



## A proposed framework for the disclosure of environmental data in a unified accounting system: A field study in Missan Refinery

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**Abstract:** In the recent of the 20<sup>th</sup> century, the interest in environmental research and studies has increased, because of the risks and challenges that face the environment and society alike. This requires a wide interest in the mechanisms and procedures to protect the environment from the effects of pollution, which has spread in most countries. Therefore, it became urgent for accounting to take part in this field as a result of the increased demand for financial and economic data and statements that pertain to the environment and natural resources. The goal of the research is to integrate the economic and environmental dimensions through the suggested framework for revealing the economic, financial, and environmental actions, including all levels of the company and exhibiting them in the format required by the beneficiary parties. Additionally, it provides an explanation of the fundamental ideas in environmental accounting and how they are disclosed in financial statements. The researchers have come up with a set of conclusions represented in the lack of sufficient interest when applying the environmental accounting system due to the fact that the senior management was not sufficiently aware of the need to disclose that environmental data in a unified accounting system. In addition, it is the lack of sufficient data on environmental pollution and ways to protect it. It was also noted that those in charge of preparing the final accounts face the difficulty of sorting and allocating between what is related to economic activity and environmental activity. The researchers also came up with a set of recommendations represented in developing a unified accounting system in a manner that is compatible with recent work developments, including those related to environmental accounting. In addition, the management of the refinery should pay attention to the scientific accounting methods related to the environment and disclose them in accounting within the financial statements. Moreover, it is emphatically recommended to hold courses and workshops for accountants in the field of environment and giving importance and confidence to the environment department in the refinery to provide it with competencies and engineering and administrative expertise familiar with environmental affairs. It would support the refinery financially to keep pace with the development taking place in protecting the environment from pollution.

**Keywords:** environmental data, the unified accounting system



### **Introduction:**

At the beginning in the early 20<sup>th</sup> century, accounting became interested in the idea of ownership, which was connected to the notion that focuses on an essential criterion for company performance, namely economic efficiency. This notion has the effect of raising the issue of accounting for the outcomes of measurement and disclosure, which serves the owner's interests. Following the turn of the 20<sup>th</sup> century, the focus of accounting changed to the idea of the accounting unit, in keeping with the dominant notion that the owners were one of the interests of the business. Thus, the responsibility of the senior management is to achieve a balance between various owners. Although profit is the goal of the company, the profit and goal are governed by some restrictions and conditions imposed by the owners and all persons who have common interests. Despite the increase in the size of companies, it has become necessary to accept the idea that aims at evaluating companies on the basis of contributing to the flow of outputs to the society. Environmental activities did not find sufficient attention to their outputs in accounting for measurement and disclosure in order to gain the same acceptability that measurement and disclosure receive in other economic activities related to accounting. In order to achieve social welfare, companies were subject to some social and economic pressure to fulfill their environmental obligations. These pressures were accompanied by more research that targeted accountants and what the accounting function can perform towards the environment and its effects, in addition to be accepted by community for delegating accountability to protect its resources. By this mandate, the accounting has to work on developing accounting and environmental methods to take into account the most significant decisions reached by accountants independently of environmental resources. This motivated researchers to investigate this field, which is the disclosure of economic and financial data related to environmental activities.

### **Research problem:**

The research problem is the inability of the unified accounting system to show the endeavors and efforts made by the management of the refinery in the field of environmental protection from pollution, in addition to the obligations borne by the refinery resulted from negative effects that harm the environment. This indicates that the environmental statements do not have the efficiency in disclosing the accounting information related to the various environmental activities.

### **Research hypothesis:**

The research hypothesis is that revealing the financial statements of the refinery cannot be the appropriate tool from an accounting point of view for planning, measuring, disclosing and then controlling the result of the company activity in the field of protecting environmental activities. Therefore, the research hypothesis can be summarized as the possibility of building an integrated proposed model for the disclosure of environmental activities in light of the use of the standardized accounting system to achieve economic and social well-being.

### **Research importance:**

The importance of research can be determined through the following:



A: In order to achieve the primary objective of this information, which is to protect the environment from pollution, higher management is required. This is based on understanding the role of the refinery in environmental protection and what is provided by the data resulting from the use of the accounting system in this field.

B- Facilitating the possibility of evaluating the company activities in the field of environmental protection, through governmental and non-governmental organizations, and based on the outputs provided by the accounting system that pertain to the environment and its protection.

### Research objectives:

Through what is mentioned of the problem and research hypothesis, the research objective is as follows:

- Introducing the concept of environmental accounting and its classifications, in addition to identifying the assets and liabilities of the environment.
- Introducing the objectives of the accounting disclosure for environmental activities approved by the Egyptian oil industrial sector, and the model for American chemical industries companies. In addition, another objective is to build a proposed model for the refinery which is the research sample for accounting disclosure in light of the using a unified accounting system.

### Research method:

In collecting their research data, the researchers relied on two methods:

- A- The descriptive approach to analyze and cover the theoretical aspect of the research.
- B- The field study curriculum to cover the applied aspect of the research.

### Research limits:

- A- Human limits: individuals working in the finance department and the environment department in the refinery (research sample).
- B- Spatial limits: Misssan refinery.
- C- Time limits: From (25/4/2022 to 30/9/2022).

