Methods of Evaluating the Impact of an Environmental Aspect in Case of a Petrol Processing Companie

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Any activity developed by an organization can generate a wide range of environmental implications. Particularly important and must be considered, are activities that have a significant negative effect on the environment, ie. pollutant. knowing harmful effects of pollution on human health, methods of assessing the criticality for an environmental aspect., are very important . The paper presents two methods for evaluating the criticality of an environmental aspect, both being able to be applied in situations of normal and abnormal functioning in the event of equipment or processes within the organization.

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Pollutants are emitted from natural and anthropogenic sources of pollution (artificial, man-made) [1-3].

In the category of natural sources of pollution is soil that can spread in the air and water:

- solid particles resulting from erosion;
- from the decomposition of organic particles, or the existence of animals and vegetation in and on soil;
- gases (CO_2, H_2S, NH_3);
- ordered complex substances.

Anthropogenic pollution comes from various human activities carried out in industry, transportation, agriculture and housework.

Industry pollutes absolutely all media (air, water, soil), causing harm to health humans, animals, agriculture, transport, construction, and even culture itself.

Were conducted and carried out numerous studies on pollutants emitted by industries, the immediate and long-term effects of pollution on the effects of reducing emissions. [4 - 6]. Studies are conducted at national level, but also through international cooperation. Table 1 shows some substances emitted by industries worldwide (mil.t). Considerable amounts are emitted into the air, sometimes tens of millions of tons, which imposes tfe strict reduction of them, to ensure the sustainable development of humanity. Outside the emissions shown in table 1, each industrial domain register in addition and other forms of pollution.

The chemical industry, emits a variety of substances with different toxicity to humans and the environment. Is eliminated sulfur compounds into the atmosphere as: carbon dioxide and sulfur trioxide in sulfuric acid industry, refineries and petrochemical mercaptans, hydrogen sulfide, carbon disulfide, and others [7, 8].

The nitrogen compounds, such as oxides and ammonia are eliminated from the nitric acid industry and nitrogen fertilizers. Chlorine is eliminated from the production of chlorine, hydrogen chloride in the atmosphere , calcium chloride in water, etc. From various processes of synthesis of compounds is eliminated by fluorine, chlorine, pesticides, synthetic intermediates, carbon black. From the recovery of crude oil and natural gas is eliminated, phenols, alcohols, ketones and ethers various hydrocarbs. Waste products is eliminated into the air, water or soil, or packaged and stored or burned, each variant presenting specific forms of environmental pollution.

Table 2 shows the effects of some chemicals in humans.

Auto, marine, rail and air transportation, emit a number of pollutants resulting from the combustion of fuels (petrol or diesel) CO_2, NO_x, unburned hydrocarbons, SO_2, aldehydes. In addition to these, this results lead oxides in the combustion of gasoline with the addition of tetraethyl lead and smoke, in particular in the burning of diesel fuel .

Agriculture affects the natural environment by:

- land improvement works;
- pesticides and fertilizers used in excess;
- development of the livestock sector;
- industrialization of agricultural products.

Table 1

POLLUTANTS EMITTED BY INDUSTRIES WORLDWIDE

Domain industry	Powders	SO_2	CO	NO_x	Hydrocarbs
Energy	23.9	52.8	4.0	70.1	-
Oil extraction	0.1	0.1	0.2	0.1	62.1
Petrochemical processing oil	0.4	2.0	8.2	0.5	31.1
Coal extraction	4.1	3.7	10.4	2.0	4.0
Ferrous Metallurgy	14.9	9.7	41.7	13.7	0.3
Non-Ferrous Metallurgy	7.0	16.5	3.6	-	-
Chemical Industry	1.4	1.2	3.0	1.9	1.3
Machine building industry	2.8	1.0	6.8	1.1	-
Building Materials	28.7	2.6	11.2	3.2	-
Other areas	16.7	10.4	11.5	7.4	1.2

