbestos containing material (ACM) is used for pipe insulation throughout the Site.

The transformers established at the Site do not contain Poly-Chloro Bi-phenyl (PCB).

Ozone Depleting Substances (ODS) are not used (cooling systems, fire extinguishers etc.) at the area.

Since there is not any deleterious material used at the site, currently there is no impact.

4.10.2. Raw Material Use

The most important raw materials utilized during operation of the RUP and associated facilities are crude oil, natural gas and water. In addition to this, important volumes of chemicals are used in the production process (catalysts, additives, etc.). The import of crude oil contributes to the world wide exploitation of fossil fuels, the emission of carbon dioxide and air pollution. On a global scale, the significance is minor but not insignificant. No mitigation is available for the use of crude oil, therefore the residual impact will be minor.

The impacts related to the use of water during the operation phase, notably the consumption of water by the different project components may significantly increase. With the implementation of water conservation program (new WWTU described in “water use” section) for the existing refinery and the extensive reuse in the RUP an extra water stress to the Sapanca Lake will not be originated. Therefore, the residual impact will be minor.

4.10.3. Storage of Chemicals and Materials

Chemical Storage Area that is located at RUP Site has been well maintained and managed properly. Chemicals are stored in area that has proper ventilation, they are labelled and have necessary identifiers where they are stored in compliance with the environmental and safety requirements (Annex-4).

4.10.4. Legal Permitting

According to national EIA regulation, the last monitoring report for the RUP Refinery was prepared by CEDFEM and submitted to the Ministry of Environment and Urbanization in 2017 and approved by the Ministry. It is also reviewed by ICC experts and no incompliance was detected.

After the beginning of operational phase of the RUP Site, Tupras had renewed its Environmental Permit and License. During the year 2020 comprehensive studies have been executed to renew the Environmental Permit Certificate, and this has been achieved. Ministry and Provincial Directorate renewed document on 26.10.2020. The permit covers the Emission Permit, Wastewater Discharge Permit and Waste Reception Permit which is valid until 26.10.2025 (Annex-19). During the assessment of the environmental permit process, the plant has been exempted from Dangerous Substance Discharge Permit and the Noise Permit by the Ministry of Environment and Urbanization.

In 2017, a little Nitrogen Production Facility was established within the RUP premises. Regarding the installation of this unit, official opinion was obtained from the Provincial Directorate of Environment and Urbanization on 02.08.2016. According to this opinion, the Environmental Impact Assessment is not required for the plant. This facility, located near the RUP wastewater treatment units, is operated by "Linde", a company that has been supplying nitrogen for many years to Tupras.

CHAPTER 5 : RISK RANKING

During the ESIA study carried out between 2008-2011, and during the construction phase studies realized between 2012-2015 for the construction site, and also during the monitoring study for the operation phase in 2020, a rating system has been used to evaluate the risks associated with each phases of the project. BS 7799 and BS 8800 Risk Evaluation Methodology have been utilized. The same approach was used for the risk analysis during this monitoring study for the operation phase in April 2021.

Based on the interviews available documents and review of the previous and current assessment works, initially the existing situation and applications with respect to the issues were identified and then the relative environmental risk potential of the RUP was classified as “Low, Moderate and High”.

The definition of low, medium and high risks has been provided according to the internationally recognized approach described below.

- Low Environmental Risk/Concern: “Low” refers to the site works which may contain environmental issues, but based on the operations and information obtained during the Site visit or presented in the documents, it is not anticipated to have an environmental occurrence which would be material or significantly interfere with daily operations.
- Moderate Environmental Risk/Concern: “Moderate” refers to the site works at the site which may contain environmental issues, which” based on the operations and information obtained during the Site visit or presented in the documents, could be present or create an environmental occurrence which would be material or significantly interfere with daily operations of the facility. The management of the environmental issue or occurrence by the facility has a significant influence on a medium risk becoming a high or low risk issue. The current approach by control and enforcement Authorities in Turkey has been considered to reduce an issue from high to moderate.
- High Environmental Risk/Concern: “High” refers to the site works at the site which may contain environmental issues, which based on the operations and information obtained during the Site visit or presented in the documents, are material or have the potential to be material or create an environmental occurrence which would significantly interfere with daily operations of the facility or its value.

The present rating study provides an overall rating for the operation site works. Individual items may represent a high risk but when considered the whole mitigation measures, relevant studies and taken precautions in the context of the site, the rating may drop to a Medium. The geological and hydro geological conditions of the area, i.e. the general supply of potable water from off-site, were considered.

For each of the individual items the following approach was adopted (considering the probability and the severity) and given in Table 5.1.

