



Türkiye Petrol Rafinerileri A.Ş.

**RE-ASSESSMENT OF ENVIRONMENTAL
COMPLIANCE OF
TÜPRAŞ REFINERIES**

(FINAL REPORT)

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Submitted by:



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1.3. GENERAL ENVIRONMENTAL WORKS in TUPRAS REFINERIES

Environmental awareness and sensitivity has been increasing in all Tüpraş Refineries. Corporate practices of Quality Management System, Environmental Management System and OHSAS have been certified since 2002 and related standards and procedures were implemented. 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.

A comprehensive system, i.e. Incident Classification, Research, Reporting (OSAR), Risk Assessment Table Guide (RDT Rehberi), has been developed and continues to be implemented. There to this system, technical-safety-environment (HSE) criteria have been implemented properly. The evaluation of the sub-contractors has been carried out. Tüpraş's HSE Unit is carrying out audits to check the compliance of the subcontractors to relevant legislation and standards. A database has been established for the approved sub-contractors of Tüpraş. On the other hand, the works done by the sub-contractors are supervised by staff responsible for environmental issues as much as OH&S matters.

Tüpraş environmental officers (as per regulation on Environmental Auditing) carry out internal environmental audits at the refineries every year. During the year 2014 each refinery has been audited by an auditor team generated from different refineries. Positive improvements have been observed evidently at site and on documentation.

Environmental culture and responsibility have been improved significantly within the organization. Having through knowledge on national, international legislation and requirements, Tüpraş's environmental staff is 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, organization involves in the discussions on the newly planned national regulations. There is a great effort in Tüpraş 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.

For example Izmir Refinery was awarded with the first prize with its project namely Base Oil Complex Burner Modernization Project for the year 2012 by Aegean Region Chamber of Industry as a result of significant amount of reduction in emissions to the atmosphere by switching from fuel oil to natural gas.

As another example, in the competition organized in 2013 by the Ministry of Environmental and Urbanization, Batman refinery was awarded with the cleanest industry.

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

Development of significant Research and Development projects are ongoing and awarded by Ministry of Industry in the scope of EN-VER (Energy Efficiency) Project. As an example, Batman Refinery has taken five awards between the dates of 2009-2013 within this scope. During the year 2014; 3.8 MTL savings have been achieved through energy efficiency efforts. The amount of total carbon reduced for the same year is 14.490 ton/year. This is achieved by switching to natural gas in boilers and F101 Furnace and connecting of some gases to fuel oil ring. Even it is planned to renew the F1101 Furnace within the scope of energy efficiency workings.

In order to increase the energy efficiency in Kırıkkale Refinery, there were some applications for "Efficiency Improvement Projects (VAP)" within the year 2013, which comprises fuel and electricity savings in some furnaces, disabling of a reboiler furnace, heat integration between two plants and new heat exchanger plant project.

In Izmir Refinery, three projects including selecting of energy type depending on the price for cost reduction, increasing efficiency of furnaces/boilers, new gas turbine project have been executed for energy efficiency concept.

In 2009, calculation of greenhouse gases was started to be calculated by Koç Holding Environmental Group. Tüpraş Environmental group has calculated since 2009. As for 2014, carbon accounting has been calculated with respect to ISO 14064 standard for Tüpraş Refineries by a Consultancy Company.

Tüpraş Refineries face some difficulties related with accomplishment of the regulations, e.g. replacement of bottom loading system. Existing truck fleet in Turkey is not appropriate for the bottom loading system. According to the legislation, the fleets will gradually change to bottom loading by 2018. TUPRAS has been invited to sectoral discussions/meetings arranged by Ministry and relevant progress has been followed closely by Tüpraş.

Tüpraş has good practices in the waste and wastewater management issues. For instance, in Izmit Refinery effluent of WWTP unit has been recovered and still used at fire water line and cooling systems. The huge amount of hazardous waste and sludge are being transported to the licensed companies like İzaydaş and some cement factories. The staff is proactive for developing better solutions for waste management like on-site bioremediation of the contaminated sludge, obtaining product which can be used as a fuel at licensed cement factory or energy plants with the waste sludge. Tüpraş Management is highly appreciated for financial and organizational supports to Research and Development Projects in this respect.

