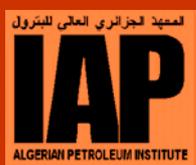


# Revue de l'Algerian Petroleum Institute

Volume 02, N° 01, Janvier 2008

Revue Semestrielle Publiée par l'Algerian Petroleum Institute, IAP

Revue Semestrielle publiée par  
l'Algerian Petroleum Institute,  
IAP Spa



Directeur de la Publication  
Dr. Salah KHEBRI

Rédacteur en Chef

Dr. Abdelaziz NACER

Conception & Diffusion:

Brahim ATTOUCHE

Centre de Documentation  
&  
d'Information

Secrétariat de la Rédaction

Avenue du 1er Novembre 35000  
Boumerdès, Algérie

Tél.: 024.81.95.59

Fax: 024.81.95.59

Email: brahim.attouche@iap.dz

ISSN: 1112-802X

## SOMMAIRE

EDITORIAL	2
ABSTRACTS/ RESUMES	3
RELIABILITY BASED INSPECTION FOR CORRODED PIPELINES <i>Noureddine BOULAKTOUT</i>	7
HALON PHASE OUT MANAGEMENT IN RTI/TRC/ SONATRACH <i>Farouk OTHMANI MARABOUT</i>	14
CONTROL OF MAJOR ACCIDENT HAZARDS ON THE ALGERIAN SECTION OF THE PEDRO DURAN FARELL GAS PIPELINE (GPDF\TRC\SH) <i>Samir RAHMANI</i>	23
ENVIRONMENTAL IMPACT ASSESSMENT OF THE DRILLING ACTIVITIES <i>Yacine YAICHE</i>	31
FORECASTING FUEL DEMAND IN INDIA TRANSPORTATION SECTOR USING POOLED CROSS SECTION TIME SERIES APPROACH FOR MODELING CAR OWNERSHIP <i>Taoufik BOUACHERA &amp; Dr. Mohammad MAZRAATI</i>	37
IMPLEMENTING AN HSE MANAGEMENT SYSTEM WITHIN THE DRILLING DIVISION OF SONATRACH <i>Kamal MEKIRI</i>	52
RECOMMANDATIONS AUX AUTEURS	60
DANS NOTRE PROCHAIN NUMERO	61

## EDITORIAL

La revue de l'Algerian Petroleum Institute n'est qu'à son deuxième numéro qui est soumis naturellement à l'appréciation de la communauté scientifique et technique du secteur de l'énergie et des mines.

En dépit des aléas qui accompagnent et guettent tout projet de cette nature, nous espérons grâce aux efforts de tous, pouvoir s'éloigner des entraves pouvant réduire à néant les élans de projets similaires connus de l'IAP par le passé, bien que les concepteurs étaient pourtant porteurs de volonté.

Nous espérons en tout cas maintenir le rythme grâce à la volonté et aux efforts de tous et nous continuons de croire en la capacité de nos enseignants-chercheurs et nos cadres de relever le défi de se positionner comme une force créatrice de savoir dans un environnement scientifique concurrentiel des plus rudes.

Dans ce deuxième numéro, nous avons essayé autant que faire ce peut, de diversifier les articles dont les thèmes touchent le HSE, le Risk management, l'Environnement, le Management et le Transport, tout en espérant les diversifier davantage dans nos prochains numéros pour couvrir la plupart des thèmes touchant aux préoccupations de notre secteur de l'énergie et des mines.

Pour rappel, la parution de cette revue s'inscrit dans la politique générale de la Formation nouvelle qu'entreprend l'Institut laquelle se fixe comme objectif de former les professionnels de l'Industrie Pétrolière et Gazière de demain, tout en sensibilisant les étudiants à des questions de développement durable.

Elle participe aussi à l'effort de R&D dans le secteur pour faire connaître les potentialités de nos cadres à tous les niveaux et révéler ainsi ceux qui, par leurs efforts, leurs travaux et leurs publications, sont à même d'apporter des solutions aux problèmes que rencontrent les structures opérationnelles dans l'Exploration, la Production, le Transport et la Transformation des Hydrocarbures liquides et gazeux .

La contribution de tous les acteurs énergétiques, chercheurs, industriels et autres est bien entendu vivement souhaitée, car cette revue constitue le cadre idoine pour l'expression de réflexions et d'actions qui doivent accompagner les efforts de mutation pour répondre aux nouveaux défis.

Tachons toujours d'en tirer le meilleur parti.