### Second: Previous studies

#### 1- Arab studies:

Al-Hayali's study 2001, which is entitled "Accounting Measurement of Environmental Pollution". This study, which was applied in Jordan, aimed at determining the social and environmental pollution costs in general. In addition, it attempted to develop the accounting method for calculating and measuring expenses that were spent on economic organizations to confront the risk of environmental pollution and to set an equation in order to calculate the fine payable on the economic organization, because of its non-use of equipment to confront and reduce pollution. Also, this study tried to prove the hypotheses related to not giving a clear definition and concept of the social cost of environmental pollution in the accounting framework. The study also has come up with conclusions that the modern responsibility of economic projects has become inconsistent with the traditional view of maximizing and increasing profits. It also concluded that the shortcomings of the accounting thought is the lack of specific directives that can be relied upon,



such as the cost unit for reducing environmental pollution. As for the recommendations, the basic one was that it was necessary for a state or individuals to work on setting laws and regulations for environmental protection and obliging economic organizations to disclose data and information related to environmental pollution. In addition, there was a need for communication and attention by institutions, academics, academics and researchers and scientific conferences to contribute to satisfying this topic and solving related problems.

Abu Khasbah's study 2002 was entitled "The Importance and Role of Environmental Costs in the Field of Decision-Making and Performance Evaluation: A Suggested Introduction to Saudi Enterprises". It aimed at adopting the scientific framework for the concept of the environment and its pollution, and aimed at identifying the types of environmental costs in addition to the role played by the accountant in the measurement and analysis of environmental costs and their impact on decision making. It also aimed at providing a proposed model to increase the effectiveness of environmental costs in Saudi companies. As for the findings of the study, the most important one was that it was impossible to separate the concept of environment and pollution, but rather each complements the other and was closely linked. Also, the financial statements prepared within the company must disclose the environmental costs.

### **2- Foreign Studies:**

A study by Ginoglou & Tahinakis 2003 was entitled "Green accounting as in information system". This study, which took place at the University of (Macedonia) aims at showing the need to expand the fields of financial accounting to include the vocabulary of natural resources and losses of productive operations. In addition to studying and evaluating the transactions between the economic and environmental systems in order to set the best measure for the performance of economic growth in order to reach the most comprehensive evaluation. This study examined the optimal measurement of natural assets, how to calculate environmental benefits and costs, and how those benefits and costs are shown in the financial statements. The findings clarified the significance of the environment in the economic sector and offered senior management with an easy-to-understand analysis to aid in making the right decisions. The recommendations of this study were to work on finding appropriate ways to link the costs of the environment and its final products and services, in addition to the importance of joint work and intensifying efforts to try to reduce the obstacles faced by accountants to implement the environmental accounting system due to the lack of specialized staff in this regard.

### **Definition of environmental accounting:**

The fact that the accounting system fulfills a service role demonstrates the relevance of the system to the business. In order to assist the beneficiary parties in reaching the best financial choice, this service involves processing a collection of financial data by capturing, tabulating, and summarizing those facts and displaying them in the financial statements. (Matar et al. 2007) indicate that accounting can be considered an integrated system due to the procedures it has that are governed by rules and principles that are generally accepted. The objective of this system is to produce financial data. (Matar et al., 2007). Also, (Shirazi) has emphasized that the outputs of the accounting system can face very critical challenges. We find that there is a multiplicity and diversity of users of accounting information in addition to the large number and multiplicity of goals that must be provided by that information. (Shirazi, 2009). Based on what we have



presented, the accounting system is one of the company service fields, and its goal is to provide sufficient and accurate information to take correct economic decisions in addition to rationalizing those decisions related to the company. Environmental accounting has also been defined by the US Environmental Protection Agency (EPA) as the identification, aggregation, analysis and disclosure of costs related to environmental costs. (EPA: 2010). Environmental accounting has been defined as the identification and measurement of the cost of activities and environmental requirements. This information can be used in decision making to reduce the negative effects of the environment. (Hassan, Walid Hussein, 2010).

Mahran indicated that some industries may have to spend large amounts of money in the treatment of environmental waste or to work and develop devices to reduce pollution to the lowest level that can be reached. This would lead to increasing the production costs. As long as the increase in these costs means a decrease in the return, many industries have resorted to increasing the prices of their products in order to preserve the environment. In other words, the consumer is the one who bears the costs of protecting the environment. (Hisham, Ali Mahran: 2012).

### **(2-2) Concepts related to environmental accounting:**

The US Environmental Protection Agency (EPA) indicated that the concept of environmental accounting at the partial level includes everything related to accounting information and environmental activities, whether on the financial side, auditing, preparing reports and taking reports. The EPA also divided the concepts based on their relationship to the environment, as follows:

**A - Environmental Financial Accounting:-** The aim of Environmental Financial Accounting is to disclose the environmental dimensions in the financial statements published at the end of the period.

**B - Environmental Management Accounting:** This type of accounting is concerned with the performance of economic and administrative management through the development and performance of accounting systems and applications related to the environment, including life-cycle costs, benefit values, and strategic planning.

**C- Environmental Cost Accounting:-** Through this type of accounting, the focus is on environmental costs, which aims at reaching the cost accounting. That is, to identify, evaluate, and allocate each of the traditional, environmental and social costs on the company operations, activities and products, provided that these activities, processes, and products contribute to preserving the environment and reducing environmental pollution, because such costs will be borne by other external parties. This is called external environmental costs. Hence, we find that there are two dimensions of environmental costs: The first are those costs that are directly affected in the sense of special costs to the company. The second includes costs that pertain to the individual, society, and the environment, which are the so-called social costs.