Another example for good practises in the waste and wastewater issues is the new water recovery system. The Water Treatment Unit is composed of pre-treatment and membrane reactor of Reverse Osmosis that will be used for recycling of treated waste water. The total investment amount is roughly 50 million Turkish liras. As a result of this investment, the water recycling will reach to the top as aimed and abstracted water from Sapanca Lake will be reduced to a minimum level. Within the framework of the project developed with Kocaeli metropolitan municipality water and sewerage (ISU) general directorate, the re-treated waste water will get ready to re-use by processing the treated waste water of Korfez region,. First phase of this unit that produce 450 cubic meters of water per an hour, has been completed. The second phase that will produce 1000 cubic meters of water per an hour, is expected to start to operate in May 2015. It means roughly 12 million tons of water recovery per a year.

The waste management standard is continuously improving 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.

On the other hand Tüpraş engages in environmental and social responsibility projects. An example is the Izmir Refinery's "Happy Wastes Project". Within three-year period, training about packaging wastes separation and awareness has been given to more than 4500 students in Aliğa. Awareness about waste has been created by reaching more than 250 housewife. 9 pieces of packaging waste containers have been gained to the neighbourhood. Totally 5 pieces of Kite Festival were organized for environmental awareness of children within the scope of Happy Wastes Project. Within the year 2014 Social Facilities Coast has been cleared by the staff within the scope of Coastal Cleanup Project.

A new subcontractor management system has been launched for integrating subcontractors with Tüpraş HSE system. Accordingly, subcontractors are being categorized upon scoring as per HSE requirements.

Brief summaries of the existing environmental management standards that are valid in all Tüpraş Refineries and still applied securely are given below:

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 TUPRAŞ Refineries and at TUPRAŞ Refinery sites and to develop methodologies and establish teams, define the responsibilities to minimise the impacts of oil and chemical contamination.

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 the 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 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.

Standard for Determination of Environmental Impacts and Aspects:

The purpose of this standard is to define environmental aspects of TUPRAS 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 Corrective, Preventive and Improvement Actions:

This Standard defines the required activities for potential or realised non compliances and the responsibilities. This 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,
- 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 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. This Standard provides a proactive HSE approach by establishing a database for the future. This 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).

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 TÜPRAŞ's HSE policy. In this regard, this Standard provides proper subcontractors to be selected and continuous improvement.

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

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 be considered the feedbacks (complaints, satisfaction, desire, wish, etc.) coming from all stakeholders in relation to Tüpraş'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.

Standard for Internal Audits:

The purpose of this standard is checking the activities of Tüpraş 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 Tüpraş, 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.

Environmental Management System

- High: The facility has not implemented ISO 14001 standard yet. The EMS is not yet properly implemented and audits are not carried out regularly.
- Moderate: The facility has recently implemented ISO 14001 standard. The Site has been certified. The EMS implementation is progressing and audits will be carried out regularly.
- Low: The facility has recently implemented ISO 14001 standard. The Site has been certified. The EMS is properly implemented and audits are carried out regularly.

Accordingly, environmental risk rating of İzmit Refinery for each individual issue and for overall site is given in Table 2.3. In the “Status during the Site Visit” column, the changes in the conditions since the previous work are indicated in bold letters.

Table 2.3. Risk Rating for İzmit Refinery as per April 2015

ISSUE	EXPLANATION	STATUS DURING SITE VISIT IN APRIL 2015	RISK RATING
CHEMICALS	Chemicals are used which can cause soil and groundwater contamination	Yes	LOW
	Stored in designated, paved area with limited access	Yes	
	Appropriate labelling and MSDS provided	Yes	
	Past spills	No	
	Particular incompliance during site visit	No	
UNDERGROUND STORAGE TANKS (UST)	USTs are used at site (past and present)	No	LOW
	USTs subjected to tightness test	N/A	
	USTs have double wall and have proper containment	N/A	
	Particular incompliance during site visit	N/A	
ABOVE GROUND STORAGE TANKS (AST)	ASTs are used at site (past and present)	Yes	LOW
	ASTs are subjected to tank maintenance program and tightness tests	Yes	
	ASTs have proper secondary containment	Yes	
	Particular incompliance during site visit	No	
AIR EMISSIONS	Air emission permit	Yes	LOW
	Periodical monitoring	Yes	
	Low NOX Burners will be installed	Yes	
	Continuous monitoring in accordance with regulations	Yes	
	Ambient air measurements	Yes	
	Limit exceedance	No	
	Particular incompliance during site visit	No	
	Fugitive VOC emissions from WWTP	No	
WASTE WATER	Waste water discharge permit	Yes	LOW
	Proper industrial waste water sewerage system	Yes	
	Proper domestic waste water sewerage system	Yes	
	Proper storm water sewerage system	Yes	
	Appropriate waste water treatment plant	Yes	
	Regular monitoring according to limits	Yes	
	Exceedance in measured parameters	No	
	Particular incompliance during site visit	No	
	Dangerous Substances Discharge Permit	NA	
WASTE MANAGEMENT	Type and quantity of wastes are recorded (in the past)	Yes	LOW
	Type and quantity of wastes are recorded (current)	Yes	
	Waste statement to the authority	Yes	
	Waste containers are labeled-colored	Yes	
	Handling practice is known and applied by site staff	Yes	
	Handling practice is known and applied by sub-contractors	Yes	
	Appropriate storage area for non-hazardous wastes	Yes	
	Appropriate storage area for hazardous wastes	Yes	
	Existence of temporary storage permit	Yes	
	Transport of HW by licensed transporters	Yes	
	Transport of HW to a licensed facility	Yes	