Table 5.1: Risk Ratings of the RUP at the Operation Phase as of April 2021

ISSUE	EXPLANATION	YES or NO	RISK RATING
WATER USE	Optimize water usage	Yes	LOW
	Inspect for water wastage and spill	Yes	
	Monitoring water usage	Yes	
	Particular incompliance during the reporting period	No	
AIR EMISSIONS	Air emission permit	Yes	LOW
	Emission measurements	Yes	
	Dust mitigation measures	Yes	
	Periodic control & maintenance of vehicles	Yes	
	Monitoring by Tupras HSE & third party	Yes	
	Particular incompliance during the reporting period	No	
ODOUR	Proper handling of fuel tanks	Yes	LOW
	Collection and disposal of wastes in a proper way	Yes	
	Collection and disposal of wastewaters in a proper way	Yes	
	Periodic control & maintenance of vehicles	Yes	
	Monitoring by Tupras HSE & third party	Yes	
	Particular incompliance during the reporting period	No	
NOISE	Noise monitoring	Yes	LOW
	Proper measures against high noise levels	Yes	
	Limit exceedances	No	
	Noise Control Permit	NA	
	Monitoring by Tupras HSE & third party	Yes	
	Particular incompliance during the reporting period	No	
WASTEWATER	Wastewater discharge permit	Yes	LOW
	Proper industrial waste water sewerage system	Yes	
	Proper domestic waste water sewerage system	Yes	
	Proper storm water system	Yes	
	Appropriate waste water treatment plant	Yes	
	Regular monitoring according to limits	Yes	
	Exceedances in measured parameters	No	
	Dangerous Substances Discharge Permit	NA	
	Particular incompliance during the reporting period	No	
SUBSURFACE CONTAMINATION	Subsurface investigation	Yes	LOW
	Remediation of contaminated soil	NA	
	Remediation of contaminated groundwater	NA	
	Monitoring by Tupras HSE & third party	Yes	
	Transfer of contaminated soils	NA	
	Particular incompliance during the reporting period	No	
CHEMICALS	Chemicals are used	Yes	LOW
	Stored in designated, paved area with limited access	Yes	
	Appropriate labelling and MSDS provided	Yes	
	Inspect for leak/spill	Yes	
	Particular incompliance during the reporting period	No	
ABOVE GROUND STORAGE TANKS (AST)	ASTs are used at site	Yes	LOW
	ASTs have proper secondary containment	Yes	
	Inspect for leak/spill and maintenance	Yes	
	Particular incompliance during the reporting period	No	

ISSUE	EXPLANATION	YES or NO	RISK RATING
WASTE MANAGEMENT	Segregation of different streams of waste	Yes	LOW
	Waste containers are labelled/coloured	Yes	
	Handling practice is known and applied by site staff	Yes	
	Appropriate storage area for non-hazardous wastes	Yes	
	Appropriate storage area for hazardous wastes	Yes	
	Temporary storage permit	Yes	
	Permit for disposal of excavated soils	NA	
	Transport of HW by licensed transporters	Yes	
	Transport of HW to a licensed facility	Yes	
	Disposal of non-hazardous wastes	Yes	
	Monitoring	Yes	
	Particular non-compliance during the reporting period	No	
OCCUPATIONAL HEALTH & SAFETY & RISK MANAGEMENT	Training of the personnel for health and safety practices	Yes	LOW
	Warnings and PPE usage	Yes	
	Recording of incidents/ accidents (OSAR)	Yes	
	Medical services	Yes	
	Particular non-compliance during the reporting period	No	
SOCIAL MANAGEMENT	Maximizing local subcontractors and workforce	Yes	LOW
	Mitigation for the community health	Yes	
	Mitigation for community safety	Yes	
	Addressing local grievances and resolving matters	Yes	
	Particular non-compliance during the reporting period	No	
HSES MANAGEMENT SYSTEM	Preparation of HSES plan inc. emergency plan	Yes	LOW
	Application of HSES plan properly	Yes	
	Internal audits periodically	Yes	
	Particular non-compliance during the reporting period	No	
ASBESTOS CONTAINING MATERIALS (ACM)	ACM usage at the site	No	LOW
	ACM safety statement	NA	
	Particular non-compliance during the reporting period	No	
POLY-CHLORO BI-PHENYL (PCB)	Transformers contain PCB	No	LOW
	Particular non-compliance during the reporting period	No	
OZONE DEPLETING SUBSTANCES (ODS)	ODS are used (cooling systems, fire extinguishers etc.)	No	LOW
	Particular non-compliance during the reporting period	No	
RAW MATERIAL USE	Optimize raw material usage	Yes	LOW
	Storage of raw material in a proper way	Yes	
	Monitoring raw material usage	Yes	
	Particular non-compliance during the reporting period	No	
GENERAL PERMITTING	Permit for operation	Yes	LOW
	ISO 14001 EMS Certification	Yes	
	Internal and external audits are periodical	Yes	
	Environmental Permit	Yes	
OVERALL RISK RATING			LOW

CHAPTER 6 : RECOMMENDATIONS

Based on the findings identified in the above sections of the report, brief recommendations are outlined in this chapter.

