

UNIVERSITY OF PETROȘANI

DOCTORAL SCHOOL

ABSTRACT of the Doctoral Thesis

MANAGEMENT OF INDUSTRIAL AND MEDICAL CRITICAL CASES AT THE STATIONS OF DISTRIBUTION OF PETROLEUM PRODUCTS IN DAMASC, SYRIA

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Doctoral thesis entitled *Management of industrial and medical critical cases at the stations of distribution of petroleum products in Damasc, Syria/ إدارة الحالات الصناعية والطبية في محطات توزيع سوريا* it is current through its theme, because in Syria / in particular the distribution in Damascus, the exploitation and capitalization of hydrocarbons (crude oil and natural gas) is a complex, strategic, tactical and operational activity.

In this context, in Syria, domestic supply (and export potential) of hydrocarbons for energy consumption (petrol, diesel, natural gas, liquefied natural gas, etc.) is a priority.

Geological surveys, exploration, exploitation-extraction of oil / natural gas, further their processing in refineries, are followed by: 1) primary storage / storage, 2) transport to oil distribution stations, 3) secondary storage / storage in stations (in tanks and reservoirs), 4) distribution / sale to customers / consumers by means of transport / motor vehicles.

Frequently, there is a need for the functional compatibility of the mentioned infrastructures with ensuring a general techno-medical-sanitary state for sustainability,

Through the doctoral thesis, the researches for new solutions in the field were carried out, justifying the theoretical and practical approaches (personal, new, original scientific contributions, launched for the first time in the specialized literature) by the imperatives of exceptional importance launched on Syrian national level, at European and international level in the field of human protection, the environment affected by hazardous substances and industrial, distribution and mass consumption activities.

What proves to be real, essential is the study of the techno-medical / sanitary effects for sustainability in the context of the priority concern for the life and health of the people of Syria.

The case study was located in the Damascus area, the capital of Syria, but the results, solutions and conclusions / proposals and advanced recommendations have the appropriate generality for extended application.

The doctoral thesis is elaborated during 7 chapters, on a number of 185 pages, comprising a total of 38 figures / drawings / schemes, 37 tables with specific data and information and 21 mathematical relations / formulas.

At the same time, conclusive aspects on the issues addressed in the 6 basic chapters are systematized, respectively a total number of 65 conclusions, personal scientific contributions, proposals and recommendations.

In the last Chapter of the paper (VII) are presented systematically a number of 12 final conclusions, 42 descriptions of personal, original scientific contributions, as well as a number of 6 proposals, recommendations and 3 future research directions in the field.

The 3 Indexes of the doctoral thesis include a number of 21 figures, drawings and schemes (out of a total of 38), 7 mathematical formulas and relations (out of a total of 21) and 31 own concepts and expressions, all original, author's creation, entries under the incidence of scientific copy-right.

The bibliography includes a number of 162 updated references, from Syria, Romania and other countries.

Chapter I is entitled *"The situation at the international, zonal and Syrian level in the exploitation and exploitation of natural energy resources such as hydrocarbons"*.

In this context, there is a general characterization of the Syrian Arab Republic and the National Capital, Damascus, being underlined that this administrative area has significant flows of transport, movement, supply, distribution of goods and fuels, has consumption and urban / rural mobility. high, technical infrastructure, significant trade, etc.

The geographical spread of oil reserves, including in Syria, determines the existence of exploration and production processes (extraction / exploitation), to which are added the specific transport infrastructure (networks, pipelines), refineries and the distribution of fuels through oil stations.

Currently, globally / globally, energy, including hydrocarbons, participates in the energy mix and the consumption of transport fuels. However, globally, energy is being resized, undergoing a "transitional" reconsideration.

It is stated that, regardless of the geo-strategic situation and critical moment in the area (Middle East), decision-makers in Syria must resort to the development and implementation of proactive plans for medium and long-term oil consumption.

As such, it would be useful in Syria to reduce the operational fragmentation of oil distribution currently recorded (2019-2020). This issue will be firmly addressed when opportunities for cross-border, cross-sectoral and cross-border cooperation arise in the area where the country is located. Syria is the only country in the eastern Mediterranean with significant hydrocarbon deposits / deposits.