**D- Ecological Accounting:** This concept is used for the process of preparing accounts that are based on material data only. It is expressed in one of the types of environmental accounting, which depends on natural resources and at the level of local administration, and its objective is to assess the life cycle of physical assets.

**F- Natural Resources Accounting:** This concept of accounting is defined as integrating the environmental dimension into the system of national accounts, in which the focus is on natural



assets. It aims at obtaining the modified economic indicators as indicated in the data of the total income of the environment.

### **(2-3) The reasons leading to pay attention for the environment by accounting**

There are several points that can explain the reasons for accounting interest in the environment, including (Ahmed, 2002):

- A. The accounting system and the environment are the appropriate tools for measurement, control and decision-making to achieve and develop the goals.
- B. There is a significant increase in environmental expenditures, whether capital or operational expenditures.
- C. The urgent need from the administration for the financial statements and outputs related to environmental expenditures.
- D. The reason for the interest in environmental accounting is the abundance of environmental costs, because they are always considered as part of the additional industrial expenses.
- E. There is an increasing need for financial statements for financial statements and environmental performance from various agencies, whether governmental, investors, lenders, banks and non-governmental organizations, because the lack of such ones helps some of the aforementioned non-compliance with environmental accountability and the destruction of natural resources.
- F. Most of the environmental activities are of a quantitative and financial nature, as they have an impact on the conditions and liabilities of the organization in addition to the costs incurred by the company.

The company outputs, in general, can be divided into major outputs and incidental or secondary outputs. This helps in polluting the environment if the company does not allocate sufficient costs to protect the environment and limit the spread of pollution, which will have an economic and social impact. Thus, accounting became responsible for measuring, disclosing, and evaluating environmental performance in the financial statements and reports.

### **(2-4) Environmental Prerequisites and Assets (EPAE: 2010)**

The concept of assets and prerequisites in accounting varies from environmental and natural assets and liabilities. The natural assets that humans cannot interfere with their creation, unlike the environmental assets. Accordingly, it is possible to distinguish between two types of assets as follows:

- A- Natural assets: It is one of the types of environmental assets, which includes the natural stock in organizations, public and private sectors, and the state. They are either found in the form of renewable assets such as land or non-renewable depleting assets such as oil. Natural assets can be defined as those assets that are discovered and developed by the organization or a particular unit during the period of time. It is always controlled by the discovered organization or unit. Thus, it appears in the financial statements and reports and has great importance, because it represents the future commodity.
- B- Environmental Assets: These assets include those that are owned by the organization or unit as a result of protecting the environment. The human being has a role in creating such assets, such as devices and equipment to protect the environment. It is either fixed or rolling. There are some cases in which are fixed assets of a particular organization. They, simultaneously, are considered current assets of another organization.



As for the environmental prerequisites, they are defined as the future economic sacrifice, which are financial obligations in exchange for expenses and the preparation of a service or commodity in the future. These prerequisites are legal obligations, whether voluntary, such as contractual obligations, or imposed involuntarily, such as the obligation of the unit to pay tax. Thus, the environmental liabilities can be divided into the following:

**A - Conventional obligations:** After enacting several laws and instructions that units and organizations must abide by, these units and organizations are now facing agreed future costs. These costs range from medium expenses to meet administrative requirements such as keeping records and preparing reports, and basic and intrinsic costs such as expenses incurred to reform land from desertification or to treat water and air.

**B - Reforming obligations:** These are obligations that arise to get rid of the effects of environmental pollution, which endanger the general life of people and the environment. Such obligations are always large in terms of expenses and costs, because they include operations related to drilling, excavation, and reforming lands and water.

**C - Obligations of fines and penalties:** Companies whose work does not comply with legal requirements may be subject to legal or civil penalties and fines. The amounts of these penalties and fines are sometimes large or small sums. The reason for this difference lies behind the nature of each violation.

**D: Compensatory obligations:** There are some laws that stipulate that companies and organizations pay compensation as a result of the risks resulting from their work, in order to protect people and their property because of the wrongful use of their properties or their use of environmental pollutants, even if those companies apply environmental standards. These obligations vary according to the harm and damage to the environment. There are personal damages, i.e. the individual is exposed to death or injury to his body or pain. There is damage to the property, i.e. the value of the property is exposed to loss or decline, as well as economic loss.

### **The third topic: First: Accounting disclosure of environmental data**

The concept and mechanisms of environmental disclosure will be discussed in the current research in addition to showing some forms of disclosure. Environmental accounting is a system of information for companies, organizations or the state. All the resulting financial and economic indicators have a major role in decision-making and on various activities, events and levels. The goal is to achieve growth and economic and social well-being. The social and environmental impacts of companies and organizations in the course of their activities may bear the greatest impact than the economic impacts. This is what prompts the administration to consider accounting as the one responsible for measuring, evaluating and disclosing the performance of the economy and the environment, whether industrial, service or commercial companies, and then working on finding ways and means to achieve the desired and predetermined goals, by showing them in the financial statements or additional lists.