ISSUE	EXPLANATION	STATUS DURING SITE VISIT IN APRIL 2015	RISK RATING
	Particular incompliance during site visit	No	
SUBSURFACE CONTAMINATION	Existing-former waste ponds	No	LOW
	Subsurface investigations/remediation at waste ponds	Yes	
	Existing-former burial sites	No	
	Other potential subsurface contamination sites	NA	
	Subsurface investigations/remediation at other potential contamination sites	NA	
	Particular incompliance during site visit	No	
ASBESTOS CONTAINING MATERIALS (ACM)	ACM roofing and wall panels	No	LOW
	ACM insulation	No	
	ACM in pipes, tiles, gaskets	No	
	Airborne asbestos fiber monitoring	No	
	Condition of ACM is good, no fiber release	Yes	
	ACM replacement is planned	N/A	
	Particular incompliance during site visit	No	
POLY-CHLORO BI-PHENYL (PCB)	Transformers contain PCB	No	LOW
	PCB containing transformers have proper containment and locked fence	N/A	
	Proper PCB handling procedure	N/A	
	Past spills	No	
OZONE DEPLETING SUBSTANCES (ODS)	ODS are used (cooling systems, fire extinguishers etc.)	No	LOW
	ODS replacement is planned / on-going (alternatives i.e., HCFC and HFC are used)	No	
NOISE	Noise monitoring	Yes	LOW
	Limit exceedance	No	
	Proper measures against high noise levels	Yes	
	Noise Control Permit	NA	
GENERAL PERMITTING	Certificate of Operations	Yes	LOW
	Non-Hygienic Establishment Operation Permit	Yes	
	Environmental Permit and License	Yes	
ENVIRONMENTAL MANAGEMENT SYSTEM	ISO 14001 EMS Certification	Yes	LOW
	ISO 14001 EMS is properly applied	Yes	
	Internal and external audits are periodical	Yes	
	Particular incompliance during site visit	No	
OVERALL RISK RATING			LOW

Table 3.1.Past Activities at the Site

Dates	Source	Description
1967 – 1972	Refinery	Design, Engineering and Construction agreement was signed with USSR for a standard Refinery scheme with a crude processing capacity of 3.0 million tons per year. Foundation works for Fuels and Lubes started.
1972 – 1981	Refinery	Processing of 3.0 million tons crude oil per year, production of 157,000 tons of final base stock. Fluid Catalytic Cracking Complex was commissioned.
1981 – 1990	Refinery	Crude processing capacity was reached to 10 million tons per year, Base Oil production capacity was increased to 285,000 tons per year. Turbo-alternators TG-1, TG-2 and VLCC jetty were commissioned.
1990 – 1998	Refinery	Commissioning of new Russian Boilers, Turbo-Alternators TG-3 and TG-4, Hydrocracker Complex, LPG off-shore platform and additional storage tanks.
1998 – 2005	Refinery	Commissioning of the CCR and Isomerisation Units.
2002-2005	Refinery	Construction of the Diesel/Kerosene Hydro-processing Unit and was commissioned.
2005	Refinery	Diesel desulphurization unit with a diesel processing capacity of 9,600 m ³ /day was commissioned in August 2005.
2008	Refinery	Gasoline Specification Improvement Project (GSIP) unit started up.
2011	Refinery	Kerosene treating unit started up
2012	Refinery	Spend Caustic Neutralization Unit
2013	Refinery	Two Bioethanol Tanks were commissioned.
2013	Refinery	3 Equalization Tanks belonging to Wastewater Treatment were commissioned.
2014	Refinery	A gas turbine (U920) with a capacity of 25 MW was commissioned in 2014.
2015	Refinery	Online Gasoline Blending Unit commissioning is going on. (Started in December 2014)

3.1.4. Past Activities Surrounding the Site

The main development of the industrial area of Aliğa- İzmir started in the 1970s. The area was previously an underdeveloped land, mainly costal area. The Aliğa District developed with the growing industries around the region and settlements has expanded through the Refinery site.

