

Oil pipeline transport, energy - environment relation

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Abstract. The crude-oil import and pipeline-related pumping activities date since 1967, when the ship Marianne III delivered the first "black gold" shipping to Constanta harbor. Due to the petroleum products growth and the development of the petrochemical industry, it has been decided to import and transport crude oil through pipelines. This paper presents the management of the environmental scheme.

Key Words: oil pipeline, management of environment, petroleum, ecology.

Introduction. Pursuant to the idea that the economic activity implies a permanent interaction with the environment, every oil company which has activity in oil industry needs issued its own environmental protection policy in order to comply with the laws and regulations in force. Moreover, the company drafted its own ecological balance in order not to pay the reestablishing of the environment damaged by the inappropriate management of the petroleum products pipeline transport system that has been constructed in parallel with the crude oil pipeline transport system. Nevertheless, our company implemented its own Ecological Management System. The main object of the study is to find a model for environmental protection plan to oil pipeline transporting.

Material and Method. In activity of oil pipeline, pollution of environment (water, air and soil) it is inevitable. Romanian Law of Environment requires that operators crude oil pipelines apply best available techniques to prevent pollution and also prove that it has implemented a plan to prevent pollution and intervention in case of disasters.

For this paper, I have studied existing environmental legislation in Romania and also I examined the implementation of environmental standards in oil transportation companies in Canada and USA.

The implementation policy of the Ecological Management comprises three steps, mainly (McAllister 2013; Chis 2005, 2010):

- the ecological management implementation planning and programming;
- drafting a plan for the environmental protection;
- drafting the environmental protection policy.

Results and Discussion. Implementation of an ecological management system in first stage was studied (Chis 2011). Is necessary to define the matter:

- accurate description of the activity (to be understood by everybody);
- description of the crude oil pipeline transport process-environment interaction;
- thorough analysis of the productive activity (based on the available knowledge).

The following data shall be analyzed:

- input data (oil analysis, environment analysis);
- output data (oil storage refinery analysis, environment data analysis);
- consumption types (water, gasoline, diesel, energy, oils motor);
- survey on the endangered values and/or functions;
- survey on the environment jeopardizing functions and parameters;
- description of the environmental protection previous results (before oil pumping);
- stating tasks (priority settlement):
 - objectives of oil pipeline company (environment, quality, energy and health policy),
 - results of oil pumping (economy and resources consumptions);
- choosing a long term strategy:
 - explicit statement of the problems and premises,
 - picking out instruments,

- developing intermediate tactics,
- promoting the cooperation with the governmental authorities,
- putting all required data at the disposal of the local governmental authorities or the other bodies involved;
- description of the global actions;
- allotting the corresponding financial means.

In the second stage I prepared environmental policy plan:

- setting realistic objectives (on short, medium and long term);
- forming a clear policy vision;
- acting in compliance with the governmental policy decisions;
- informing the governmental local decision factors concerning the potential ecological accidents and providing the resources to remove the accidental pollution effects.

In the third stage I defined responsibilities and resources:

- establishing the personnel resources for the implementation of the ecological management;
- initialize the implementation actions pursuant to the laws and regulations in force;
- identify and register the environmental protection issues affected by the production process;
- initialize, recommend or develop new means to remove these problems;
- the programs implementation control;
- the control of the activity all along the existence of the production process, reviewing the environmental protection policy in due time;
- stating the own potential ecological accidents removing plan;
- the election of the contactors who have implemented the ecological management system.

The assessment of the production activity impact on the environment. The environmental protection system must be able to respond to:

- the normal operating conditions;
- the abnormal operating conditions (including the potential damages resulting from unscheduled turn on/off procedures;
- the incidents, the accidents and the potential crisis situations.

Moreover, the system must survey the following elements arising during the performance of the production process, which would affect the environment:

- the air emissions;
- the water emissions;
- the liquid and solid wastes;
- the potential field contaminations;
- the smoke-producing products resulting from combustion, vibrations, noise, visual impact sources (lights);
- the overall energy sources, water and other sources necessary for the production process.

The implementation of the ecological management. The exploitation industry of the fluid transport systems through pipelines faces very complex problems whose resolution requires the development of some efficient programs of modernization and removal of the actual exploitation risk situation (Chis et al 1998).

Most of the problems are related to:

- the alarming increase of the accident number due to the corrosion;
- the increase of the accidents number due to the human factor (oil products' thefts, incompliance with the technological discipline, etc);
- the aging of the technological installations.

All these problems always cause environmental pollution, the process of regaining the initial environmental condition involving a great amount of materials and human resources.

The efficient organization of the fight against the oil pollution effects must rely on the remark according to which in the fight against the oil pollution effects “The maximum efficiency is achievable in minimum time”. Therefore, the following organization scheme of the fight against the oil pollution effects was proposed, comprising the following stages: action plan in case of pollutions (A.P.P.), and pollution prevention plan (P.P.P.). The pollution prevention plan (P.P.P.) has the structure in Table 1. The means of alarming and notifying an oil accidental pollution is rendered in Figure 1. The Action Plan in case of pollution (A.P.P.) is rendered in Figure 2.