### **The concept of accounting disclosure and its importance:**

The science of accounting is associated to the environment it operates through reports and financial statements, which represent the basis for the operations and practices covered by accounting. Accounting is an open system to the environment. Thus, the outputs of the accounting



system serve as a link between the unit and the organization on the one hand, and the internal and external parties on the other hand. The benefit of these parties from the outputs of the accounting system depends on the manner and quantity of environmental data and data that are disclosed. Accounting disclosure has been defined by (Al-Rashed) as the disclosure of financial information, whether quantitative or descriptive in the financial statements, in addition to disclosing it in the margins, tables and notes. This leads to presenting these menus in the correct form, not misleading, and be suitable for users in order to make rational decisions. (Al-Rashed, 2008)

Along with the rise of international markets, economic and social growth has had a significant impact on the importance of disclosure and its manifestation of how accounting data serve as the primary source of decision making for parties working with the organization or company concerned. All of this led to the interest in disclosure, where other parties began to deal with it with all transparency to include the public of consumers, investors and agencies for consumer protection, because these parties have common interests with the company or organization. This in turn gave the accounting the greater responsibility to meet the needs of all parties to help them make their appropriate decisions. All of this led to a conflict of performance regarding the quantity and quality of data and information that can be disclosed in the financial statements. This is what sparked a great controversy between the owners and investors who are reluctant to disclose on the one hand, and the legitimate desires of the other parties. The published data and the degree of its preference present three types of disclosure:

- 1- Full disclosure: Through this type, all parties dealing with the organization are provided with information and data to make rational decisions.
- 2- Fair disclosure: This type of disclosure is concerned with taking into account the state of equilibrium to meet the needs of users for financial reports.
- 3- Adequate disclosure: By which we mean that the disclosure of financial reports for all basic and necessary information, which in turn makes that information not misleading.

It should be noted that there is no major and fundamental conflict between the above concepts of disclosure. In order to achieve the goal of disclosure in assisting the customer to take the appropriate decision, in addition to helping the organization to release its responsibility towards investors and owners. Hence, the disclosure should reflect the appropriate timeliness, ease of presentation, objectivity, and impartiality. (Al-Rashed: 2008).

### **The concept of environmental disclosure:**

The concept of disclosure is the same, whether from an accounting or environmental point of view. However, the concept of accounting disclosure is only presenting business results from financial statements and reports in the light of accounting policies and concepts only. This type of disclosure does not give a complete view of the activities that have impacts on the environment. Therefore, the result of the business and the financial and accounting data is incomplete and does not meet the required purpose. It takes the appropriate and correct decision in the areas related to the environment, especially those related to the costs and prerequisites of the environment.

This poses a challenge to accounting, especially in recent years, in which industrial activity has increased and expanded. This in turn leads to the emergence of negative environmental effects resulting from pollution and waste of toxic materials that are dangerous to the environment. Jerboa et al. pointed to the disclosure of information related to the costs and prerequisites of the



environment, which is essential in clarifying the items of the balance sheet and the income statement. When preparing the report related to the disclosure or any item of the financial statements or a specific group of items. Here, it must be clarified whether that item or those items are material or not. If the item is material, then it must be considered not only for the importance of the amount, but also for the importance of the nature of the item. (Jerboa et al. 2012)

Through the mentioned above, environmental disclosure can be defined as “a process through which information on environmental obligations is presented so that stakeholders can obtain information necessary for planning, control and decision-making. Hence, it is clear that environmental disclosure is a somewhat modern phenomenon. Interest in environmental disclosure has increased at the end of the last century, as a result of the pressures exerted by governmental and non-governmental bodies, such as civil society organizations, etc. These pressures were represented in enacting laws and regulations, in addition to resorting to accounting standards sometimes and meeting the needs of consumers, investors and workers with the organization at other times. Whatever the motive for disclosure, the companies found themselves in front of obligations that cannot be ignored regarding environmental reports on the activities they carry out, including information related to capital and operating expenses related to the environment, damage and injury to individuals and property, and penalties resulting from the non-application of laws and regulations issued by multiple parties. All of these procedures put the beneficiary in front of a clear view of the behavior of that organization towards the environment. (Shirazi: 2009)

Hence, we can say that the organization disclosure of environmental activities is the result of mandatory or voluntary legal obligations. The first obligation is legal disclosure, which is by virtue of governmental laws and legislation. The second obligation is the voluntary disclosure resulting from administrative decisions. It is part of the organization responsibilities and culture towards the environment is significant in terms of making the appropriate decision, improving the reputation and image of the organization within the community, thinking about expanding the company or organization in the market and competing with other organizations and companies. There is a study conducted by the Governmental Labor Organization specialized for experts in accounting standards and national reports "ISAR", which showed great concern about the lack of information that is disclosed by companies working in areas that have clear environmental impacts. A survey conducted by the organization in 1991 included 220 organizations and companies that disclosed environmental data in their accounting and financial statements, but their disclosure of that information was partial and descriptive, as it did not show the relationship between costs, results, and goals. The biggest role of the United Nations "UN" was the prominent impact in guiding organizations and introducing disclosure, because of its great importance and impact on the results of the work of the organization and the company.