3.1.5. Geology

In Aliğa and surroundings, different alluvial and shore sediment formations, called Dikili group, Zeytindağ group, Kocaçay formations occur. The Site geology is mainly formed by the formations of Dikili group. This group comprises laterally and perpendicularly located volcanic and sedimentary rocks.

The volcanic rocks are predominantly represented by andesite, lathite type lava and their pyroclasts. The sedimentary rocks include bitumen shale, siltstone and limestone (with tiny grains, grey colour). These rock formations are shaped in recessed and transitive relations with volcanic rocks. Near Aliğa, the thickness of these rocks reaches 100 meters.

3.3. RISK RATING

The purpose of this task is rating the facilities according to risk classes (High, Moderate, Low) depending on the materiality of the conditions from assessment work.

The risk rating methodology of ICC-Golder was explained in details in Chapter 2.3 during 2005. Accordingly, risk rating of İzmir Refinery for each individual issue and for overall site is given in Table 3.2. In the “Status during the Site Visit” column, the changes in the conditions since the previous work are indicated in bold letters.

Table 3.2 Risk Rating for İzmir Refinery

ISSUE	EXPLANATION	STATUS DURING SITE VISIT ON APRIL 2015	RISK RATING
CHEMICALS	Chemicals are used which can cause soil and groundwater contamination	Yes	LOW
	Stored in designated, paved area with limited access	Yes	
	Appropriate labelling and MSDS provided	Yes	
	Past spills	No	
	Particular incompliance during site visit	No	
UNDERGROUND STORAGE TANKS (UST)	USTs are used at site (past and present)	No	N/A
	USTs subjected to tightness test	N/A	
	USTs are not single wall and have proper containment	N/A	
	Particular incompliance during site visit	N/A	
ABOVE GROUND STORAGE TANKS (AST)	ASTs are used at site (past and present)	Yes	LOW
	ASTs are subjected to tank maintenance program and tightness tests	Yes	
	ASTs have proper secondary containment	Yes	
	Particular incompliance during site visit	No	
AIR EMISSIONS	Air emission permit	Yes	LOW
	Periodical monitoring	Yes	
	Continuous monitoring in accordance with regulations	Yes	
	Ambient air measurements	Yes	
	Limit exceedance	No	
	Particular incompliance during site visit	No	
	Fugitive VOC emissions from WWTP	Yes	
WASTE WATER	Waste water discharge permit	Yes	LOW
	Proper industrial waste water sewerage system	Yes	
	Proper domestic waste water sewerage system	Yes	
	Proper storm water sewerage system	Yes	
	Appropriate waste water treatment plant	Yes	
	Regular monitoring according to limits	Yes	
	Exceedances in measured parameters	No	
	Particular incompliance during site visit	No	
Dangerous Substances Discharge Permit	N/A		
WASTE MANAGEMENT	Type and quantity of wastes are recorded (in the past)	Yes	LOW
	Type and quantity of wastes are recorded (current)	Yes	
	Waste statement to the authority	Yes	
	Waste containers are labeled-colored	Yes	
	Handling practice is known and applied by site staff	Yes	
	Handling practice is known and applied by sub-contractors	Yes	
	Appropriate storage area for non-hazardous wastes	Yes	
	Appropriate storage area for hazardous wastes	Yes	
	Temporary storage permit	Yes	
	Transport of HW by licensed transporters	Yes	
	Transport of HW to a licensed facility	Yes	
	Particular incompliance during site visit	No	