Mainly, the elements that show concern for the intensification of the domestic production of crude oil and natural gas, for the refining of hydrocarbons, the distribution of white products for food and industrial consumption, transport and domestic / domestic consumption are presented.

Chapter II is entitled *"Distribution of Petroleum Products in Damascus, Syria."*

The main directions of evolution in the distribution of petroleum products are reported, with analytical emphasis on the sanitary protection area afferent to a Station and the specific Safety and Health Plans in the field.

It is presented that the average incidence rates of malignant neoplasms affecting the hematopoietic and lymphoid tissues decrease with distance from the source of emission (in the first 75 m in the vicinity of an oil distribution station).

From practical observations, in the field, in the Damascus area, it was concluded that, in fact, the causes of diseases among the staff of the oil service stations depend on the time of exposure and the infrastructural framework that causes the exposure.

Research in Damascus also refers to elements of descriptive statistics / elements of binomial distribution / Poisson distribution in micro-environments / microenvironments, fuel / fuel distribution stations and spaces in their infrastructure.

Elements related to statistical models and to the analysis of linear variation and regression / logarithmic regression in micro-environments / microenvironments, fuel / fuel supply stations and spaces in their infrastructure are discussed, reaching clarifications about non-parametric inferential statistics.

Chapter III is entitled "*Research on the perspective of sustainable techno-medical safety in the distribution stations of octane oil products in Damascus, Syria*" and presents the main objective, which provides, in summary, elements of knowledge for the application part in field, to obtain a model, describe and propose how to acquire the information necessary to perform statistical analysis of data, to arrive at results that are interpreted to serve in making feasible decisions for techno-medical-health and sustainability.

It describes the actions and stages of field research in Damascus, the establishment of data collection sources for the descriptive and analytical field.

The Alpha Kronbach coefficient method is used to measure the consistency / stability of the questionnaire distributed by the author in the oil stations and the average internal connection between the measured phases is reflected. The results of the Alpha Kronbach test to record the stability / consistency of the questionnaire show the lowest value as 0.610, and the highest recorded is 0.919. It is found that, in fact, the questionnaires distributed by the author are stable, credible and the analysis of the results is reliable.

Conceptual and operational examples are presented regarding the distribution of petroleum products, assessment of available resources of refined hydrocarbon products, size of existing network infrastructure, systematization of critical technical, socio-sanitary, risks, medical erosion, workers' health and public health situations. .

Chapter IV is entitled "*Critical situations in the distribution of hydrocarbon products at oil stations in Damascus, Syria*" and states that from a toxicological perspective, irregular biological events are observed in oil distribution stations, indicating the effects of exposures.

The main conditions and relationships between the characterization of the risk in the distribution stations of petroleum products and its qualitative and quantitative determination are identified, including the complementary, adjacent uncertainties, relying on probabilities of adverse, undesirable effects on the organism, distribution system or population under well-defined exposure conditions.

In essence, it is recommended that starting from the major risks and hazards associated with petroleum products in distribution (highly flammable products), transport, unloading, storage and sale operations be specific / special and safe.

It is found that benzene has a carcinogenic effect and toluene, ethylene and xylene induce relatively non-carcinogenic health risks.

Critical and suggestive, exemplary, technical situations of techno-medical-sanitation in the fuel distribution stations in Damascus are presented in a systematic and suggestive way.

Chapter V is entitled "*Modeling and Optimization in the Distribution of Petroleum Distribution Stations in Damascus, Syria*".

In this context, an original scientific contribution is made, by designing a model of "Sustainable Techno-Medical-Sanitary Optimum" {M(TMSD)}, with the help of which it is possible to resort to parametric iteration / reiteration, aiming at achieving / fulfilling value. and qualitative imposed on a general objective function F(TMSD).