### **Objectives of environmental disclosure**

There are some difficulties in defining the objectives of environmental disclosure because of its clear positive effects for all parties involved in the organization. Based on what we mentioned of the motives and reasons behind the companies commitment to the concept of disclosure, it is possible to divide the objectives of disclosure as follows:



- A. Stability and preservation of the competitive position of the organization and the company within the market with similar organizations and companies, through improving its reputation towards the parties dealing with it economically and socially.
- B. Disclosing that the organization and the company apply the laws and legislation, whether governmental or non-governmental, gives it the legal legitimacy to carry out and continue its work.
- C. Disclosure usually provides a good set of data and information that enables the parties to know the organization and the company that they are taking all measures and measures to preserve the environment. In addition, disclosure provides the administration with sufficient data about the size of the costs incurred towards the environment and its protection.
- D. Obligating the organization and the company to take the procedures for environmental safety and protect it from waste and pollution resulting from the work of that organization or company. It leads to an increase in comfort and psychological and health stability for working individuals. (Gadin: 2008)

### 2- External objectives

The most important external objectives are:

- A. The organization and the company must be committed to the requirements of social responsibility and share in bearing the burdens of society.
- B. Considering disclosure as the means to the art of managing negotiation between owners and third parties who put pressure on the company, such as suppliers, consumers, the public and others.
- C. Giving a clear view of the activities and events carried out by the company and the organization within the scope of protecting the environment and its safety from pollution and waste of toxic substances. This leads to the exemption from legal liability for those damages and injuries that may arise from other similar companies.
- D. Disclosure related to environmental activities assists data and information users to take appropriate decisions, plan, control and evaluate performance, in addition to developing research aspects related to environmental safety.
- E. Gaining satisfaction and generating consumer confidence in the goods and services offered by the organization or company in the market. (Faraghly, 2009)

### Models approved in accounting disclosure related to environmental data.

In addition to reviewing the models endorsed by bodies or organizations with expertise in environmental affairs, we will attempt to highlight the key information that must be disclosed in environmental reports, whether that disclosure occurs through the financial statements of the final accounts or in the form of attached lists. The following is a presentation of the accounting data related to the environment that must be disclosed. The difference in users' desires regarding the process of disclosing environmental data has a significant impact on the multiplicity of reporting models related to environmental disclosure. This led to the lack of a reliable standard model in this context, which, in turn, led to the fact that the disclosure of environmental data may be appropriate for a particular party, and may not be so for the other party. This has put the regulators of financial reports in front of two methods:

- 1- Adopting a single, multi-purpose model must meet all the needs of consumers and users.



2- Several forms of reports are to be adopted, provided that each form should serve a specific level. We note that the above two methods cost the company a lot of effort, money, and time. Hence, the concern of the Environmental Protection Agency “EPA” and the Financial Accounting Standards Board “FASB” with the nature and type of information that must be disclosed.

EPA and FASB indicated that the disclosure should include the following main themes:

- A- Disclosure of environmental procedures and activities.
- B- Disclosing the accounting procedures that pertain to the environment.
- C- Disclosure of the assets, liabilities and costs of the environment.

The above topics include detailed information. For example, the first axis includes the programs and policies adopted by the company to preserve the environment, the modifications made by the company, the procedures put in place by the company to reduce the negative effects of environmental pollution, and the commitment to protect the environment. As for the second axis, it includes the effects of financial measures to protect the environment in capital spending and profit in the current period. It is in the event that there are actual amounts charged to the result of the works for the current period and are related to environmental affairs. Here, these sums must be mentioned and referred to in the general ledger record, and they should be classified according to their nature. For example, expenses related to the treatment of fluid flow, gas leakage, air pollution, or solid waste treatment. As for the third axis, it includes the disclosure of the company holdings related to the environment, including prerequisites, assets, and reserves. (EPA:2010)

### Models of Environmental Disclosure

It has already been pointed out that the multiplicity of users of financial statements and the difference in their desires has made many companies face the problem of defining an appropriate disclosure model that meets the needs of consumers and users. Although there are some suggestions by some researchers to solve this problem, which is to prepare a model for the financial statements that meet the needs of the target user so that he is chosen from among the multiple categories used for these lists. This suggestion did not eliminate the problem or develop a recognized form for disclosure, because of the large number of users of reports and the reason for using them. Hence, we will present two models for environmental disclosure to cover aspects of the research and as an introduction to the proposed model as follows:

- 1- The model for the companies of American chemical industries:

The greatest interest of these companies was to disclose capital and current expenditures in the different period, and that is related to the product, its suitability, activities, and environmental protection. In particular, the safety of workers and work sites, trying to avoid accidents and the emergence of crises, and how to deal with the emissions of the production process. The annual reports tab included capital and current expenditures after they gave the full definition, which is considered environmental capital expenditures. It aims at reducing the environmental damages that result from the company activities. There is a difficulty in sorting out the costs that are related to the environment. Hence, appropriate estimates of the activity that are related to the environment, such as a percentage or a certain amount of the total amount, are put in place. Below is Figure No. (1) of the annual estimate model, which concerns the important investments and expenses in protecting the environment.