ISSUE	EXPLANATION	STATUS DURING SITE VISIT ON APRIL 2015	RISK RATING
SUBSURFACE CONTAMINATION	Existing-former waste ponds	No	LOW
	Existing-former burial sites	No	
	Subsurface investigations/remediation at burial sites	Yes	
	Other potential subsurface contamination sites	Yes	
	Subsurface investigations/remediation at other potential contamination sites	N/A	
	Particular incompliance during site visit	No	
ASBESTOS CONTAINING MATERIALS (ACM)	ACM roofing and wall panels	No	LOW
	ACM insulation	No	
	ACM in pipes, tiles, gaskets	No records	
	Airborne asbestos fibre monitoring	No	
	Condition of ACM is good, no fibre release	N/A	
	ACM replacement is completed	Yes	
	Particular incompliance during site visit	No	
POLY-CHLORO BI-PHENYL (PCB)	Transformers contain PCB	No	LOW
	PCB containing transformers have proper containment and locked fence	N/A	
	Proper PCB handling procedure	N/A	
	Past spills	No information	
OZONE DEPLETING SUBSTANCES (ODS)	ODS are used (cooling systems, fire extinguishers etc.)	Yes	LOW
	ODS replacement is on-going (alternatives i.e., HCFC and HFC are used)	Yes	
NOISE	Noise monitoring	Yes	LOW
	Limit exceedances	No	
	Proper measures against high noise levels	Yes	
	Noise Control Permit	N/A	
GENERAL PERMITTING	Certificate of Operations	Yes	LOW
	Non-Hygienic Establishment Operation Permit	Yes	
	Environmental Permit and License	Yes	
ENVIRONMENTAL MANAGEMENT SYSTEM	ISO 14001 EMS Certification	Yes	LOW
	ISO 14001 EMS is properly applied	Yes	
	Internal and external audits are periodical	Yes	
	Particular incompliance during site visit	No	
OVERALL RATING			LOW

A privately owned and recently built mobile thermal power plant was located approximately 1 km to the north of the Site. This thermal power plant fired fuel oil, which was supplied by the Refinery with a dedicated above-ground fuel oil pipeline. Currently, the plant has dismantled.

4.1.3 Site History

Installation of Kırıkkale Refinery was taken into the investment program in 1976 to supply the oil products demand of the Central Anatolian Region. Kırıkkale Refinery is designed to process 5 million tons of Kerkük crude oil with 36°API gravity annually. The plant was located in Kırıkkale-Hacılar Village based on the main criteria such as product marketing conditions, raw water supply and transportation.

The construction of Kırıkkale Refinery began on 6 October 1976. BOTAŞ pipeline system received the crude oil first time on 9 September 1986. The crude oil entered the storage tanks of Kırıkkale Refinery on 4 October 1986 and Kırıkkale Refinery was commissioned on 25 October 1986. The last modernization projects at Kırıkkale Refinery include a hydrocracker complex with a capacity of 2,305 m³/day, which was completed in October 1993, an isomerisation unit with a capacity of 1,435 m³/day, which was completed in December 1998, and an LPG sweetening unit with a capacity of 960 m³/day completed in June 2000.

The project which is aimed to provide compliance with EU specifications of 2005 and 2009 by decreasing the sulfur amount in diesel and by increasing the production of premium gasoline and related to the production of gas oil and premium gasoline, had been finalized completely. Diesel desulphurization unit has been got into mostly operation recently. The past activities at the site are summarized in Table 4.1.

Table 4.1.Past Activities at the Site

Dates	Description
1976 - 1986	Design, Engineering and Construction Refinery scheme with a crude processing capacity of 5.0 million tons per year.
1993	A hydrocracker complex with a capacity of 2,305 m ³ /day
1998	An isomerisation unit with a capacity of 1,435 m ³ /day
2000	An LPG sweetening unit with a capacity of 960 m ³ /day
2008	A new diesel desulphurization unit and a CCR reformer unit
2008	2 nos of Ethanol Storage Tanks were under construction.
2008	MTBE Unloading Station and Transfer Pumps; completed.
2009	Ethanol Unloading Station and Transfer Pumps; completed.
2009	Revision of Naphta Unloading Station; completed.
2009	2 no.s of Ethanol Storage Tanks; construction is completed.
2009	3 no.s of Asphalt Storage Tanks; construction is completed.
2011	Railway loading system is under construction; but unloading system is completed.
2012	4x15.780 m ³ capacities of Asphalt Storage Tanks; constructions are completed.
2012	FO Unloading Station and Transfer Pumps are completed.
2012	2x10.000 m ³ capacities of slop tanks are completed. Decanter system is completed.
2013	The construction works for the new 7250 wagon filling island have been completed.
2014	Studies are ongoing to establish a new power plant facility within the scope of Power Plant Modernization project.

4.3 RISK RATING

The purpose of this task is rating the facilities according to risk classes (High, Moderate, Low) depending on the materiality of the conditions from assessment work.

The risk rating methodology of ICC is explained in Chapter 2.3. Accordingly, risk rating of Kırıkkale Refinery for each individual issue and for overall site is given in Table 4.2. In the “Status During the Site Visit” column, the changes in the conditions since the previous work are indicated in bold letters.

