



**UNAPREĐENJE SISTEMA MENADŽMENTA ŽIVOTNOM SREDINOM U ORGANIZACIJI AZZAWIYA OIL REFINING COMPANY - LIBYA PRIMENOM STANDARDA ISO 14001:2015**

**IMPROVEMENT OF THE ENVIRONMENTAL MANAGEMENT SYSTEM IN THE ORGANIZATION AZZAWIYA OIL REFINING COMPANY - LIBYA BY THE IMPLEMENTATION OF THE STANDARD ISO 14001:2015**

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**Oblast: INDUSTRIJSKO INŽENJERSTVO I MENADŽMENT**

**Kratak sadržaj:** - *Upravljanje životnom sredinom je postalo ključni deo društvenog života i dominantno pitanje za svaki sektor privrede u razvijenom svetu. Međutim, prethodno relativno odsustvo naprednog EMS-a u libijskoj naftnoj industriji učinilo je da kompanije nisu mogle da se takmiče u međunarodnom naftnom sektoru. Od pre deceniju, industrija nafte i gasa u Libiji pokušava da se transformiše, usklađujući se prema zahtevima i očekivanjima industrijskih zemalja sveta. Ovaj rad ima za cilj da upozna mogućnosti primene standarda upravljanja životnom sredinom ISO 14001: 2015 u sektoru industrije nafte i gasa u Libiji i stepen njegovog uticaja na podizanje nivoa ekološke svesti među poslodavcima, zainteresovanim stranama i zaposlenima.*

**Ključne reči:** *Sistem menadžmenta, menadžment životnom sredinom*

**Abstract:** - *Environmental management became a crucial part of societal life and a dominant issue for every sector of economies in the developed world. However, the previous relative absence of advanced EMS in the Libyan petroleum industry made the companies not able to compete in the international petroleum sector. Since decades ago, the Oil and Gas industry in Libya has been trying to transform by aligning itself according to the requirements and expectations of the industrial nations of the world. This work aims to know the Application prospects of the environmental management standard ISO 14001: 2015 in the oil and gas industry sector in Libya and the extent of its impact in raising the level of environmental awareness among employers, interested parties, and employees.*

**Keywords:** *Management system, modeling, environmental management*

## 1. INTRODUCTION

The topic of this work is analyzing the state of environmental management in the organization Azzawiya Oil Refining Company – Libya by using effective tools for that, evaluating risks associated with the

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organization's activities, mitigating them, and improving the current environmental management system in the aimed organization by the implementation of the international standard ISO 14001:2015.

The petroleum refining activities in the (ARC) could cause serious environmental problems if a modern environmental management system is not followed. This helps the organization to improve its environmental performance through more efficient use of resources and reduction of waste. Moreover, gaining a competitive advantage for better local and international business opportunities and winning the trust of stakeholders.

## 2. ENVIRONMENTAL MANAGEMENT SYSTEM

An effective (EMS) aims to provide organizations with the proper tools to deal with the planning, controlling, and monitoring of their environmental policies.

The Deming cycle, (P-D-C-A) represents the core of any effective management system.

The ISO 14001:2015 standard's revision in 2015 adopted the high-level structure (HLS). By using the (Annex SL) structure it is possible to combine management systems to create an integrated management system (IMS) to save time, money, and effort.

## 3. OIL AND GAS INDUSTRY

The USA had the first big discovery of oil in 1858, and the first refinery in 1860. The petroleum refining processes in the (ARC), (Separation processes, cracking & conversion processes, treating Processes, and blending & combination processes), could have a harmful effect on the surrounding environment.

## 4. ANALYSIS OF THE ENVIRONMENTAL MANAGEMENT STATE IN AZZAWIYA OIL REFINERY, ITS ACTIVITIES' ENVIRONMENTAL ASPECTS AND IMPACTS, AND THE SUGGESTED COUNTERMEASURES

4.1. Predictable Environmental Risks of Refining Activities in (ARC): -

- Air pollution hazards.
- Water pollution hazards.
- Soil pollution hazards.

#### 4.2 Analysis of Environmental Management State in (ARC)

By using of Ishikawa diagram and FMEA (Fig.1), regarding the methodology of Risk identification, analysis, evaluation, and reduction. The following is the finding of the potential cause of the predictable risks and suggesting general countermeasures to solve the problem. Moreover, creating a comprehensive list of risks based on those events that might affect the surrounding environment, where I need to do a lot of brainstorming and ask (WHY?) or (HOW?).