**Dr. Salah KHEBRI**

**Président Directeur Général**

## RELIABILITY BASED INSPECTION FOR CORRODED PIPELINES

Noureddine BOULAKTOUT

Algerian Petroleum Institute, IAP Spa, Avenue du 1er novembre 35000, Boumerdès , Algeria

E-Mail: Nouro2002@yahoo.com

**Abstract:** Pipeline Integrity Management is a growth industry. Much of the material published in the last few years has been directed to optimising maintenance cost by accepting and managing some level of risk. Risk is typically established by complex statistical calculations based on available data. The method used in the present study works well when both the accuracy and confidence of the data used in the calculations are very high. This method works less well when the data is less accurate and can lead to underestimating both the degree of risk and its associated cost. This project is a general review of industry practice for determining risk and its cost. The project reviews also other specifications (accuracy and confidence) of in-line-inspection tools with regard to the use of data as a basis for complex calculations (based on Monte Carlo Simulation) to determine the acceptable risk and the optimum inspection interval. Currently the facilities protection department of the Sonatrach's transportation branch has no risk-based models that consider both the risk of failure along the pipeline network and the cost of inspection as a basis for management decisions on ILI (in-line) inspection scheduling and repair activities. Furthermore the ILI inspection decision is generally based on a fully subjective assessment. The facilities protection department does a good job of maintaining the pipelines, but the decision as to where to allocate resources and when in some cases may be a reactive measure. The present study applies risk-based model to show that the accepted risk has a quantifiable cost commensurate with the accuracy of the data used in the risk assessment process. The proper use of risk assessment / risk management principles and tools in the present study can help the pipeline operator to maintain the flow of pipeline integrity data and the analysis of this data. In the other hand the risk can be estimated and its attributes can be defined through an algorithm (series of relationships and mathematical simulations). This risk-based model may aid in the rational, prioritisation of resources and identification of improvement opportunities.

**Keywords:** Risk-based inspection, In line inspection, Corroded pipelines, Total business impact.

---

## HALON PHASE OUT MANAGEMENT IN RTI/TRC/SONATRACH

Farouk OTHMANI MARABOUT

Algerian Petroleum Institute, IAP Spa, Avenue du 1er novembre 35000, Boumerdès , Algeria

E-Mail: othmani.marabout.farouk@gmail.com

**Abstract:** Hydrocarbon pipelines transportation activity is an important part of SONATRACH business and where great care must be emphasised. The significance of hydrocarbons transportation is owed to its paramount role to link up-stream and down stream businesses, and on the other part; it guarantees products delivery to external. In order to ensure such a business continuity and face product delivery interruptions that may be caused by fire incidents or ignitions, especially in facilities where such incidents may partially affect business integrity, cause harm to employees, population, environment and facilities, TRC is using a Halon based fire fighting system for fire protection purpose of the floating roofs rim seals of oil storage tanks across its different regions. The Halon use (except critical uses) is currently banned in non 5<sup>th</sup> Montreal Protocol's article parties, a delay has been granted to developing countries that will no longer be authorised to use Halon after 31<sup>st</sup> December 2010.

As the hydrocarbons sector, mostly, represented by SONATRACH, is the most important Halon user in Algeria, thus, SONATRACH is highly concerned by this issue. Under such pressures, it has been an emergent necessity to set up a Halon phase out management strategy. It is true that the origin of a such issue is purely an environmental concern that have been reinforced by a public policy, but other people and facilities safety matters, that have a considerable weight in the Halon phase out process, have to be highlighted and adequately managed.

**Keywords:** Halon, Ozone depletion, Risk assessment, waste management.

## CONTROL OF MAJOR ACCIDENT HAZARDS ON THE ALGERIAN SECTION OF THE PEDRO DURAN FARELL GAS PIPELINE (GPDF/TRC\SH)

Samir RAHMANI

Algerian Petroleum Institute, IAP Spa, Avenue du 1er novembre 35000, Boumerdès , Algeria

E-mail: rahmani.samir@gmail.com

**Abstract :** Pipelines transporting hazardous material such as natural gas has being recognised as being major accident potential. This potential threat is increasing with the growing demand on natural gas that instigates the realisation of further gas pipeline systems.

In this context the present paper aims to present an integrated approach that could prevent and control the major hazards which might rise from operating high pressure gas pipelines.

This approach includes firstly, a Safety Management System which has to be melt in the general company management system and has to have effective and compatible interfaces with the different stakeholders' activities. Secondly, it is a risk based approach that is supported by a structured risk assessment process which identifies the potential major hazards and quantifies their eventual consequences as well as their likelihood using deferent risk assessment techniques. Thirdly, this approach sets out and puts in place cost effective prevention and mitigation measures able to ensure the control of eventual major hazards. This approach must be fully implemented under the accountability of the line management and has to be supported by the top management in order to ensure its effectiveness.