Table 4.2 Risk Rating for Kırıkkale Refinery

ISSUE	DESCRIPTION	STATUS DURING SITE VISIT ON MAY 2015	RISK RATING	
CHEMICALS	Chemicals are used which can cause soil and groundwater contamination	Yes	LOW	
	Stored in designated, paved area with limited access	Yes		
	Appropriate labeling and MSDS provided	Yes		
	Past spills	No		
	Particular incompliance during site visit	No		
UNDERGROUND STORAGE TANKS (UST)	USTs are used at site (past and present)	Yes (Refuel. Tank)	LOW	
	USTs subjected to tightness test	Yes		
	USTs have double wall and have proper containment	Yes		
	Age of the UST (> 20 yrs)	Yes		
	Particular incompliance during site visit	No		
ABOVE GROUND STORAGE TANKS (AST)	ASTs are used at site (past and present)	Yes	LOW	
	ASTs are subjected to tank maintenance program and tightness tests	Yes		
	ASTs have proper secondary containment	Yes		
	Particular incompliance during site visit	No		
AIR EMISSIONS	Air emission permit	Yes	LOW	
	Periodical monitoring	Yes		
	Continuous monitoring in accordance with regulations	Yes		
	Ambient air measurements	Limit exceedance	No	LOW
		Particular incompliance during site visit	No	
		Fugitive VOC emissions from WWTP-API	Yes	
WASTE WATER	Wastewater discharge permit	Yes	LOW	
	Proper industrial waste water sewerage system	Yes		
	Proper domestic waste water sewerage system	Yes		
	Proper storm water sewerage system with control basins prior to discharge	Yes		
	Clean storm water sewer system	Yes		
	Appropriate waste water treatment plant	Yes		
	Regular monitoring according to limits	Yes		
	Exceedances in measured parameters	No		
	Particular incompliance during site visit	No		
	Dangerous Substances Discharge Permit	NA		
WASTE MANAGEMENT	Type and quantity of wastes are recorded	Yes	LOW	
	Waste statement to the authority	Yes		
	Waste containers are labeled-colored	Yes		
	Handling practice is known and applied by site staff	Yes		
	Handling practice is known and applied by sub-contractors	Yes		

ISSUE	DESCRIPTION	STATUS DURING SITE VISIT ON MAY 2015	RISK RATING
	Appropriate storage area for non-hazardous wastes	Yes	
	Appropriate storage area for hazardous wastes	Yes	
	Existence of temporary storage permit	Yes	
	Transport of HW by licensed transporters	Yes	
	Transport of HW to a licensed facility	Yes	
	Particular incompliance during site visit	No	
SUBSURFACE CONTAMINATION	Existing sludge pits	No	LOW
	Subsurface investigations/remediation at sludge pit area	N/A	
	Existing-former burial sites	No	
	Subsurface investigations at burial sites	No	
	Other potential subsurface contamination areas	Yes	
	Subsurface investigations/remediation at other potential contamination sites	N/A	
	Particular incompliance during site visit	No	
ASBESTOS CONTAINING MATERIALS (ACM)	ACM roofing	No	LOW
	ACM insulation	No	
	ACM in pipes, tiles, gaskets	Yes (isolated)	
	Airborne asbestos fiber monitoring	Yes	
	ACM replacement is completed	Yes	
	Particular incompliance during site visit	No	
POLY-CHLORO BI-PHENYL (PCB)	Transformers contain PCB	No	N/A
	Past spills	No	
OZONE DEPLETING SUBSTANCES (ODS)	ODS are used (cooling systems, fire extinguishers etc.)	Yes	LOW
	ODS alternatives i.e., HCFC and HFC are used	Yes	
NOISE	Noise monitoring	Yes	LOW
	Limit exceedances	No	
	Proper measures against high noise levels	Yes	
	Noise Control Permit	N/A	
GENERAL PERMITTING	Certificate of Operations	Yes	LOW
	Non-Hygienic Establishment Operation Permit	Yes	
	Environmental Permit	Yes	
ENVIRONMENTAL MANAGEMENT SYSTEM	ISO 14001 EMS Certification	Yes	LOW
	ISO 14001 EMS is properly applied	Yes	
	Internal and external audits are periodical	Yes	
	Particular incompliance during site visit	No	
OVERALL RATING			LOW

5.3. RISK RATING

The purpose of this task is rating the facilities according to risk classes (High, Moderate, and Low) depending on the materiality of the conditions from assessment work.

The risk rating methodology of ICC-Golder is explained in Chapter 2.3. Accordingly, risk rating of Batman Refinery for each individual issue and for overall site is given in Table 5.2. In the “Status during the Site Visit” column, the changes in the conditions since the previous work are indicated in bold letters.