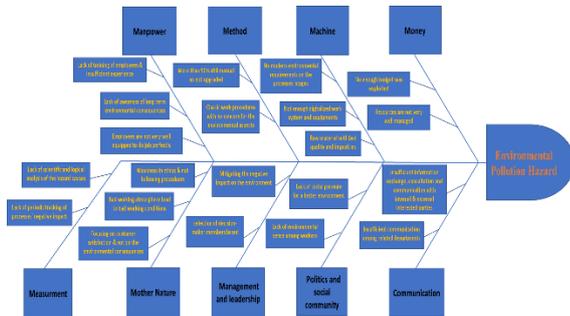


Fig. 1 Ishikawa Diagram / Fishbone Diagram

Assessing risks, evaluation, and calculation of Risk Priority Number (RPN), regarding severity (S), occurrence (O), and detectability (D) values. (RPN = S \* O \* D).

Effect of the failure	Potential root causes	Potential Failure mode	Severity (1-10)	occurrence (1-10)	detection (1-10)	(RPN)
Environmental Pollution Hazard	Manpower	- Lack of training and insufficient experience.	6	6	5	180
		- Lack of awareness among workers of the long-term environmental consequences.	7	8	6	336
		- Employees are not very well equipped to do jobs perfectly.	4	5	6	120
	Method	- More than 50% of the processes are still manual and not upgraded.	5	7	8	280
		- Classical work procedures with no concern for the environmental aspect.	8	6	7	336
	Machine	- Absence of modern environmental requirements on the processes' operational stages.	8	8	6	384
		- The process equipment and working system are not digitalized enough.	3	5	6	90
		- Raw materials with bad quality and impurities.	5	8	6	240
	Money	- No enough budget was exploited to run the process properly.	6	5	4	120
		- Resources are not very well managed to improve the process's perfect performance.	6	5	5	150

Table 1 Failure Mode and Effect Analysis

Risk Evaluation by comparing the RPN scores against the acceptable level of risk and finding out the acceptable risks and the unacceptable risks. Accordingly, choosing the potential failure modes with RPN above 200 to be focused on, and implementing countermeasures to mitigate them.

#### 4.3- The Suggested Countermeasures and Implementation Possibilities: -

- Lack of awareness among workers of the long-term environmental consequences. (RPN = 336)
  - Raising awareness among employees about the environmental risks resulting from the organization's various activities.

- More than 50% of the processes are still manual and not upgraded. (RPN = 280)

- Updating the various stages of processes by introducing modern technical methods.

- Classical work procedures with no concern for the environmental aspect. (RPN = 336) & •Absence of modern environmental requirements on the processes' operational stages. (RPN = 384)

- Developing work procedures to be in line with modern environmental requirements.

- Raw materials with bad quality and impurities (Sulfur compounds and dissolved salts). (RPN = 240)

- Raw material treatment before the insertion into the production processes' stages.

- Lack of periodic tracking of the potential environmental impacts of production processes. (RPN = 504)

- Monitoring the potential environmental impacts of processes periodically and continuously.

- Lack of scientific and logical analysis of the hazard causes. (RPN = 280)

- Creating a committee of experts in the field for the scientific and logical analysis of the data and results.

- Focusing on customer satisfaction with indifference to the environmental consequences. (RPN = 336)

- Developing legislation that ensures a balance between the interests of customers and the organization, and the safety of the surrounding environment during production operations.

- Weakness in work ethics among the employees and not following work procedures. (RPN = 432)

- Raising the level of work ethics among employees and enacting strict procedures to deter negligence.

- Improving performance and mitigating the impact of production processes on the environment is not a top management priority. (RPN = 504)

- Updating the organization's policy system so that attention to the surrounding environment is a priority.

- Lack of environmental sense among employees while performing work. (RPN = 294)

- Raising the level of environmental awareness among workers by placing awareness and rationalization signs within the work sites.

- Negative attitudes among residents near the site and the lack of social pressure for a better environment. (RPN = 210)

- Raising awareness of the population about the positive role of social control over industrial activities and the demand for activating spatial development.

- Insufficient useful information exchange, consultation, and continuous communication with internal and external interested parties. (RPN = 504)

- Raising the efficiency of consultation processes and information exchange between internal and external stakeholders.