**Keywords:** gas pipeline, major accident hazard, risk analysis, individual risk, Safety Management System. environment protection and pipeline profitability.

---

## ENVIRONMENTAL IMPACT ASSESSMENT OF THE DRILLING ACTIVITIES

Yacine YAICHE

Algerian Petroleum Institute, IAP Spa, Avenue du 1er novembre 35000, Boumerdès , Algeria

Email:yaiche@yahoo.com

**Abstract:** - "Algeria has an estimated 11.8 billion barrels of proven oil reserves" [1]. Sonatrach is striving to double its oil fields production within the 5 to 7 coming years, especially with recent increases in oil prices on the market. For this reason, a large scale drilling operation program has been launched. Particular attention must be given to the strict application of the environmental protection program during the drilling because of:

- The vulnerability of the natural environment.
- The proximity of built up areas to the drilling site.
- The nature of the activity.

**Key words:** Environmental Impact Assessment, Drilling activities.

## FORECASTING FUEL DEMAND IN INDIA TRANSPORTATION SECTOR USING POOLED CROSS SECTION TIME SERIES APPROACH FOR MODELING

Taoufik BOUACHERA<sup>1</sup> - Dr Mohammad MAZRAATI<sup>2</sup>

<sup>1</sup> Algerian Petroleum Institute, IAP Spa, Avenue du 1er novembre 35000, Boumerdès, Algeria

Email: Toufik.bouachera@iap.dz

<sup>2</sup> Energy Studies Department – Organization of the Petroleum Exporting Countries OPEC – Vienna (Austria)

**Abstract:** Motorization in Asia is soaring in step with rapid growth in incomes. Even though the car population is still low in countries like China, India, or Indonesia, escalating number of vehicles is following GDP growth. This quick growth in car ownership may represent a significant implication on road transport fuel demand. This paper forecasts the demand for transport fuel in India. For this purpose, econometric models based on time series data are generated for specific factor affecting demand: car ownership.

So, firstly the econometric car ownership model was attempted in this study for projecting future car stock in India based on cross section time series technique. The car stock is modeled by using three models, which are the logistic, quasi-logistic and Gompertz curves. However, due to the size of India car fleet, these models were modeled by using pooled data of seven Asian countries (Japan, China, S. Korea, Thailand, Indonesia, Malaysia, and India). Then, a set of fuel consumption scenarios were developed in order to make forecast until 2030. These scenarios were generated by taking into consideration car stock, fuel efficiency and the average distance traveled in India.

**Keywords:** transport fuel modeling, car stock projections, Gompertz function, and quasi-logistic function.

## IMPLEMENTING AN HSE MANAGEMENT SYSTEM WITHIN THE DRILLING DIVISION OF SONATRACH

Kamal MEKIRI

Algerian Petroleum Institute, IAP Spa, Avenue du 1er novembre 35000, Boumerdès, Algeria

E-Mail: mekiri.kamal@caramail.com

**Abstract :** Sonatrach aims to achieve high industry standards in health, safety and environmental. Sonatrach's management believes that good HSE performance is an integral part of efficient and profitable business management. Sonatrach has adopted a very comprehensive policy "HSE Policy", which consider five main principles as pillars for the implementation of the policy. These are:

- Comply with legislations and legal requirements regarding HSE and make its own standards.
- Develop a preventive risk management approach for HSE.
- Ensure continuous performance improvement in HSE;
- Ensure adequate HSE training for all Sonatrach employees.

Develop the information and communication plan regarding HSE with its employees, partners and other third parties.

Such broad goals can not be approached without a structured HSE Management System A Health Safety and Environment Management System (HSE-MS) describes the way an organisation is managed with respect to its stated objectives. HSE-MS provide continuity, identify areas for improvement and can be used to demonstrate that controls supported by procedures and documentation are in place. helps the Drilling Division to control the progress of the HSE-MS implementation.

Sonatrach has recognised the importance and the synergy that it will be gained through managing health, safety and environmental issues all together. It is currently studying how an HSE-MS can be implemented successfully within its different divisions.

As long as the Drilling Division is one of Sonatrach upstream divisions, it has to apply Sonatrach HSE policy through the implementation of an HSE-MS. This Study shows how to facilitate a successful implementation of an efficient HSE-MS within the Drilling Division of Sonatrach. It began by discussing the different steps needed to ensure an efficient preparation of the groundwork, and then it describes the HSE-MS of the E&P forum model and summarizes its requirements in a checklist that can be used for both the preliminary review and the implementation process of the HSE-MS. This study ends with explaining a method that can be used to quantitatively measure the performance of the HSE-MS and helps the Drilling Division to control the progress of the HSE-MS implementation.

---