The Refinery is carrying out noise measurements performed by an independent, accredited institution once every 2 years. The last report examined during this audit belongs to 2019. It is stated that the measurements for the year 2021 is planned to be carried out at the end of this year. Measurement results should be examined carefully by authorized personnel and special measures should be taken, if necessary.

At Tupaş Refinery, ambient air quality measurements are carried out once every 2 years. During the audit, it is stated that this year's measurements are continuing and the report will be ready in June. When the report comes, the values should be examined carefully and if there are values close to the limits, the necessary measures should be taken.

As stated in the previous report, some measures were taken to control excessive rainfall in 2018. Later a similar incompliance was not reported. However, those measures mentioned in the wastewater section of this report should be constantly monitored whether they are appropriate or not.

One of the most important issues in the refinery in terms of health and environmental pollution is dust emission arising from the activities of Delayed Coking Unit. Until now, the following measures have been taken so far are found to be very successful. The implementation of these measures given below should be continued:

- The top and side portions of the conveyor was closed.
- Automatic folding system was made for the storage area.
- A different route was designated for trucks.
- A wheel washing unit was set up.
- A concrete set was constructed between the dock and the sea, in order to prevent dust spread towards the sea.
- An automatic and closed filling system was installed.

Additional instructions which may be requested by the Ministry in accordance with the Regulation on Soil Pollution Control and Point Source Contaminated Sites should be followed.

Tupras has been informing all relevant stakeholders about the project as described within the stakeholders section. Further disclosure activities should be performed.

We recommend that ISO 45001 audits should be done properly and the certification process should be completed in 2021.

The outbreak of COVID-19 virus should be continuously monitored carefully and new strategies and measures should be adopted immediately, if needed.

CHAPTER 7 : CONCLUSIONS

ICC and Royal HaskoningDHV performed the work of “*Environmental Social Impact Assessment (ESIA) of RUP*” for Tupras Incorporation previously. This current study has been undertaken on behalf of Tupras Incorporation to monitor the ESIA of RUP and to verify, whether the mitigation measures as laid down in the Environmental and Social Action Plan defined in the ESIA are applied in accordance with said standards during the operation.

Internal documents and third party reports provided by Tupras during this audit period in April 2021, related to the process of health, safety, environmental and social efforts were examined, besides the interviews with the site staff. Most of the mitigation measures and current situation are supported with the pictures and the related documents given in the Annexes.

The management and standard of the operational activities were generally found to be at acceptable level. This chapter outlines the most important findings and issues concerning the ESAP besides the recommendations.

There is a well-defined and functioning health, safety and environmental management system under the supervision of HSE Unit. The social management system has been under the supervision of the Corporate Communications Department of Tupras. Since HSE and social aspects have been handled in different departments, it is recommended that the liaison between those departments should be kept very strong.

The air emissions sourced by the activities were measured by an accredited third party and the results were in the legally accepted limits of both Turkish and EU legislation and not leading to any environmental liabilities.

Potable water is supplied by the pipeline from the Sapanca Lake. For the usage of the Sapanca Lake there is a valid permit taken from State Hydraulic Works (DSI). Usage of the existing water line did not cause an extra load. There is a sufficient monitoring system for water consumption at the RUP. After the investment of The New Water Treatment Unit for recycling of treated wastewater, the abstracted water from Sapanca Lake has been reduced to a minimum level. Although it cannot be provided for 2020 as the coronavirus is effective, generally 98% of the total water consumption is recovered from recycling.

The soils that were identified as contaminated and temporarily stored on the land before, had been sent for landfilling. With the submission of these soils, currently there is no contaminated soil in the field.

A groundwater drainage system was also installed to collect passively the ground water flow migrating towards the sea and to minimize impacts on soil and groundwater media.

There is a proper waste management system. Waste sorting, storage, collection and disposal were performed according to the current Turkish and EU legislation.

Noise sourced from the different operational activities were measured by an accredited third party and the results were in the legally accepted limits of both Turkish and EU legislation and not leading to any environmental liabilities.

Health and safety conditions have met the current legislation and OHSAS 18001. Accordingly, induction and training activities were performed satisfactorily. ISO 45001, a new ISO standard has been released to replace OHSAS 18001; has also been studied by Tüpr̈as' management systems department and system integrations have been completed. The necessary measures have been adopted against the COVID-19 virus.

This survey and assessment of the RUP show that there are no major health, safety, environmental and social hazards affecting the labours and occupants of the neighbouring area, with the measures that are implemented properly. Relevantly in Table 5.1, risk ratings for the operation phase as of April 2021 are explicitly given.

ANNEXES

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