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REGIONAL ASSOCIATION OF  
OIL, GAS AND BIOFUELS SECTOR COMPANIES  
IN LATIN AMERICA AND THE CARIBBEAN

# **SAFETY BENCHMARKING IN THE OIL AND GAS INDUSTRY IN LATIN AMERICA AND THE CARIBBEAN**

## ***2010 STATISTICS FOR ARPEL MEMBER COMPANIES***





# ARPEL REPORT

## **Safety benchmarking in the oil and gas industry in Latin America and the Caribbean**

### ***2010 Statistics for ARPEL Member Companies***

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*ARPEL, July 2012*



**ARPEL**

***Report on Safety Benchmarking in the Oil and Industry for Latin America and the Caribbean - 2010 Statistics for ARPEL Member Companies***

***ARPEL OHS Report N° 28-2012***

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## 1.0 EXECUTIVE SUMMARY

One of the activities of the Environment, Health and Safety Committee of the Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean (ARPEL) focuses on the initiative of compiling information on occupational injuries, diseases and fatalities in the oil industry of Latin America and the Caribbean.

In this sense, the present report represents the fourteenth annual compilation of data in reference to occupational injuries, diseases and fatalities, for ARPEL Member Companies. The objective of this report is to contribute to eradicate damages to people and facilities from the oil industry's activities. The same provides a comparative analysis of the performance in occupational health and industrial safety of the oil industry, for ARPEL's member companies in 2010. This report also includes comparisons with ARPEL's data compiled in previous studies, from 1997 to now, and some of the results are compared with the OGP<sup>1</sup> Report N° 455 on safety performance indicators for year 2010.

Four indicators of reactive nature are analyzed, considering the *total of incidents*, their *gravity* and *frequency*, and *fatal incidents*. Compiled data correspond to companies' workers and contractors separately; a "combined" result is also provided for companies' workers and contractors as a whole. These four indicators are analyzed for on-shore and offshore activities, together in a first instance; after that, a specific analysis is included for offshore activities as well. Besides the comparative analysis at the level of the oil industry as a whole, the individual reactive indicators of each Member Company of ARPEL in 2010 are also comparatively analyzed (keeping the confidentiality of these data).

This report also includes two indicators of proactive nature: *Safety Tasks Planned Observations and Safety Training Intensity*, both for company workers only. This report includes all main sectors of the oil industry, which, different to previous years, are grouped in eight functions: Exploration and Production, Refining, Transport of liquids through pipelines (Transport – pipelines for liquids), Transport of gases through pipelines (Transport – pipelines for gases), Transport through pipelines in general (Transport – pipelines not separated), Maritime Transport (Transport – Maritime), Distribution, and Others. The definitions of such functions correspond to ARPEL User's Manual, 5<sup>th</sup> Edition (2010). Fatality causes are also analyzed for year 2010 and compared to previous years.

Twelve ARPEL Member Companies reported Contractors data and four reported data on offshore activities, out of fifteen ARPEL Member Companies that reported data for year 2010.

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<sup>1</sup> International Association of Oil and Gas Producers



**Table 1.0: List of companies that answered to the “2010 Safety Benchmarking in the Oil and Gas Industry in Latin America and the Caribbean”**

ANCAP	PETROPERU
CHEVRON	PETROTRIN
ECOPETROL	RECOPE
EP PETROECUADOR	REFIDOMSA
HOCOL	Repsol YPF
PCJ	PEMEX
PDVSA	STAATSOLIE
PETROBRAS	

### 1.1. Selected results for the year 2010

- The total Man-hours (in thousands) reported in this Report amounts to 2,102,488; considering both companies and contractors and correspond to 15 Member Companies.
- The Total Incidents Rate (for all functional units) for companies and contractors combined was of 3.61 incidents per 1,000,000 worked hours (Companies only: 5.06. Contractors only: 2.77). The function with the largest number of incidents was "Transport – pipelines for gases" for Companies, with 12.17 incidents per 1,000,000 worked hours.
- In average for all functional units, the Companies' workers lost 54.53 days per 1,000,000 hours worked, compared to 102.87 lost workdays by Contractors.
- The incidents' Frequency rate with lost workdays considering all functional units for both Company and Contractors, corresponds to 1.57 cases of lost workdays per 1,000,000 hours. (Companies only: 2.74; Contractors only: 0.90)
- The function that registered the largest rate of fatalities in 2010 was "Distribution", with a Rate of 0.134 fatalities per 1,000,000 worked hours, followed by "transport-pipelines for gases" (0.074), "refining" (0.040), "transport-pipelines not separated" (0.022), "E&P" (0.019) and "others" (0.010). "Transport-maritime" and "transport-pipelines for liquids" did not register any fatalities. The total number of fatalities registered for the year 2010 was 49.
- Fatalities occurred in 2010 were mainly caused by "Car Accidents" (16 cases), "struck by equipment" (7), "fall" and "toxic gas or liquid" (6), "fires and explosions" (5), "electrocution" (4), "drowning" and "others" (2), "caught in or between" (1).
- Being this the eighth year in which safety proactive indicators are reported, twelve companies reported data for their calculation.
- Considering all functions, 3.70 task planned observations (TPO) were carried out per employee during 2010 for the companies' workers. "Refining" was the function that registered the highest value (15.93).
- The Safety Training Intensity Rate registered a global value of 0.45 training hours per 100 worked hours for the companies' workers.