Table 5.2 Risk Rating for Batman Refinery

ISSUE	DESCRIPTION	STATUS DURING THE SITE VISIT IN APRIL 2015	RISK RATING
CHEMICALS	Chemicals are used which can cause soil and groundwater contamination	Yes	LOW
	Stored in designated, paved area with limited access	Yes	
	Appropriate labelling and MSDS provided	Yes	
	Chemicals used in operations stored in paved areas with containment	Yes	
	Past spills	No	
	Particular incompliance during site visit	No	
UNDERGROUND STORAGE TANKS (UST)	USTs are used at site (past and present)	No	N/A
ABOVE GROUND STORAGE TANKS (AST)	ASTs are used at site (past and present)	Yes	LOW
	ASTs are subjected to tank maintenance program and tightness tests	Yes	
	ASTs have proper secondary containment	Yes	
	Particular incompliance during site visit	No	
AIR EMISSIONS	Air emission permit	Yes	LOW
	Periodical monitoring online	Yes	
	Low NOx Burners will be installed	N/A	
	Continuous monitoring in accordance with regulations	Yes	
	Ambient air measurements	Yes	
	Limit exceedance	No	
	Double Seals for VOC emissions	Yes	
	Particular incompliance during site visit	No	
Fugitive VOC emissions from WWTP	Yes		
WASTEWATER	Wastewater discharge permit	Yes	LOW
	Proper industrial wastewater sewerage system	Yes	
	Proper domestic wastewater sewerage system	Yes	
	Proper storm water sewerage system with control basins prior to discharge	Yes	
	Clean storm water sewerage system	Yes	
	Appropriate wastewater treatment plant	Yes	
	Regular monitoring according to limits	Yes	
	Exceedances in measured parameters	No	
	Particular incompliance during site visit	No	
	Dangerous Substances Discharge Permit	N/A	
WASTE MANAGEMENT	Type and quantity of wastes are recorded (in the past)	No	LOW
	Type and quantity of wastes are recorded (current)	Yes	
	Waste statement to the authority	Yes	
	Waste containers are labeled-colored	Yes	
	Handling practice is known and applied by site staff	Yes	
	Handling practice is known and applied by sub-contractors	Yes	

ISSUE	DESCRIPTION	STATUS DURING THE SITE VISIT IN APRIL 2015	RISK RATING
	Appropriate storage area for non-hazardous wastes	Yes	
	Appropriate storage area for hazardous wastes	Yes	
	Existence of temporary storage permit	Yes	
	Transport of HW by licensed transporters	Yes	
	Transport of HW to a licensed facility	Yes	
	Particular incompliance during site visit	No	
SUBSURFACE CONTAMINATION	Existing sludge pits at hazardous waste storage area	Yes	LOW
	Subsurface investigations/remediation at sludge pit area at the hazardous waste storage area	Yes	
	Existing-former hazardous waste burial sites	No	
	Subsurface investigations at burial sites	Yes	
	Other potential subsurface contamination areas	Yes	
	Subsurface investigations/remediation at other potential contamination sites	N/A	
	Contamination at surface waters	No	
	Particular incompliance during site visit	No	
ASBESTOS CONTAINING MATERIALS (ACM)	ACM roofing	No	LOW
	ACM insulation	No	
	ACM in pipes, tiles, gaskets	No	
	Airborne asbestos fiber monitoring	No	
	ACM replacement is planned	Yes (Completed)	
	Particular incompliance during site visit	No	
POLY-CHLORO BI-PHENYL (PCB)	Transformers contain PCB	No	LOW
	PCB containing transformers have proper containment and locked fence	N/A	
	Proper PCB handling procedure	N/A	
	Past spills	No	
OZONE DEPLETING SUBSTANCES (ODS)	ODS are used (cooling systems, fire extinguishers etc.)	Yes-No (Restricted, no more usage)	LOW
	ODS alternatives i.e., HCFC and HFC are used	Yes	
NOISE	Noise monitoring	Yes	LOW
	Limit exceedances	No	
	Proper measures against high noise levels	Yes	
	Noise Control Permit	Yes	
GENERAL PERMITTING	Certificate of Operations	Yes	LOW
	Non-Hygienic Establishment Operation Permit	Yes	
	Environmental Permit	Yes	
ENVIRONMENTAL MANAGEMENT SYSTEM	ISO 14001 EMS Certification	Yes	LOW
	ISO 14001 EMS is properly applied	Yes	
	Internal and external audits are periodical	Yes	
	Particular incompliance during site visit	No	
OVERALL RATING			LOW