Table 1
Prevention plan in case of oil accidental pollutions (McAllister 2013; Chis & Popescu 1997)

<i>At company level</i>	<i>At territorial entity level</i>
1. Introduction	1. Introduction
1.1. Political definition and elaboration of the environmental protection	1.1. Planning and drafting pollution prevention plan
1.2. Defining the aim of the pollution prevention plan	
1.3. Planning and drafting pollution prevention plan	
2. Managerial organization of fighting against pollution	2. Managerial organization of fighting against pollution
2.1. Personnel structure and responsibilities	2.1. Responsibilities
3. Organization on announcing an accident	3. Organization on announcing an accident
3.1. Detection and alarm/alert procedure	3.1. Detection and alarm/alert procedure
3.2. Accident assessment	3.2. Accident assessment
3.3. Study of pollution mitigation in the field	3.3. Study of pollution mitigation in the field
3.4. Complete information regarding the accident impact on the environment	3.4. Complete information regarding the accident impact on the environment
4. Action plan in case of pollution	4. Action plan in case of pollution
4.1. Identification damaged system	4.1. Identification damaged system
4.2. Accident definition	4.2. Accident definition
4.3. Leak oil pipeline stop	4.3. Leak oil pipeline stop
4.4. Accident remedy	4.4. Accident remedy
4.5. Cleaning of the environment deteriorated	4.5. Cleaning of the environment deteriorated
4.6. Wastes storing	4.6. Wastes storing
4.7. Drafting the documentation	4.7. Drafting the documentation
5. Environment parameters (recovery)	5. Environment parameters (recovery)
5.1. Biological, meteorological and hydrological elements	5.1. Biological, meteorological and hydrological elements
6. Training program	6. Training program
7. The attachments of the pollution prevention plan	7. The attachments of the pollution prevention plan
7.1. The relations with the authorities and contractors	7.1. The relations with the authorities and contractors
7.2. The logistic description	7.2. The logistic description
7.3. Description of the communication system	7.3. Description of the communication system
7.4. Organization of the environmental protection department (critical structures department)	7.4. Organization of the environmental protection department (critical structures department)
7.5. Control equipments endowment	7.5. Control equipments endowment
7.6. Contracting research programs with research and education institutions	7.6. Contracting research programs with research and education institutions
7.7. Contracting relations with damaged environment rehabilitation bodies	7.7. Contracting relations with damaged environment rehabilitation bodies
7.8. Compensations related to the crops, waters and population affected by the pollution	7.8. Compensations related to the crops, waters and population affected by the pollution
7.9. Communication with population and media	7.9. Communication with population and media