## 1.2. Selected comparative results for the term 1997/2010

- The number of reported worked hours exceeds those of previous years, despite not belonging to a record number of participating companies.
- The Total Incident's rate (that includes diseases, injuries and fatalities) for most functional units considering both the Company's workers and Contractors, seems to be relatively constant during the fourteen years' period. In average for all functions, with the exception of "Transport-pipelines for gases", which has an important increase since 2009 (1.6 to 12.2). At average for all functions, the lowest values of this rate correspond to the years 2002 to 2004, for the company's workers, contractors and combined.
- The Incidents' Gravity Rate (IGR), considering all functions for both Company and Contractors was higher in 2010 than in 2009 (82.39 vs 60.50 lost workdays per 1,000,000 worked hours. Considering companies only, IGR decreased in comparison with 2009 (54.54 vs 57.61), while considering contractors only, IGR increased from 62.63 to 102.87.
- The Incidents' Frequency rate with Lost Workdays in 2010 showed, with no distinction of functions, a decrease in comparison with the year 2009, falling from 2.343 to 1.573. The decrease occurred both in the Company and in the Contractors categories, reaching, in the latter case, the lowest value ever registered (0.904).
- The fatal incidents rate has increased for companies in some functions (Transport-pipelines for gases, Distribution and in minor rate for Refining) meanwhile the other functions for companies and contractors shows similar values as 2009.
- "Fires and Explosions" is still the main cause of fatalities for the period 2001-2010 (87 cases, 15.9%), followed by "car accidents" (85 cases, 15.5%) and "struck by equipment" (83 cases, 15.1%).
- Offshore activities lost the lowest number of workdays per 1,000,000 worked hours for all the period considered for workers of the Companies (43.7 days per 1,000,000 worked hours).
- The Task Planned Observations Rate decreased from 3.9 (2009) to 3.7 (2010), but remained in higher levels than 2008 and the previous years.
- The Safety Training Intensity Rate, considering all functions together, increased from 0.17 to 0.45 in comparison to the previous year,
- Following there is a graph showing the total reported Man-hours (in millions, for both the Company's workers and Contractors and including offshore activities) and the number of Member Companies that participated in each year's report for the term 1997/2010.

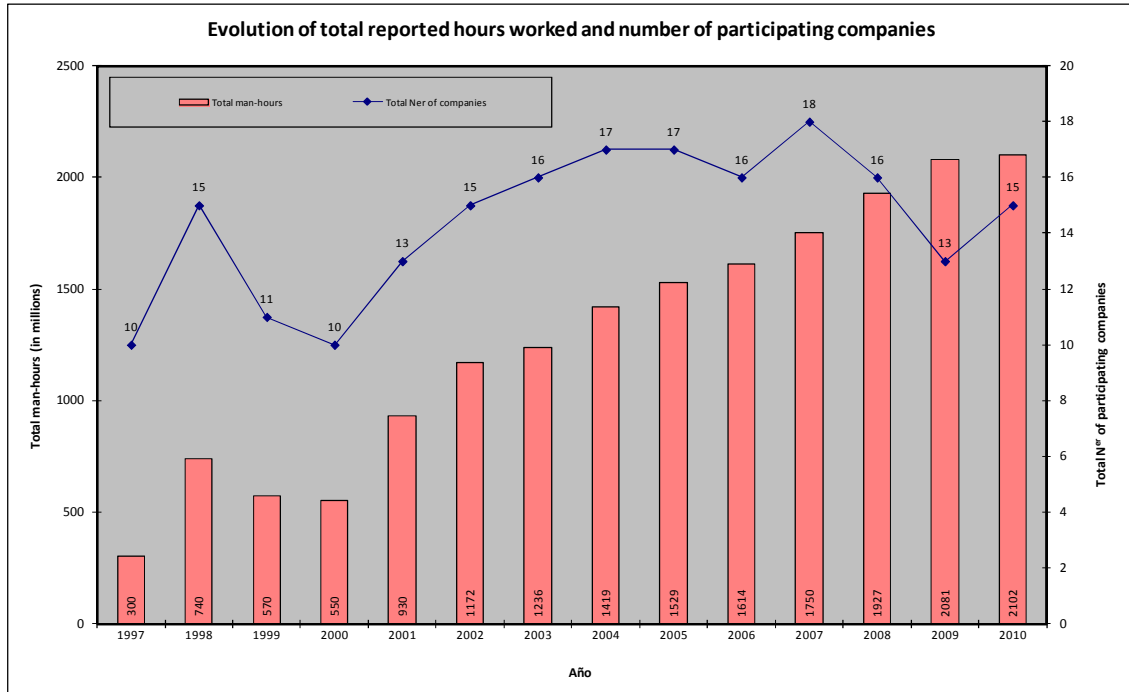


Figure 1.2



## 2.0 REACTIVE INDICATORS – onshore and offshore activities

### Explanatory notes

As is 2009 Report, all reactive indicators in this document are reported as “incidents per 1,000,000 worked hours”. For brevity’s sake, only a numeric value is provided and units are as aforementioned.

Not all companies reported data required to calculate all indicators. For this reason, and for each indicator, only those companies that reported all required data correspondent to the specific indicator were considered to calculate it. Thus, the total man-hours reported in tables 9.1 to 9.4 (appendix B) does not always match the value used to calculate the rates. The total man-hours effectively used for the calculation of each indicator are noted in each case.

### 2.1. Total incidents’ rate (per functional unit); data of year 2010

The total incidents’ rate is defined by means of the following formula:

$$\text{Total incidents' rate} = \frac{\text{Total recordable cases} \times 1,000}{\text{Worked hours in thousands}}$$

(Please refer to Chapters 6.0 and 10.0 of the User's Manual)

Function	Number of companies that reported data related to this indicator	Total reported man-hours (company and contractors) - in thousands.	Man-hours used for the calculation of this indicator (company and contractors) – in thousands
E&P	9	901,242	901,242
Refining	13	225,614	225,614
Transport – pipelines for liquids	5	16,894	16,894
Transport – pipelines for gases	2	13,582	13,582
<i>Transport – pipelines not separated</i>	3	91,198	91,198
Transport - Maritime	4	25,732	25,732
Distribution	10	97,124	97,124
Others	11	731,102	731,102
<b>Total</b>	15	2,102,488	2,102,488

