



National Iranian Oil Refining and Distribution Company  
(NIORDC)



Journal of Farayandno

Review Paper

## Risk Assessment and Management of Oil and Gas Infrastructure in Border Provinces with the Aim of Reducing Threat Effects

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Received: 2 Mar 2022

Accepted: 6 Jun 2022

### 1. ABSTRACT

One of the most important strategies of any country for the integrated and comprehensive development of all regions is the distribution of energy infrastructure with the aim of expanding industries, creating employment, providing public services and preventing the migration of residents of border areas. Therefore, reducing the vulnerability of oil and gas infrastructures is important due to their critical role in life, because even a short interruption in the provision of oil and gas infrastructure services will have irreparable effects on the various activities of the country in critical conditions. In this article, after reviewing the different methods of risk assessment using FEMA's method, first the oil and gas assets of the border provinces were screened, then identification and evaluation of vulnerabilities and the risk of each asset is calculated based on threats. Finally, solutions are provided to reduce the risk in the oil and gas infrastructure of the border provinces.

**Keywords:** Fema Method, Threat assessment, Risk Assessment, Oil and Gas.

### 2. INTRODUCTION

Sustainable energy resources is one of the important requirement to develop a country. So that most of the investments are spent on providing energy sources and its processing infrastructure. The experiences of wars during the last half century show that border areas have always been under military threat due to the ease of access, wide geographical area, concentration of centers of gravity, facilities and manpower. In addition, terrorist and technological threats can be a source of threat in various ways. Iran's income depending on oil, gas and petrochemical industries although sensitivity and ability of this industry for ignition and explosion raise requirements of comprehensive and codified program in the field of passive defense and crisis management for enemy attacks and vulnerability in cyber space. It's clear that stopping the operation and servicing of oil and gas networks can cause great financial and political damage to countries. The main aim in this article related to while examining the vulnerable points in the border areas, seeks to provide solutions to protect and reduce the vulnerability of the infrastructures needed by the people in the border areas.

### 3. MATERIALS AND METHODS

The research method is usually set based on the nature of the subject and the goals of each research. During various stages, it has been tried to investigate the important infrastructures of the border provinces with scientific and systematic knowledge, and finally, by recognizing and evaluating the vulnerability of these infrastructures, it is possible to reduce possible damages. Our research method in the current study is quantitative and descriptive-analytical in terms of approach. In this article, using the FEMA method, first the oil and gas assets of the border provinces were screened, then identification and evaluation of vulnerabilities and the risk of each asset is calculated based on threats. Finally, solutions are provided to reduce the risk in the oil and gas infrastructure of the border provinces.

### 4. RESULTS AND DISCUSSION

In this study, the FEMA failure mode analysis method was used to determine the risk number in assets. In this method, risk refers to the potential of damage or loss of assets and calculation based on the relationship between asset value, threat

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Please Cite This Article Using:

Abtahi, S.E., Kalhor, R., Sedaghat Shayegan, D., "Risk Assessment and Management of Oil and Gas Infrastructure in Border Provinces with the Aim of Reducing Threat Effects", Journal of Farayandno – Vol. 17 – No. 77, pp. 70-90, In Persian, (2022).



and vulnerability. To calculate the asset value, first the assets of the province are identified and screened, and then the assets are evaluated based on the value tables prepared according to series of indicators. These indicators include; Economic or capital value, functional value, uniqueness and the possibility of replacement, the level of coverage of users and the necessity of continuity of performance in times of crisis. In the second section, first using three methods; Examining internal and external library sources, extracting the opinions of experts and specialists in the field of crisis management and passive defense of the province and checking the records of intentional man-made threats in the province, identifying the basic threats and then calculating the threat number using the assessment indicators. In the third part, we identify the vulnerabilities and then calculate the vulnerability number of each asset using the evaluation indicators. Finally, we calculate the risk number of each asset using the asset value number, the threat number and the vulnerability number.

## 5. CONCLUSION

After calculating the risk number of each asset, it is possible to determine the assets with high, medium and low risk using solutions mentioned in the text to reduce their vulnerability according to the conditions of each asset.

## 6. ACKNOWLEDGEMENT

In the end, I would like to express my gratitude to all those who have contributed to the writing of this article.

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