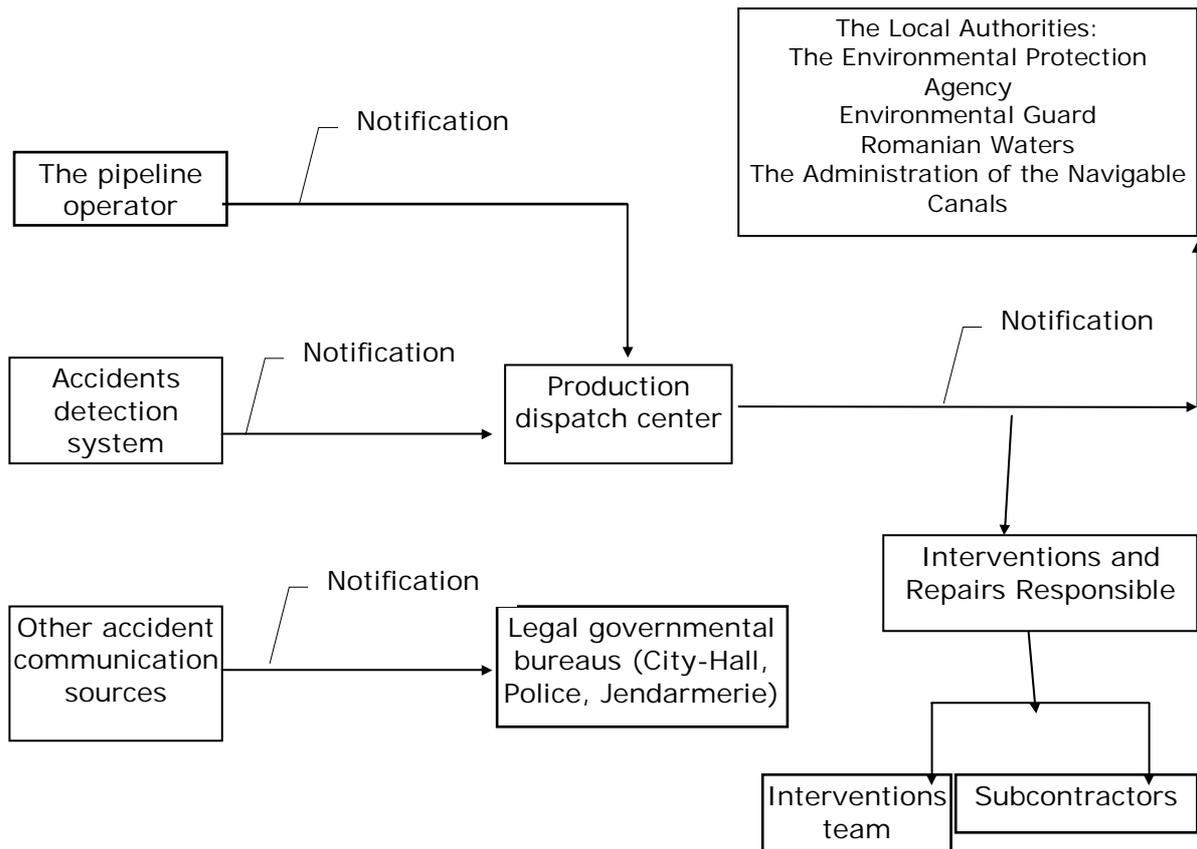


Figure 1. The alarm and notification means in case of accident.

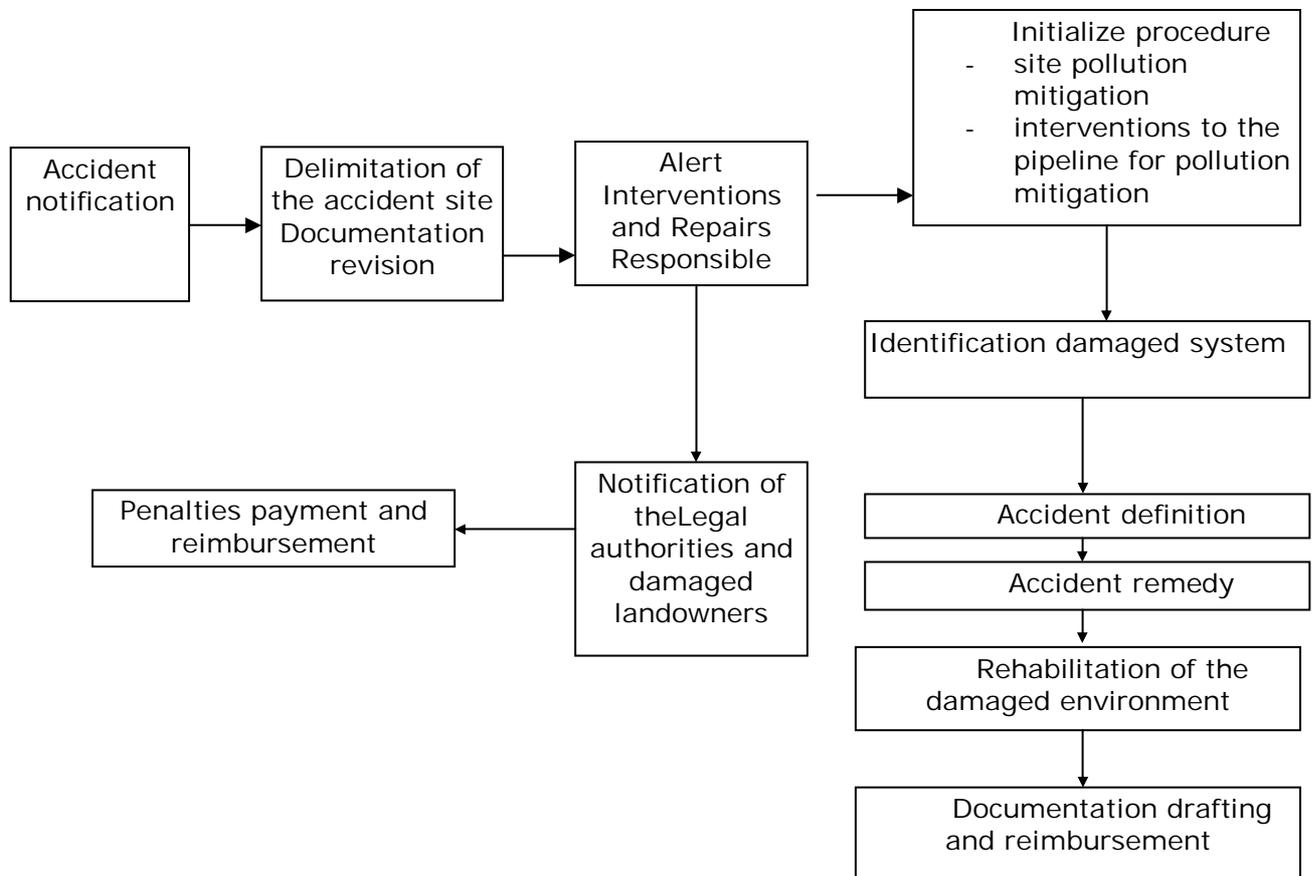


Figure 2. Action plan in case of pollution.

Conclusions. This document presents a point of view regarding the organization of the environmental protection activity within Oil Industry Activity. Before starting any economic productive activity, each agent should study its impact on the environment, including its integration in the ecosystem. Without these studies, the economic agent might be bound to pay the recovery of the environment affected by significant losses for his activity.

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