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Table 2

POLLUTING EFFECTS OF CHEMICALS ON HUMAN HEALTHS

Pollutants	Effects
Benzene	Anemia, chromosome aberrations.
Carbon disulphide	Neurological, psychiatric and gastrointestinal.
Dichloroethane	Liver disease and kidney. Cardiac disorders, central nervous system effects.
Formaldehyde	Chromosome aberrations, eye irritation, dermatitis, respiratory infections in children.
Trichloroethylene	Kidney cancer, skin, genital, liver dysfunction, disorders of the central nervous system.
Carbon black	Dermatitis, skin cancer, eye irritation, respiratory system disorders.

The pesticides act on soil microorganisms by inhibiting certain enzymes, decreasing of fungal (parasitic micro mushrooms), decreased retention of nitrogen by influencing nitri and denitrifying microorganisms.

Another problem with implications for environmental pollution is eliminaarea waste with minimal environmental impact.

Traditionally, environmental engineering objective was the removal of domestic waste based on health grounds. In most cities this type of removal was introduced centuries ago. However, the focus was only on city cleaning, waste fate being indifferent.

Waste modern management focuses on treatment and disposal of which can not be recycled in environmentally safe way. In the past 20 years we have developed a number of techniques for treating waste, all consisting primarily of:

- waste incineration with or without the use of thermal energy;
- composting;
- production of biogas to produce heat;
- sanitary and storage platforms with and without the use of gas.

Trend waste management is an integrated with more resources based on source separation and segregation, followed by reprocessing, recycling, energy use, or treatment with an increased number of technologies. For each of them was an incredible development of technologies, for example, advanced systems to the flue gas cleaning, polymer lining compounds.

With the increasing cost of waste treatment and the number of treatment techniques, it is increasingly important to have reliable data to choose the correct techniques for certain local waste.

From a historical perspective, recycling was focused on the recovery of valuable metals and similar based on a private initiative. Only in the last two decades, recycling, composting, etc., were based on mutual benefits for society (reduced requirement for storage platforms, save the raw material etc.). Also, the burning of waste, biogas, etc., produce energy that replaces other important energy sources, all in the context of effective protection of the environment.

Experimental part

We present below the impact assessment of an environmental aspect in the case of an oil processing company from Romania, through the application of two methods.

For example, with both methods we evaluate air pollution with ammonia in case of an oil processing company from Constanta county, in the Navodari city area, in 2014, for a period of seven days.

The first method sets a score in relation to the degree of significance of the criterion, as in the example of table 3.

Of course there are other criteria can be considered, that the organization considers important (for example: reduce water consumption, reduce energy consumption, persistence of environmental effect, etc.)

Following the review and the evaluation of each of the environmental aspects of the organization after specified criteria, we can calculate an index of significance (IS) of the impact that might have on the environment with the relation 1:

$$IS = L \times S \times C \quad (1)$$

(between 1-10) (between 1-10) (between 1-10) (between 1-1000)

In case of the analyzed company for ammonia air pollution (pollutant) in the city of Navodari on a 7-days period in 2014, resulted IS = 5x5x5 = 75.

Table 3

SETTING SCORE IN RELATION TO THE DEGREE OF SIGNIFICANCE OF THE CRITERION

No.	Criterion	Score	Significance
1.	Compliance with environmental laws and regulations (L)	1	They are recognized and implemented properly with all applicable environmental regulations.
		5	Regulations are implemented partially.
		10	Regulations are either not known or not applied.
2.	The intensity of the impact in relation to the sensitivity of the receiving environment (S)	1	The environment is not sensitive and not paying attention to the impact.
		5	The environment is slightly sensitive and attention impact is limited.
		10	The environment is very sensitive and very alert to any impact.
3.	Control over Impact (C)	1	There are a preventive control, permanent and regulated on the process generating impact.
		5	Process control is limited and has not a preventive character.
		10	There is not provided a process control. The impact is uncontrollable. There are not allocated means and resources necessary for the control.