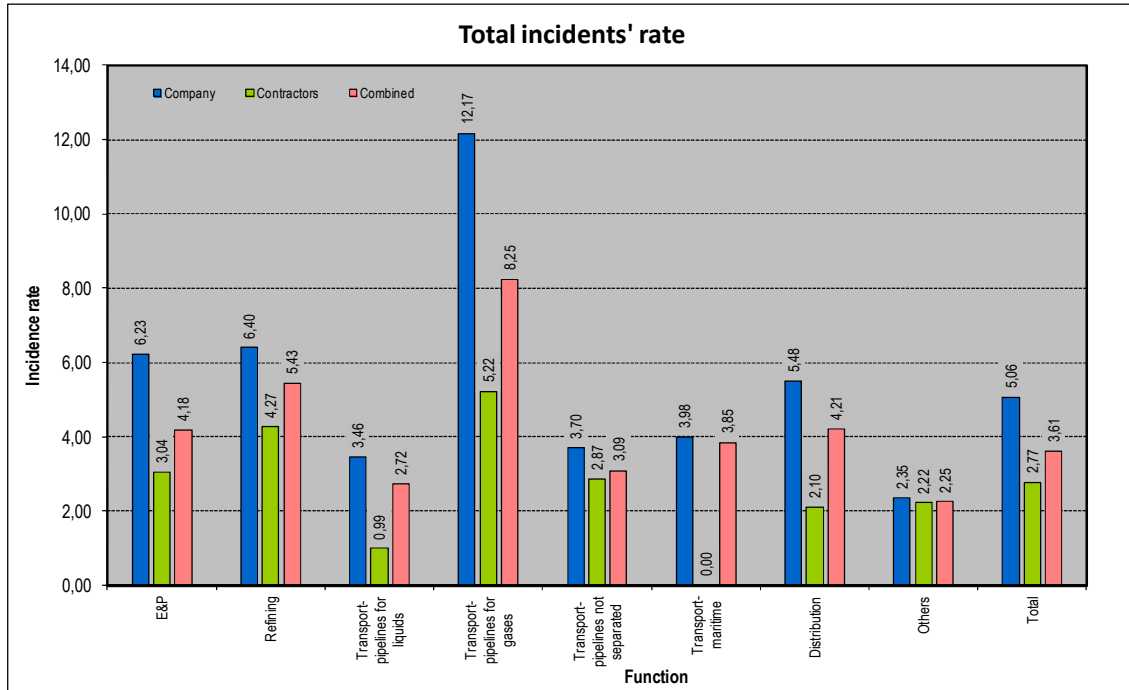


Figure 2.1

## 2.2. Evolution of the total incidents' rate (per functional unit)

### 2.2.1 Company data

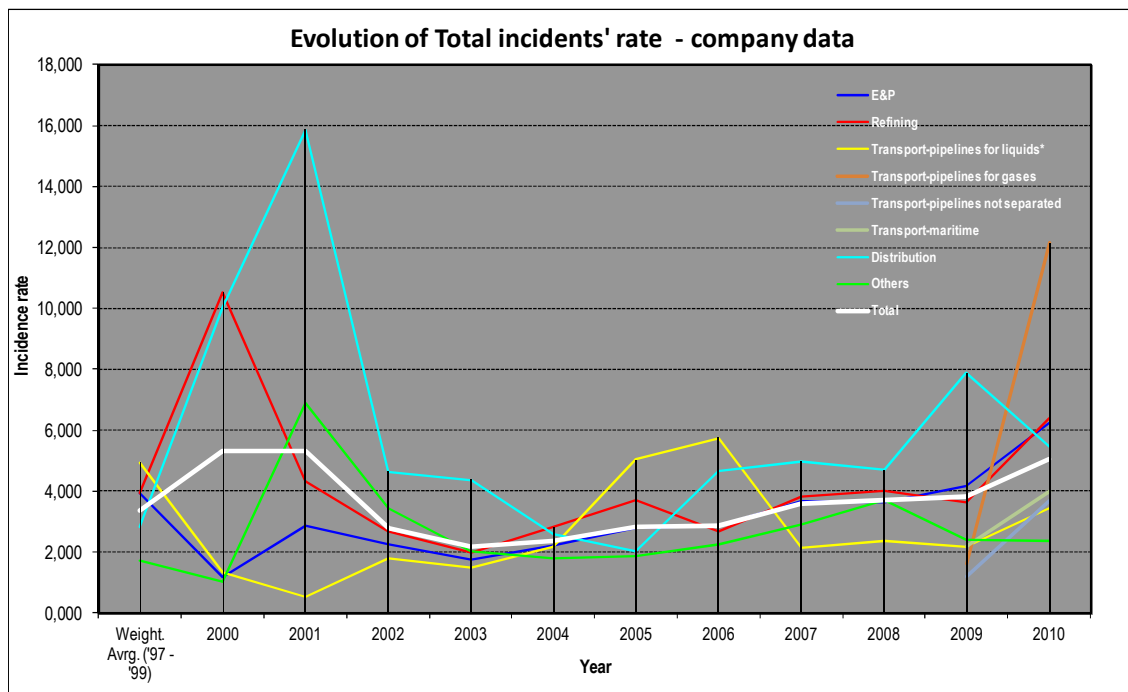


Figure 2.2.1



2.2.2 Contractors data

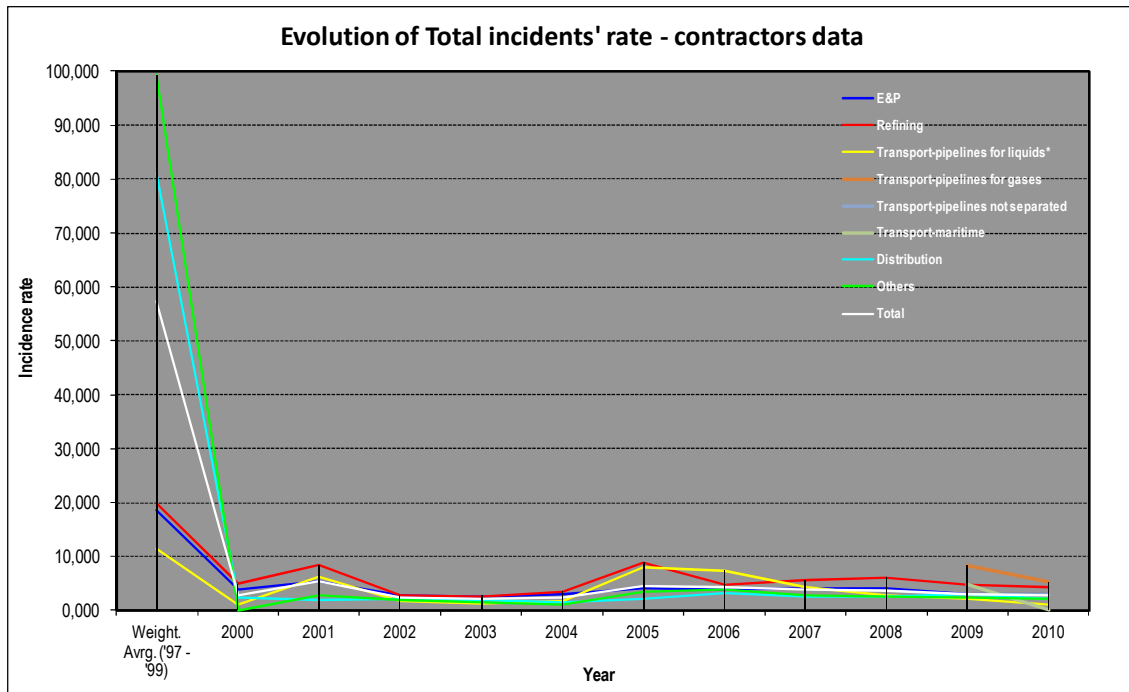


Figure 2.2.2

2.2.3 Combined data

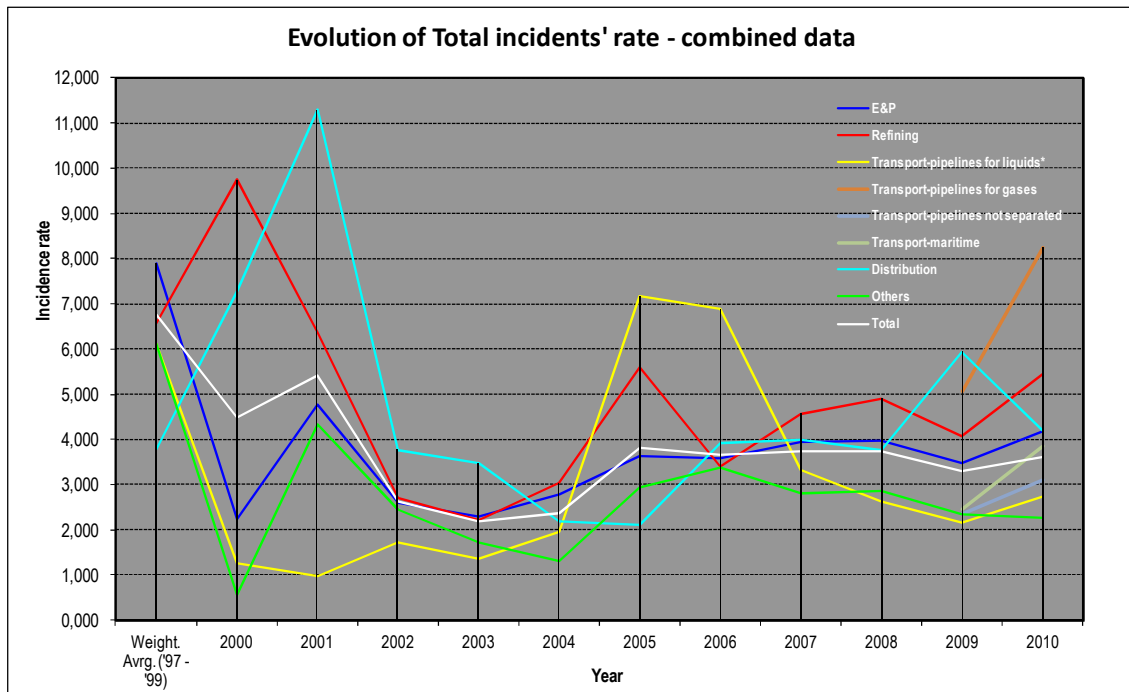


Figure 2.2.3



Figures 2.2.1 to 2.2.3 show the results for company’s employees, contractors and combined, respectively, of the total incidents’ rate for term 1997/2010, calculated as “incidents per 1,000,000 worked hours”. The corresponding tabulated results are shown in appendix A. The combined “Total” (figure 2.2.3) represents data reported by the following number of companies according to the year in consideration:

Year	Number of companies that reported data	
	For this indicator	For this report
1997	10	10
1998	15	15
1999	11	11
2000	10	10
2001	11	13
2002	15	15
2003	16	16
2004	17	17
2005	17	17
2006	16	16
2007	18	18
2008	16	16
2009	13	13
2010	15	15

### 2.3. Incidents’ gravity rate (per functional unit); data of year 2010

The incidents’ gravity rate is defined by the following formula:

$$\text{Incidents' gravity rate} = \frac{\text{Number of days away from work} \times 1,000}{\text{Worked hours in thousands}}$$

(Please refer to Chapters 6.0 and 10.0 of the User's Manual)

Function	Number of companies that reported data related to this indicator	Total reported man-hours (Company and Contractors) - in thousands.	Man-hours used for the calculation of the indicator (Company and Contractors) – in thousands
E&P	9	901,242	663,047
Refining	13	225,614	219,182
Transport – pipelines for liquids	5	16,894	14,613
Transport – pipelines for gases	2	13,582	12,149
<i>Transport – pipelines not separated</i>	3	91,198	91,198
Transport - Maritime	4	25,732	25,010
Distribution	10	97,124	88,330
Others	11	731,102	700,187
<b>Total</b>	<b>15</b>	<b>2,102,488</b>	<b>1,813,716</b>