Company: Year :	Location
Data	Sum
First - capital investments: 1 - Treating water pollution. 2- Treating air pollution. 3- Recycling and treating solid waste. 4- Other. Total Second – Costs of operating: 1- Treating waste water. 2- Solid waste treatment. 3- Other. Total Third - Expenditures related to research and development: 1- Development in production activities. 2- Development in activities that lead to waste reduction. 3- Other. Fourth Total - Environmental Planning Department. Fifth - Refunded costs: 1- The value of the recovered raw materials. 2- The value of the energy recovered. Total	

Figure No. (1) (Grey B:2009)

3-The model for the Egyptian oil sector companies, where the accounts of the Egyptian oil sector are prepared on the basis of the unified accounting system. Thus, all expenses and revenues of the units appropriate to the nature of the work are determined. Regardless of the nature and type of the activity and its inclusion in the final accounts of the accounting principles, environmental expenditures can be classified as capital expenditures and current operating expenditures, regardless of the nature of covering those expenditures. In other words, it covers the micro or macro level. This indicates that the opening of independent accounts for any activity is paid so that the administration can track expenses and report on all expenses, bearing in mind that all levels that are related to environmental assets are visible in the balance sheet of that company. As is the case with oil reserves and others. In return, all the company liabilities and obligations must be visible in the final financial statements

Figure (2) shows the modified balance sheet model for the Egyptian oil sector as a model for environmental disclosure.

<p>First: Current and Contingent Environmental Liabilities</p> <ol style="list-style-type: none"> <li>1- Current Liabilities:</li> <li>2- Liabilities related to environmental agreements.</li> <li>3- Therapeutic requirements. Compensatory liabilities.</li> <li>4- Contingent (future) liabilities: - Liabilities related to environmental agreements.</li> <li>5- Therapeutic requirements. Compensatory liabilities.</li> </ol> <p>Second: Ownership rights and other liabilities:</p> <p>Ownership rights. Long-term liabilities. Short-term liabilities.</p>	<p>First: Environmental and Natural Assets</p> <ol style="list-style-type: none"> <li>1- Environmental Assets:</li> <li>2- Current assets (pollution bonds). Fixed assets (environmental deposits). Environmental fame.</li> <li>3- Environmental performance bonds.</li> <li>4- Natural Assets:</li> <li>5- Reserves of natural and non-renewable resources.</li> <li>6- Reserves of natural and renewable resources.</li> </ol> <p>Second: Economic Assets</p> <ol style="list-style-type: none"> <li>1- Current assets.</li> <li>2- Fixed assets.</li> </ol>
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Figure No. (2) (INT I:2011)

### Second: The proposed model for accounting disclosure of environmental data related to Misssan Refinery

A brief of the research sample (Misssan Refinery): Misssan Refinery is one of the refineries affiliated with the South Refineries Company of the Iraqi Ministry of Oil, located in Basra, which was established in 1969. Misssan Refinery was established in 1999 with a production capacity of about 10,000 b/m. In 2010, it was expanded with two refining units. The production capacity of each unit is about (10,000) b/m, bringing the total capacity of the refinery to about (30,000) b/m. It is known that the Iraqi oil sector in general has its accounts prepared according to the unified accounting system. Since the outputs of the unified accounting system, in its current traditional form, which includes the current activity account, is considered as the final account and the balance sheet list that did not mention the measurement, classification and disclosure of environmental expenditures. This leads to the fact that the financial statements and final accounts do not give a clear and sufficient view of the nature of the company activity in relation to environmental activities. The goal is to give a clear view of the total events and activities of Misssan Refinery. Therefore, the researchers suggested a model of accounting disclosure that can achieve integration between both the economic performance of the refinery and the performance of its environmental activities after taking into account the requirements needed by the unified



accounting system. Based on the above, the researchers believe that the inclusion of environmental dimensions in the unified and approved accounting system in the refinery would have a mutual impact of economic activities on environmental activities so that the disclosure would be clear, not misleading, and be the most comprehensive. It allows users of the financial statements to achieve their goals, that they seek, which are to make final decisions, monitor, and evaluate the worker's performance in the refinery. We have mentioned several models of environmental disclosure in this research, but in various ways, including the separation of total capital expenditures and current expenditures related to environmental activities. Another type of disclosure reports was in the form of amended lists, which include the economic and environmental aspects of the company activities, as stated in the model of the unified accounting system for the Egyptian oil sector, Figure No. (2).

The work of the refinery, which is the research sample, has effects and pollutants towards the environment represented by the pollution of land, water and air. Through visits made by the two researchers to the refinery, we can clarify these effects:

**Water pollution:** Excess and residual water is removed from the production process through special pipes. Since this water contains a percentage of hydrocarbons and chemicals in human waste. As a result, it will affect the pollution surrounding the refinery as well as the governorate.

**Air pollution:** The process of refining crude oil continuously leads to the rise of vapors in the air, which leads to air pollution in addition to the pollution resulting from "Faler" emitted from toxic gases and burning materials that pollute the environment. The effects of the environmental pollution factors that we have referred to were of the interest of the refinery senior management. It worked to develop procedures and treatments that would eliminate the pollution problem.

**Land pollution:** This type of pollution occurs through the exposure of pipelines and pumps transporting crude oil to damage and breakdowns that lead to oil spills into the ground. This increases the intensity of pollution to the ground. It is worth noting that these effects of environmental pollution have financial implications. The management of the refinery must bear the responsibility for providing the requirements to address this problem. In the form prepared by researchers from the Environment Department in the refinery, is represented in the environmental measures taken in Misssan refinery, and the objective of each procedure:

Objective	Measures	No
Reducing the sulfur content in the produced gas oil.	Establishment of a hydrogenation unit with a card (2x10) thousand b/d.	1
Production of Reformate, which is one of the components of gasoline.	Establishment of a unit to improve gasoline through continuous reactivation "CCR".	2
Minimize the amount of TEL used. - Increase the octane number of gasoline.	Establishment of an isomerization unit for isomerite production.	3

Minimizing and limiting the effects of water pollution and reducing the discharge of industrial water to the outside	Establishment of an industrial water treatment unit.	4
- Increasing the improvement in the quality of the produced gasoline.	Establishment of a tetraethyl lead "TEL" injection system.	5
Diseases resulting from pollution are treated in the refinery.	Establishing a health clinic for the housing unit in the refinery.	6

Figure (3): The table was prepared by researchers based on the information of the Environment Department.