Table 4

THE CRITERIA FOR ASSESSING THE ENVIRONMENTAL ASPECT CRITICALITY

Criterion	Weighting coefficient	10 points	5 points	1 point
Gravity (G)	$\alpha = 3$	huge weight	medium gravity	insignificant gravity
Frequency (F)	$\beta = 1$	daily	periodical	occasional
The amount (C)	$\gamma = 2$	significant amount	average amount	insignificant amount
Conformity (R)	$\delta = 5$	there are not are complied applicable legal requirements	realization of the requirements is to limit or unsystematic	systematic legal requirements are met
The sensitivity (S)	$\lambda = 4$	there are systematic complaints	sporadic complaints	No claims or complaints

It is necessary for the organization to establish a limit beyond which the environmental aspects evaluated by the methodology described above are considered significant, this limit then being able to be decreased year by year. It is evident that the objectives and targets that the organization will propose, must be directly related to reducing the significant environmental impacts, so determined.

The second method is taken from instrumentation specific for quality management systems and is known as: Failure Mode Effects Analysis and their criticality (FMEAC). In this case, the criteria which must keep in mind are:

-environmental impact gravity (G);

-the frequency with which the considered environmental impact aspect, occurs (F);

- the quantity of pollutants emitted to the environment (C);

- compliance with the legislation and environmental regulations (R);

- sensitivity of public opinion in relation to the considered environmental aspect (S)

These criteria are assigned weighting factors: α, β, γ, δ, λ, which makes the assessment to gain a greater degree of finesse and sensitivity in relation to the interest pursued by valuer.

Criticality (Cr) of the considered environmental aspect is calculating than with the relation 2

$$Cr = \alpha G \times \beta F \times \gamma C \times \delta R \times \lambda S \quad (2)$$

where α, β, γ, δ, λ take values between 1 and 5 (for example: $\alpha = 3$, $\beta = 1$, $\gamma = 2$, $\delta = 5$, $\lambda = 4$).

For a suitable dimensioning for criteria G, M, C, R and S, we can use the grid shown in table 4.

Again, in case of the analyzed company for ammonia air pollution (pollutant), in the city of Navodari on a 7-day period in 2014, resulted value of the criticality environmental aspect calculated using the equation 2, which is:

$$Cr = 3x5x1x1x2x5x5x5x4x5 = 15x1x10x25x20 = 75000$$

Once calculated, the indicator of the criticality environmental aspect as stated above, it will compare with the the significance threshold, originally set. If the calculated indicator is upper to the significance threshold it will consider that it has a significant impact on the environment. It is indicated preparing a list of all the aspects that present a significant environmental impact by each organization concerned with environmental protection.

Conclusions

As was shown above, the activity undertaken by an organization can generate a wide range of environmental implications. However, there are very important and must be considered as activities that have a significant negative effect on the environment. Although the basic idea after is guided the impact evaluation is: *how big are the effects on the environment*, it is clear that must be considered and other items such as:

- intensity and size impact;
- the severity of impact;
- the character of the generated changes (reversible or irreversible);
- maintaining lasting effects;
- interacting with other factors;
- costs that the eliminate of the effects imposed on them.

For an organization to be able to determine *what is significant for the environmental impact* would be necessary for the beginning to define a scale of importance that considers it is necessary to grant to the environmental issues. Some indicative criteria in this regard are listed below:

- the degree of compliance with environmental legislation;
- codes of good practice that the groups industrial organization belongs;
- scientific criteria indicating major effects on the local, regional or global environment ;
- pressure from the local community or the public;
- values, principles and regulations then lead the organization;
- pressures from banking or insurance companies;
- considerations for reducing energy costs and raw materials;
- the risk of seriously affecting the environment.

Both methods of assessing the impact of an environmental aspect above presented, can be applied in situations of normal and abnormal functioning in the event of equipment or processes within the organization.

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