- Insufficient communication among different related departments in the organization. (RPN = 448)

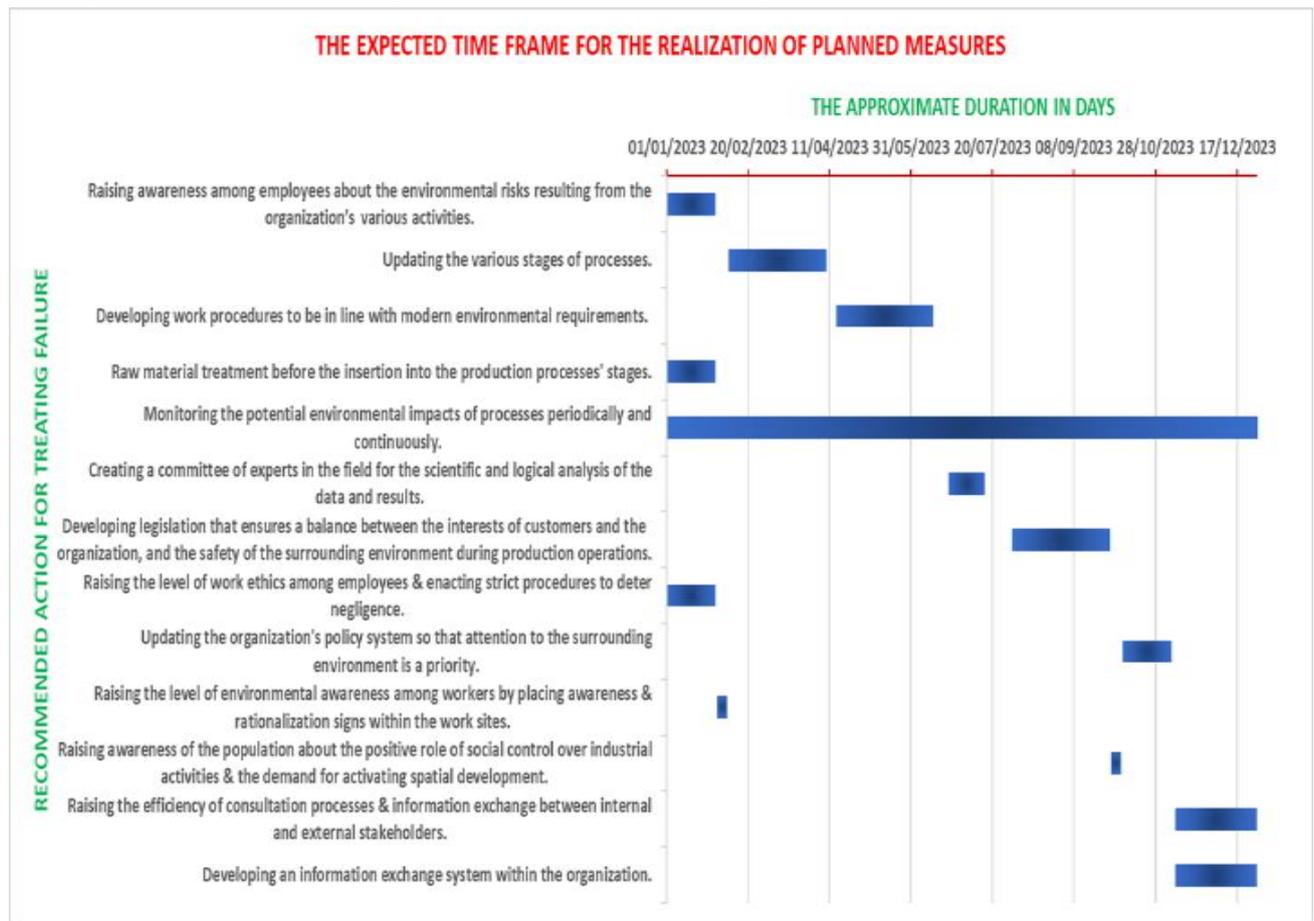
Effect Cause	Recommended Actions	Implementing Responsibility	New Actions & Expected Results				
			Actions Taken	New Sever. (1-10)	New Occur. (1-10)	New Detec. (1-10)	New R.P.N
- Lack of awareness among workers of the long-term environmental consequences.	- Raising awareness among employees about the environmental risks resulting from the organization's various activities.	- Training Department/ Health & Safety, Environment, and Security Department/ Specialized External Parties under the supervision of the Chairmanship of the Management Committee.	Theoretic. & practical training courses were activated.	3	3	4	36
- More than 50% of the processes are still manual and not upgraded.	- Updating the various stages of processes.	- Specialized External Parties under the supervision of the Technical Department and Health & Safety, Environment, and Security Department.	Modern technical methods in the processes were introduced.	4	3	3	36
- Classical work procedures with no concern for the environmental aspect. - Absence of modern environmental requirements on the processes' operational stages.	- Developing work procedures to be in line with modern environmental requirements.	- Technical Department/ Health & Safety, Environment and Security Department.	work procedures were developed.	2	3	2	12
- Raw materials with bad quality and impurities.	- Raw material treatment before the insertion into the production processes' stages.	- Technical Department/ Raw Material & Products Management/ Chemical Analysis & Quality Control Division.	Raw material's stream was treated. - Quality of the raw material stream was monitored.	2	3	5	30