- The proposed model of disclosure for accounting and disclosure of environmental pollution in Missan refinery was approved in a way that is consistent with the requirements of the unified accounting system used in the refinery. Here, we must refer to the following:

- After informing the researchers of the quantity and nature of the costs achieved in the environment department of the refinery, these costs will be categorized with the accounting system used by categorizing the costs mentioned in the accounting system. These costs are (production center 5, production services center 6, marketing services center 7, and administrative services center 8).

- To achieve the proposed model to a sufficient degree of comprehensiveness of all costs of the refinery related to environmental affairs. The costs were divided into capital costs and current costs. This breakdown of costs would meet the disclosure needs. Thus, capital costs will appear in the balance sheet, while current costs will appear in the current operations statement.

- Any new model application or new idea that is characterized by clarity and ease, shall always be taken into account to be far from complexity. Hence, the researchers took this view by making a disclosure form for the refinery. The proposed model deals with three types of pollution: air, water and land.

1- The proposed disclosure form appears according to the relationship of costs with the centers for cost control. The form includes a tab for environmental costs, namely, environmental capital costs and environmental current costs, as shown in Figure (4).

Cost center	Cost type	Types of pollution						Amount allocated	Amount allocated
		Land pollution		Water pollution		Air pollution			
		Current costs	Capital costs	Current costs	Capital costs	Current costs	Capital costs		
Production center	Purchasing the environment								



	al assets								
	Capital assets for protecting environment		934005		345634				1279639
	Deferred revenue expenditure								
	Salaries and wages of the employees	120445		60786					181231
	Environmental service supplies	66780		33980					100760
	Appreciation of the environmental equipment	80667		45920					126587
	Other costs								
Total			934005	273637	345634	143636			1696912
	Purchasing the environmental assets								
	Capital assets for protecting environment		543218		132432				675650
	Deferred revenue expenditure								
	Salaries and wages of the employees	42563		22985					65548
Center of production services	Environmental commodity supplies	25765		11298					37063

	Environmental service supplies	4561		2970					7531
	Appreciation of the environmental equipment	40876		19876					60752
	Other costs								
<b>Total</b>			543218	113765	132432	57129			846544

Figure No. (4): The table was prepared by researchers based on company data (amounts in thousands of dinars)

It is noted that the terms of use "environmental costs" have been mentioned at the bilateral level, as in salaries, wages, and commodity, and service requirements. It is possible to prepare detailed statements attached to the form to determine the types of these uses, at the triple or quadruple level. Including the uses with such details would make the form lengthy and inconspicuous. In fact, the model has dealt with the key aspect of the items of environmental uses that can be realized in the cost centers and has given flexibility for what can be achieved from environmental costs within the paragraph of other environmental costs. It is worth noting that the costs of the administrative and marketing services centers were dealt with in a totality as in Figure (5) due to the difficulty of separating air, water, and land pollution in these centers. After fixing all the environmental costs and determining the total amounts spent to protect the environment from the three types of pollution referred to, they are classified into environmental capital costs and other environmental current costs. The data of the model will be presented in two main financial statements: the current operations statement and the balance sheet statement, in order to complement the aspects of environmental disclosure within the financial statements included in the unified accounting system.

Second: Exposing the current economic-environmental processes

On the other hand, it means preparing a statement that includes all of the current operational costs incurred by the company as a result of carrying out its economic activity. In addition, the disclosure includes the current environmental costs that it incurs in order to preserve the environment from the pollution caused as a result of its production operations. These statements include environmental costs, salaries and wages paid to workers in the field of environmental protection, costs of commodity and service requirements, and depreciation of various fixed assets used in cost centers, up to the final result of the disclosure that expresses the surplus "deficit" of current economic and environmental operations as shown in Figure No. (5)

Accounting manual	Details	Sum
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	current revenue	
45-41	Revenue from current activities (1)	20140553094
	current expenses	
31	salaries and wages	2857923462
32	commodity supplies	5397483211
33	service supplies	4388793412
37	Appreciations	3493214420
	Total current expenses	16137414505
	The surplus of current operations transferred from the first stage (1-2=3)	4003138589
	Transferable revenues and other revenues are added	
48	Transferable revenue	3394805
49	Other revenue	117983427
	Total other transferable income (4)	121378232
	Other economic transfer expenses are reduced	
38	Transfer Expenses	190324758
39	Other expenses	32815937
	Total other transfer expenses (5)	22140695
	Surplus of current operations of economic activity, second stage (3+4-5=6)	4102202126
	Environmental current expenditures are reduced	
31	salaries and wages	290738514
32	commodity supplies	180925372
33	service supplies	32748392
37	Appreciations	250419372
	Total of the current and environmental expenses (7)	754831650
	Distributable economic and ecological surplus (6-7)	3347370476

Figure No. (5): The table was prepared by the researchers based on company data

### Disclosure of the economic-environmental balance sheet

This statement is prepared by distinguishing between fixed assets and current assets that the company uses in its production processes from those it uses in order to protect the environment from pollution. This is done after taking into account the data of the costs disclosure form in Figure (5), especially with regard to the purchase of fixed assets. The capital additions

needed to protect against pollution are also taken into consideration, as well as attention to deferred environmental revenue expenditures, which include research and exploration expenses, research and experiments carried out by the company in order to develop its operations in line with the requirements of preserving the environment in the event that it is not completely extinguished.