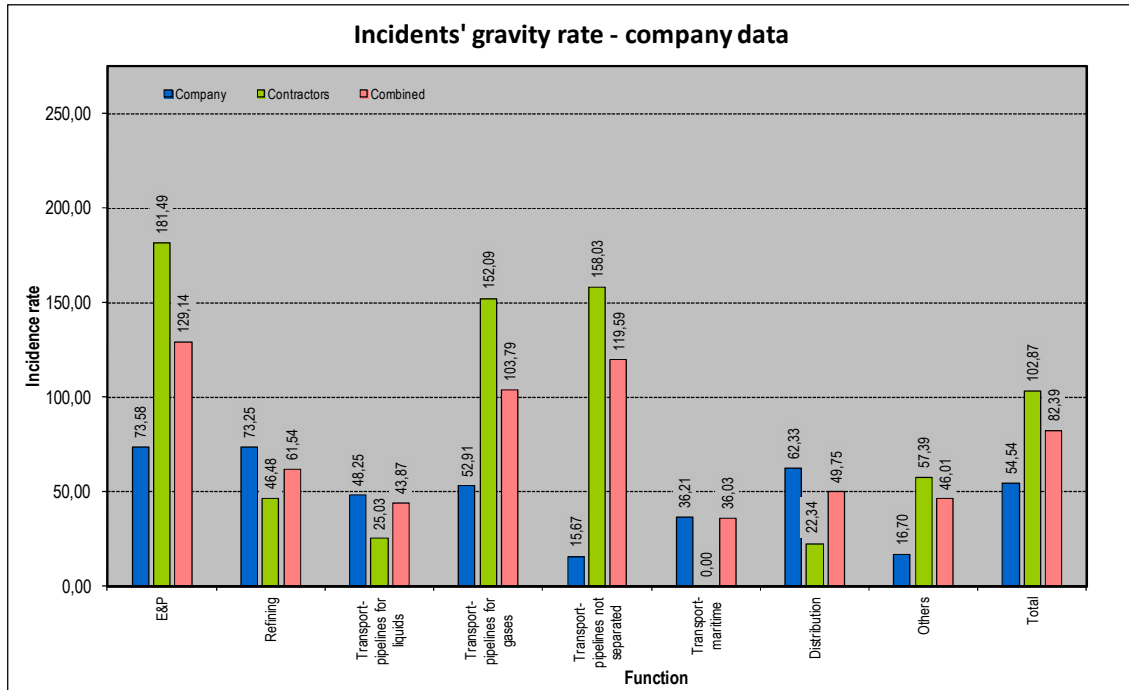


Figure 2.3

## 2.4. Evolution of the incidents' gravity rate (per functional unit)

### 2.4.1 Company data

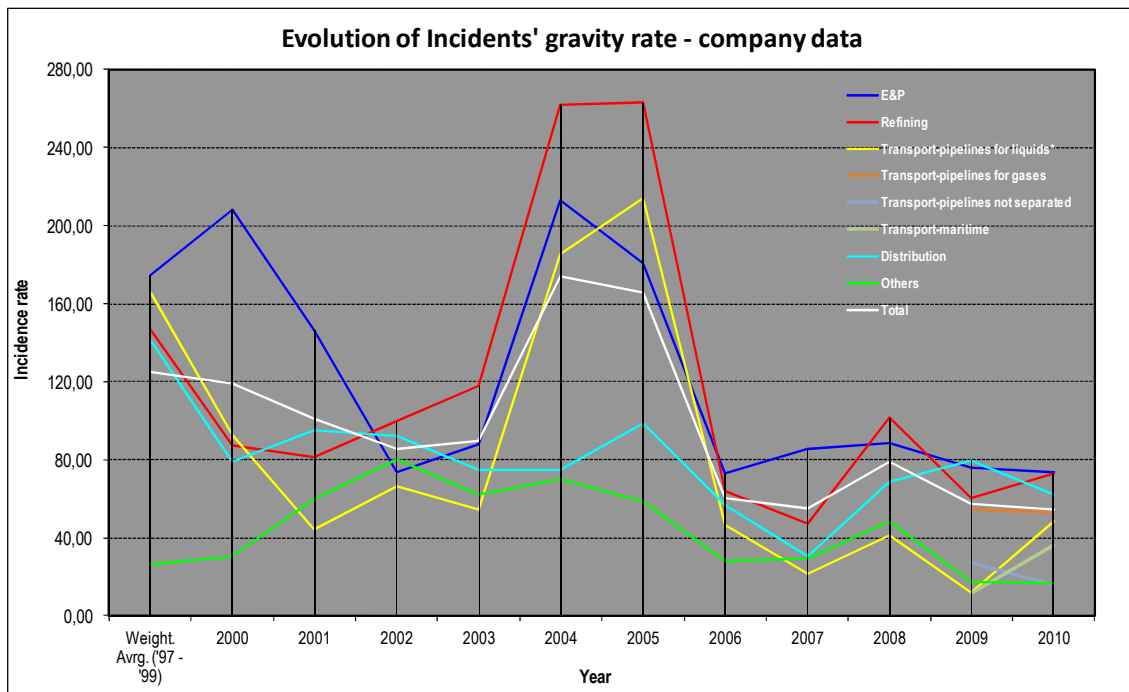


Figure 2.4.1



### 2.4.2 Contractors data

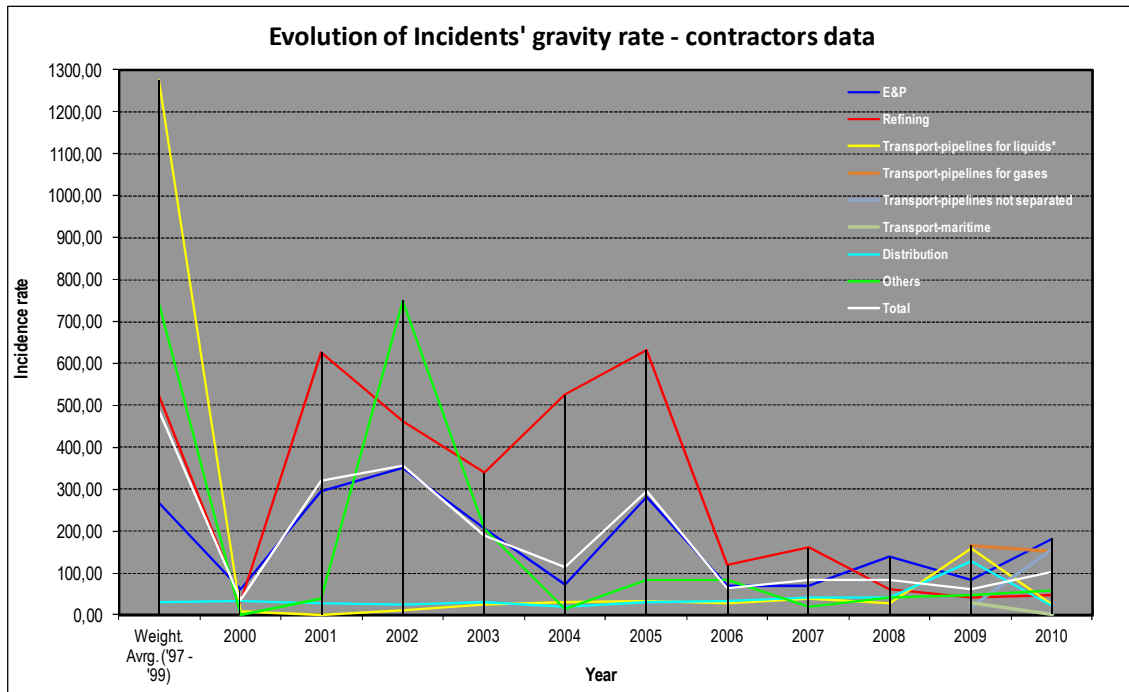


Figure 2.4.2

### 2.4.3 Combined data

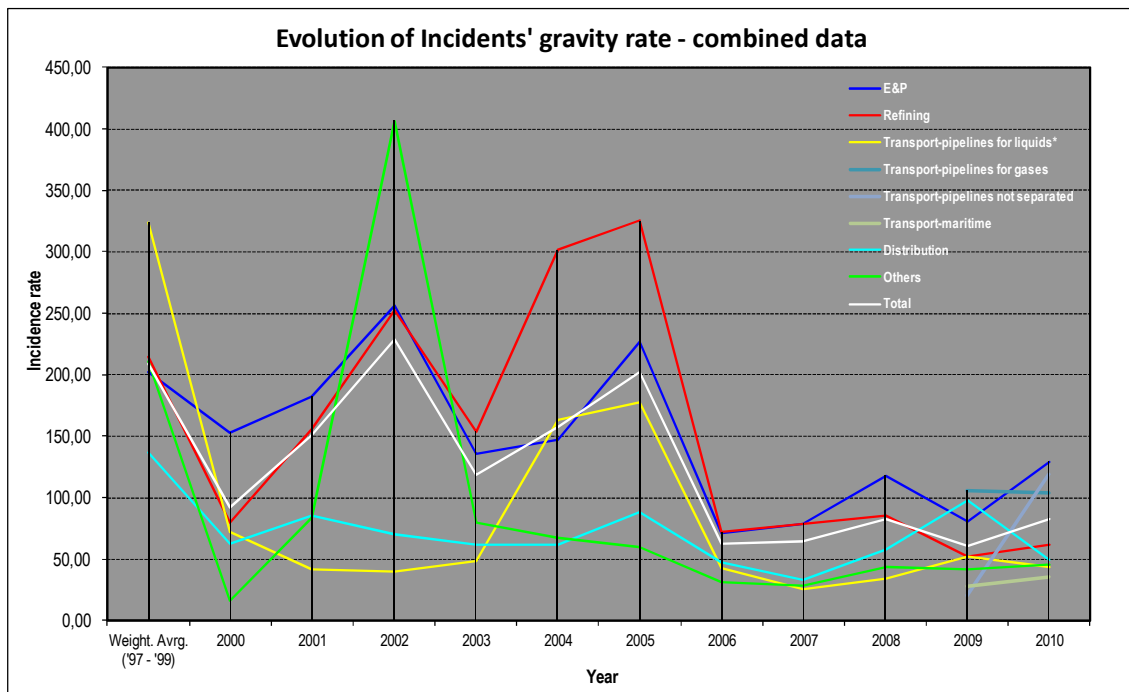


Figure 2.4.3

Figures 2.4.1 to 2.4.3 represent the results of the incidents' gravity rate for the Company's workers, Contractors and Combined, respectively, for the term 1997/2010, calculated as "incidents per 1,000,000 worked hours".



The tabulated results corresponding to the thirteen years are shown in appendix A. The combined “Total” (figure 2.4.3) represents data reported by the following number of companies according to the year in consideration:

Year	Number of companies that reported data	
	For this indicator	For this indicator
1997	10	10
1998	15	15
1999	10	11
2000	10	10
2001	12	13
2002	13	15
2003	15	16
2004	17	17
2005	15	17
2006	14	16
2007	18	18
2008	16	16
2009	13	13
2010	15	15

## 2.5. Incidents’ frequency rate with lost workdays (per functional unit); data of year 2010

The incidents’ frequency rate with lost workdays is defined by the following formula:

$$\text{Incidents' frequency rate with lost workdays} = \frac{\text{Lost workdays cases} \times 1,000}{\text{Worked hours in thousands}}$$

(Please refer to Chapters 6.0 and 10.0 of the User's Manual)

Function	Number of companies that reported data related to this indicator	Total reported man-hours (company and contractors) - in thousands	Man-hours used for the calculation of this indicator (company and contractors) – in thousands
E&P	9	901,242	884,934
Refining	12	225,614	221,608
Transport – pipelines for liquids	5	16,894	16,894
Transport – pipelines for gases	2	13,582	13,582
<i>Transport – pipelines not separated</i>	2	91,198	87,198
Transport - Maritime	4	25,732	25,732
Distribution	9	97,124	96,353
Others	10	731,102	729,328
<b>Total</b>	<b>14</b>	<b>2,102,488</b>	<b>2,075,629</b>