Table 7.1 IZMIT REFINERY: Status of risk ratings since 2005 to 2015

Issue	IZMIT REFINERY RISK RATINGS									
	June 2005	Dec 2005	Dec 2006	Dec 2007	Dec 2008	2009-2011	March 2012	March 2013	April 2014	April 2015
Chemicals	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Underground Storage Tanks (UST)	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Above Ground Storage Tanks (AST)	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low
Air Emissions	Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low
Waste Water	Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low
Waste Management	Moderate	Low to Moderate	Low to Moderate	Low	Low to Moderate	Low	Low	Low	Low	Low
Subsurface Contamination	Moderate to High	Moderate to High	Moderate to High	Low to Moderate	Low	Low	Low	Low	Low	Low
Asbestos Containing Materials	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Poly-Chloro Bi-Phenyl (PCB)	Moderate to High	Moderate to High	Moderate to High	Low	Low	Low	Low	Low	Low	Low
Ozone Depleting Substances	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Noise	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
General Permitting	High	Low	Low	Low	Low	Low	Low	Low	Low	Low
Environmental Management System	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Overall Risk Rating	Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low

Table 7.2 IZMIR REFINERY: Status of risk ratings since 2005 to 2015

ISSUE	IZMIR REFINERY RISK RATINGS									
	June 2005	Dec 2005	Dec 2006	Dec 2007	Dec 2008	2009/2011	March 2012	March 2013	April 2014	April 2015
Chemicals	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Underground Storage Tanks (UST)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Above Ground Storage Tanks (AST)	Low to Moderate	Low to Moderate	Low to Moderate	Moderate to Low	Low	Low	Low	Low	Low	Low
Air Emissions	High	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Waste Water	Low to Moderate	Low to Moderate	Low to Moderate	Moderate to Low	Low	Low	Low	Low	Low	Low
Waste Management	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Subsurface Contamination	Moderate to High	Moderate to High	Moderate to High	Moderate to Low	Low	Low	Low	Low	Low	Low
Asbestos Containing Materials	Moderate	Moderate	Moderate to Low	Low	Low	Low	Low	Low	Low	Low
Poly-Chloro Bi-Phenyl (PCB)	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Ozone Depleting Substances	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Noise	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
General Permitting	High	Low	Low	Low	Low	Low	Low	Low	Low	Low
Environmental Management System	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low
Overall Risk Rating	Moderate to High	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low

Table 7.3. KIRIKKALE REFINERY: Status of risk ratings since 2005 to 2015

ISSUE	KIRIKKALE REFINERY RISK RATINGS									
	June 2005	Dec 2005	Dec 2006	Dec 2007	Dec 2008	2009/2011	March 2012	April 2013	April 2014	May 2015
Chemicals	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Underground Storage Tanks (UST)	Moderate	Moderate	Moderate	Moderate to Low	Low	Low	Low	Low	Low	Low
Above Ground Storage Tanks (AST)	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low
Air Emissions	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Water Discharge	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low
Waste Management	Low	Low	Low	Low	Low to Moderate	Low	Low	Low	Low	Low
Subsurface Contamination	Moderate to High	Moderate to High	Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low
Asbestos Containing Materials	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Poly-Chloro Bi-Phenyl (PCB)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ozone Depleting Substances	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Noise	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
General Permitting	Low to Moderate	Low	Low	Low	Low	Low	Low	Low	Low	Low
Environmental Management System	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Overall Risk Rating	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

Table 7.4. BATMAN REFINERY: Status of risk ratings since 2005 to 2015

ISSUE	BATMAN REFINERY RISK RATINGS									
	June 2005	Dec 2005	Dec 2006	Dec 2007	Dec 2008	2009/2011	March 2012	March 2013	April 2014	April 2015
Chemicals	Moderate to High	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Underground Storage Tanks (UST)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Above Ground Storage Tanks (AST)	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Air Emissions	High	High	High	Low	Low	Low	Low	Low	Low	Low
Water Discharge	High	High	Moderate to High	Low	Low	Low	Low	Low	Low	Low
Waste Management	High	Moderate to High	Moderate to High	Low	Low	Low	Low	Low	Low	Low
Subsurface Contamination	High	High	Moderate to High	Low to Moderate	Low	Low	Low	Low	Low	Low
Asbestos Containing Materials	High	Moderate to High	Moderate to High	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low
Poly-Chloro Bi-Phenyl (PCB)	High	Moderate to High	Moderate to High	Low to Moderate	Low	Low	Low	Low	Low	Low
Ozone Depleting Substances	High	High	High	Moderate	Moderate to Low	Low	Low	Low	Low	Low
Noise	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
General Permitting	High	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Environmental Management System	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low
Overall Risk Rating	High	High	Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low