Figure No. (6) shows the economic-environmental balance sheet form for the research sample company. This is carried out after it has been separated in a way that fits with the proposed framework for disclosing environmental data, in addition to taking into account the capital additions that the company intends to develop for expansion and environmental purposes. It should be noted that the researchers have separated the data of the final accounts of the company mentioned in the research sample for the year 2007 in line with the requirements of preparing the proposed framework for disclosure, because the company did not separate the costs of economic activities from those costs that were spent for environmental purposes.

### Missan Refinery Company (PJSC)

Statement of the economic-environmental balance sheet as of 31/12/2008

Accounting manual	Details	Sum
11	Economic fixed assets (book value)	5,437,229,413
12	Projects under implementation	1,100,000,000
	Total economic fixed assets and under implementation	6,537,229,413
	Economic Current Assets	
13	Stock Cost	1,227,835,214
16	Debtors	1,175,398,416
18	Cash	3,537,823,915
	Total economic current assets	5,941,057,545
	Total economic assets (fixed and current)	12,478,286,958
11	Environmental fixed assets	1,249,365,428
12	Projects under implementation	422,000,000
	Total environmental fixed assets and projects under implementation	1,671,365,428
	Traded Environmental Assets	
13	Environmental stock	20,735,316
138	Documentary credits for the purchase of environmental assets	9,314,573
	Total environmental current assets	30,049,989
	Total environmental assets (fixed and current)	1,701,415,417
	Total economic-environmental assets	14,179,702,375
	Funding sources	
	long-term sources of financing	
21	Paid-up and nominal capital	1,245,378,200
22	Reserves	2,857,416,790

<b>23</b>	Customizations	<b>1,120,734,500</b>
<b>24</b>	Loans	<b>1,200,000,000</b>
	The sum of the long-term financing sources	<b>6,423,529,490</b>
	short-term sources of financing	
<b>26</b>	Creditors	<b>7,756,172,885</b>
	Total funding sources	<b>14,179,702,375</b>

Figure No. (6): Preparation of researchers based on company data

### Conclusions

- 1- The application of the environmental accounting system in the various companies did not receive sufficient attention. This stems, in part, from the lack of awareness of the company management and its weak contribution to the accountabilities that it must hold in the field of environmental protection and society.
- 2- The accounting disclosure of environmental activities in its early stages is still facing numerous problems. The basic one is the lack of financial and technical data on pollution and pollutants, as well as the lack of qualified expertise who can work in this field.
- 3- Adequate disclosure of environmental data can provide a database that would lend some legitimacy to the company in the area of compliance with the governmental legislation and laws related to the environment. In addition, the disclosure clarifies the positive role of the company in the field of environmental research and studies.
- 4- The sample company prepares its final accounts according to the unified accounting system. This means neglecting environmental costs and obligations. There is no identification, measurement and disclosure of these costs. This is would adversely affect the efficiency of the method of allocating costs.
- 5- Accountants face some difficulties in the field of environmental accounting. One of these difficulties is the failure to be guided by standards related to environmental accounting in the field of environmental work, as well as the difficulty of sorting and allocating capital and operational costs between what is economic and what is related to the environment.
- 6- When paying field visits to the company, the researchers did not find any application of the concepts of environmental accounting. Everything in the environment section is newly created. Preliminary measures have been taken to protect the environment from the various pollutants raised by the company and resulting from its operational operations and with significant environmental impacts.

### Recommendations

- 1- The senior management is recommended to adopt the model proposed by the researchers for the accounting disclosure of environmental data because of its importance in the field of planning and control to protect the environment from the pollution risks caused by the sample company and other companies in the same sector.
- 2- It is recommended to develop a unified accounting system in a way that suits modern developments, including the requirements of environmental accounting. This is done by



reviewing the accounting guide, final accounts and financial statements to include appropriate accounts such as environmental costs and obligations, as well as environmental assets.

- 3- The researchers also recommend emphasizing the need for the company management to pay attention to the scientific methods of environmental accounting and disclosure of environmental financial data through preparing special courses for accounting cadres in this field.
- 4- It is recommended to involve employees in the environment department and production departments with important environmental impacts in intensive courses that contribute to overcoming the risks of these effects on the one hand and reducing them if possible on the other hand.
- 5- Paying special attention to the environment department in the company and providing it with engineering and administrative competencies who are familiar with environmental affairs, as well as supporting it financially and morally in order to keep pace with the latest developments in the field of environmental protection from the effects of pollution caused by crude oil refining operations.
- 6- It is recommended to develop legislation and laws that oblige all companies to take the necessary measures to reduce the pollution phenomenon resulting from the practice of their production activities, as well as issuing an Iraqi environmental accounting standard that takes the privacy of the actual reality of the country.
- 7- It is recommended to complete the projects included in the plan of the Environment Department as soon as possible by allocating the necessary credits or completing the processing requirements, because these projects have a product that contributes to reducing the effects of pollution in the air, water, and land in the company.

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