ACTIVITIES	RESPONSIBILITIES	APPROXIMATE DURATION IN DAYS	
Recommended Action for Treating Failure	Responsible Body	Start Date	End Date
- Raising awareness among employees about the environmental risks resulting from the organization's various activities.	- Training Department/ Health & Safety, Environment, and Security Department/ Specialized External Parties under the supervision of the Chairmanship of the Management Committee.	01/01/2023	31/01/2023
- Updating the various stages of processes.	- Specialized External Parties under the supervision of the Technical Department and Health & Safety, Environment, and Security Department.	08/02/2023	09/04/2023
- Developing work procedures to be in line with modern environmental requirements.	- Technical Department/ Health & Safety, Environment and Security Department.	15/04/2023	14/06/2023
- Raw material treatment before the insertion into the production processes' stages.	- Technical Department/ Raw Material & Products Management/ Chemical Analysis & Quality Control Division.	01/01/2023	31/01/2023
- Monitoring the potential environmental impacts of processes periodically and continuously.	- Health & Safety, Environment, and Security Department/ Specialized External Parties under the supervision of the Chairmanship of the Management Committee.	01/01/2023	31/12/2023
- Creating a committee of experts in the field for the scientific and logical analysis of the data and results.	- Health & Safety, Environment and Security Department/ Chairmanship of the Management Committee.	23/06/2023	15/07/2023

### FMEA with Treatment, (Matrix B)

The positive effect of the countermeasures taken to address and mitigate the failure caused in processes can be obviously observed. This is evident in the noticeable descending in the values of RPN, which is a basic item in assessing the severity of the risk.

Developing an information exchange system within the organization to ensure quick and sufficient information exchange between the concerned departments.



The Expected Time Frame (Gantt Chart) for The Realization of Planned Measures

## 5. PROGRAM FOR IMPROVING THE ENVIRONMENTAL MANAGEMENT SYSTEM IN THE AIMED ORGANIZATION

5.1- Improvement of the Environmental Management System in (ARC), using the standard ISO 14001:2015.

Regarding the requirements of the ISO 14001 standard, the extent of documented information for an environmental management system can differ from one organization to another due to:

- The size of the organization and its type of activities, processes, products, and services.
- The need to demonstrate fulfillment of its compliance obligations.
- The complexity of processes and their interactions.
- The competence of persons doing work under the organization's control.

Accordingly, and based on the requirements of the EMS structure, the following documents in the aimed organization, (ARC), need to be defined: -

- Scope of the environmental management system (Context of the organization).
- Environmental policy (Leadership and commitment).
- Risk and opportunity to be addressed and processes needed (Planning).
- Criteria for evaluation of significant environmental aspects (Planning).
- Significant environmental aspects (Planning).
- Compliance obligation documents (Planning).
- Environmental objectives and plans to achieve them (Planning).
- Operational planning and control (Planning).
- Emergency preparedness and response (Operation).
- Information for monitoring, measurement, analysis, and evaluation (Performance evaluation).
- Internal audit program (Performance evaluation).
- Management review (Performance evaluation).
- Nonconformity and corrective actions (improvement).
- Communications for training, qualification, and experience exchange (Support).

## 6. CONCLUSION

Environmental issues can be managed effectively by using a perfect EMS.

Activities of the (ARC) could cause serious environmental problems if a modern (EMS) is not followed. Attention to environmental protection and related issues made the oil and gas industry in Libya under increasing pressure to improve environmental performance.

The working principle of the current environmental management in the oil and gas industry in Libya is based on the traditional active type and not on the proactive measures required by the new EMS, ISO14001:2015.

The new standard ISO 14001:2015 is an EMS that provides a framework for addressing environmental responsibilities.

Work must be done to understand the requirements of the ISO14001:2015 standard, follow up on the activation of the requirements of the system in general, and give priority to documents in the organization that need to be defined.

The practical priority for implementing ISO 14001:2015 is working hard to identify, monitor, and control the environmental impact of the organization's activities, including pollution prevention and efficient use of resources.

The organization needs to review its management system and ensure its continual improvement. This could be done with the assistance of an independent specialized consultant. Even though, the organization needs to take ownership and demonstrate commitment.

## 7. REFERENCES

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### Short biography:



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