It is made for the first time, in mathematical symbolic expression, the original model in question, launched for the first time in the literature. The developed model will continue to go through the processing in information programming / "software", and then, there will be the possibility / probability of its use as a calculation tool that has uncommendable values (those of input / inputs), transformation and obtaining controllable values (outputs), imposed for minimum expenses and maximum efficiency / safety / sustainability (maximum techno-medical-sanitation for sustainability).

The {M(TMSD)} model, as such, has the potential or the set of iterative / iterative valences for all situations / cases in an oil station (including Damascus) in a limited range [0,1].

The creation of a Teleprocessing data network {TMSD} in the Damascus district area starts from the network formalization of the parameter of sustainable technical-medical-sanitary optimization of the oil distribution stations. The simple network of multipoint terminals is examined and it is considered necessary to resort to the formalization of a global model of the quasi-complete optimization problem.

At the same time, the need to satisfy the mathematical lattice properties for contributions to obtaining the optimal {(TMSD)} in the Damascus district area is expressed.

It is concluded that the optimum {(TMSD)}, for any variant, accompanies / can accompany the "utility" and, equally, between the "utility" and the "sustainable techno-medical-sanitary optimum" disarticulations, different meanings can be registered (divergent increases / decreases).

It is considered that, on the whole, the issue of optimization {(TMSD)}, in close connection with the supply and distribution of petroleum products in Damascus, is limited, in case, to solving a linear problem which, however, has large dimensions. Therefore, the advanced concept is "alternative solution of two or more smaller problems." The idea of "piloting" the system of oil distribution stations in Damascus is also recommended.

A scientific achievement in the doctoral thesis proves the complex integrated interactive-preventive model with probabilistic statistical testing for obtaining sustainable techno-medical-sanitary solutions in oil stations in Damascus, Syria. The advanced recommendation, on this occasion, is to emphasize the systemic concern for the inclusion of the aggregate (coverage) parameter {[TMSD]} in the implicit / intrinsic, technical-functional configuration of the technological distribution flows in the Damascus Oil Stations.

Chapter VI, entitled "*Management of oil supply / distribution sub-structures / micro-stations / micro-petrol stations, complementary to the existing base system / station network in Damascus, Syria*" presents the scheme of the algorithm for setting up reliable networks for stations distribution of petroleum products.

It is appreciated that the adequacy of resources, the more accurate knowledge of the aggregate performance to be achieved, the balance and quasi-perfect compatibility between "hardware" and "software", - these are elements of primary / incipient substantiation of the formalization of the network of trust / a network with "confidence" in the existence and sustainable operation of oil distribution stations in Damascus, Syria.

The thesis is launched that in the researched area (Damascus) we are dealing with a compensatory multi-directionality, which highlights, successively or simultaneously, the network diagnosis and the specific decision / decisions in the Petroleum Stations. It has been observed that such a network can even be acyclic, as long as the variability of the variables is manifested.

It is noticed that the conditional probabilities can be reduced numerically (quantitatively) for the variables from the network of scientifically investigated oil stations, when we are dealing with binary variables. The final state of the network is met and assumed when a level of conditional aggregate probability of operation is identified / can be established, in the spirit and practice of safety / sustainability.

It is concluded, in conclusion, that the outputs (aggregate / compound fuel supply) at network level in Damascus stations currently meet (2018-2020), in proportion of 72%, and the level of allocation (emissary), corresponding induces pressure in an aggressive context on conditions, techno-medical-sanitary situations for sustainability.

It is the proposal to introduce dynamic resilience for the network of oil distribution stations in Damascus.

The last **Chapter (VII)** is entitled "*Final conclusions. Personal scientific contributions, Proposals and recommendations. Future directions of research*".

Within it, the results reached following the research carried out for the scientific elucidation of the topic of the doctoral thesis are described with relevance and in an original contributory way.

Conclusions, proposals and recommendations, personal scientific contributions, can be used by practitioners, researchers in scientific institutes and organizations, decision makers, developers of strategies, tactics, programs and development plans in Syria and other countries, as well as government and legislative authorities, who can fruit the positive ideas and alignments of reliable, feasible, sustainable societal construction.