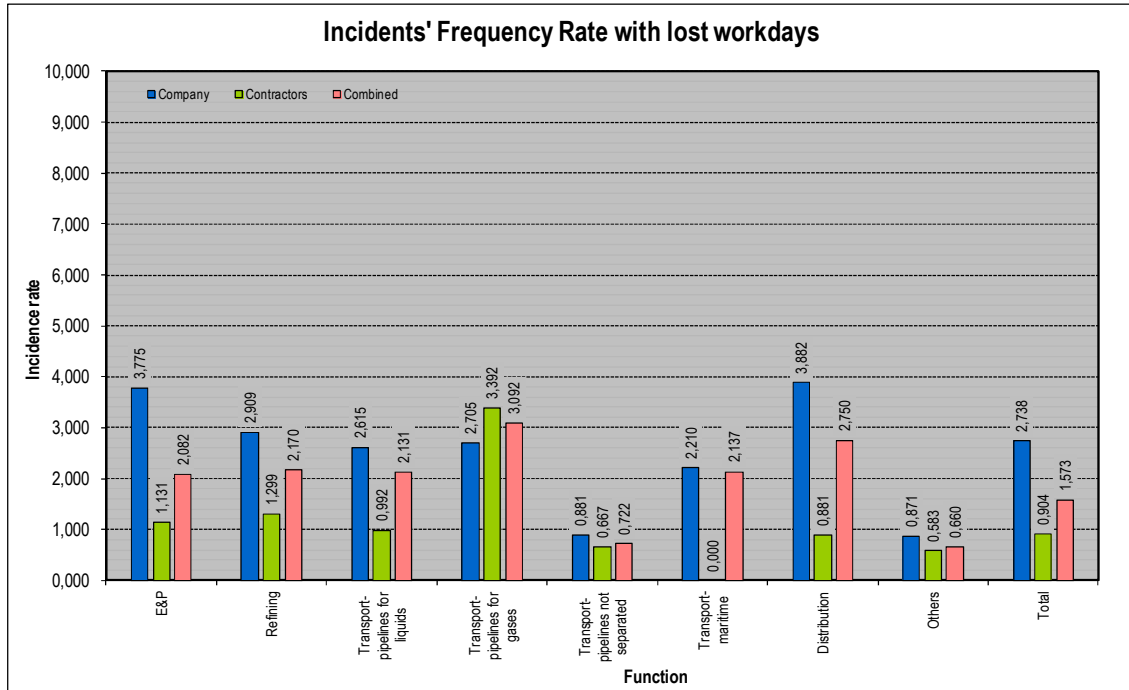


Figure 2.5

## 2.6. Evolution of the incidents' frequency rate with lost workdays (per functional unit)

### 2.6.1 Company data

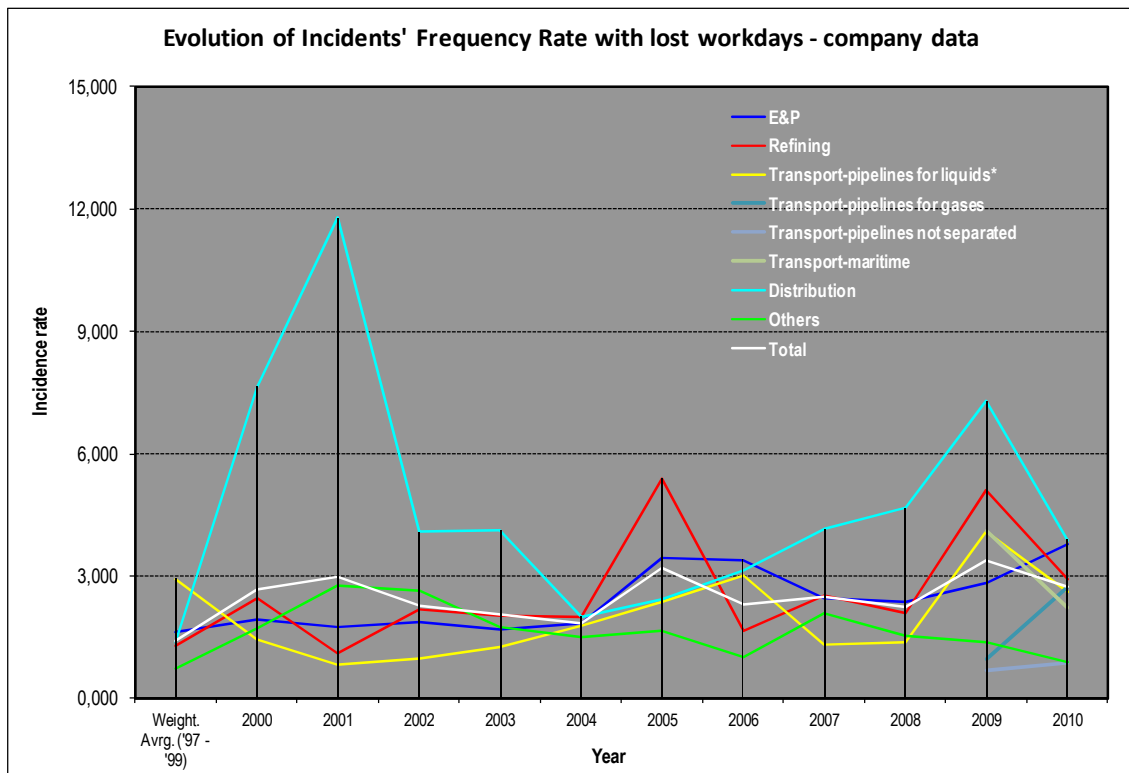


Figure 2.6.1



2.6.2 Contractors data

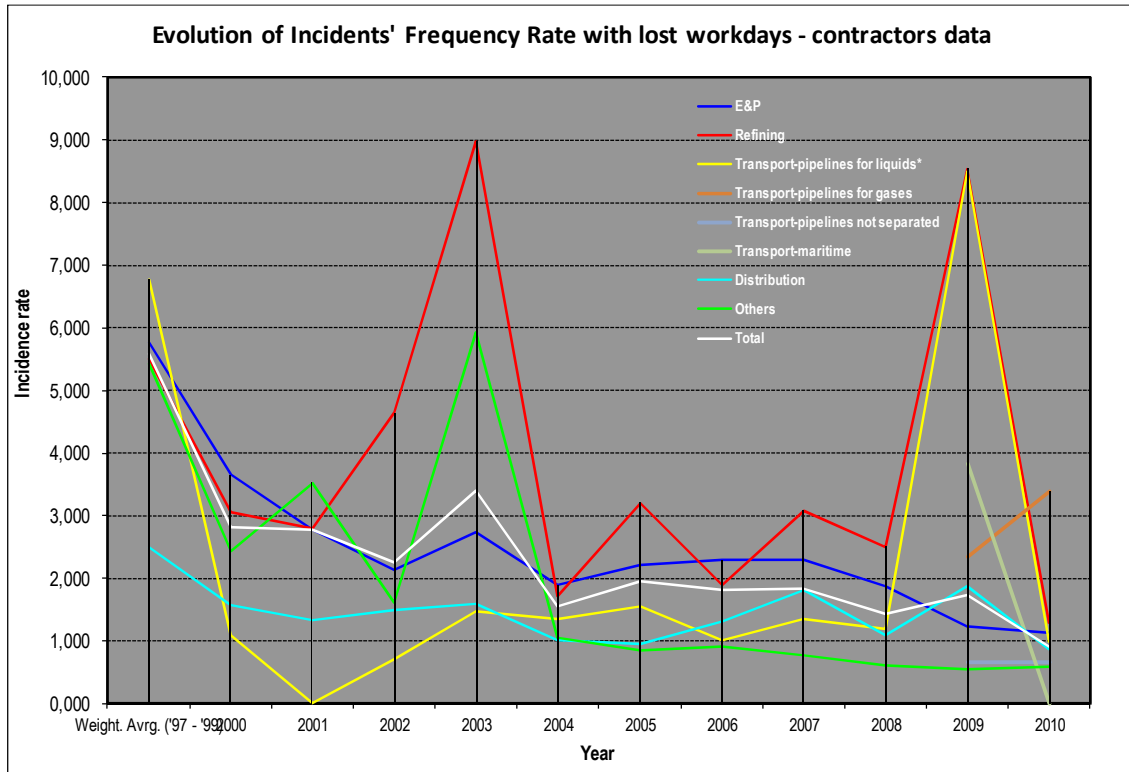


Figure 2.6.2

2.6.3 Combined data

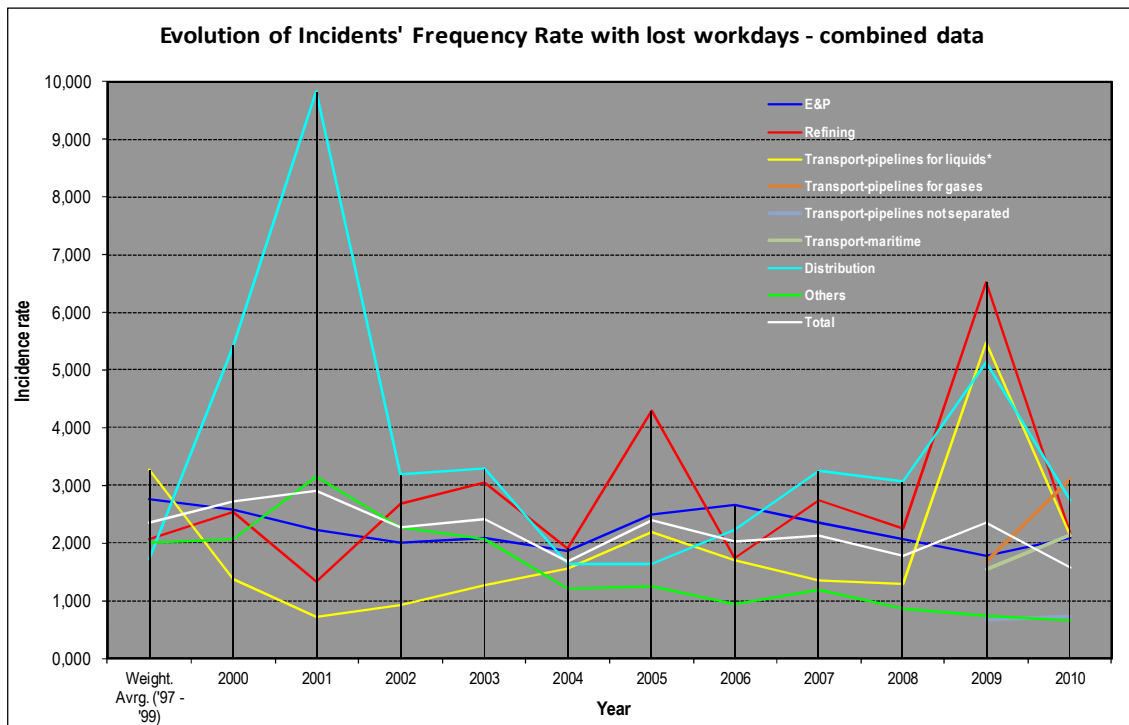


Figure 2.6.3



Figures 2.6.1 to 2.6.3 represent the results of the incidents' frequency rate with lost workdays for the term 1997/2010 for the company's workers, contractors and combined, respectively, calculated as "incidents per 1,000,000 worked hours". The corresponding tabulated results are shown in appendix A. The combined "Total" (figure 2.6.3) represents data reported by the following number of companies according to the year in consideration:

Year	Number of companies that reported data	
	For this indicator	For this indicator
1997	10	10
1998	14	15
1999	11	11
2000	9	10
2001	10	13
2002	14	15
2003	15	16
2004	16	17
2005	17	17
2006	14	16
2007	18	18
2008	16	16
2009	13	13
2010	14	15

### 2.7. Fatal incidents' rate (per functional unit); data of year 2010

The fatal incidents' rate is defined by the following formula:

$$\text{Fatal incidents' rate} = \frac{\text{Number of fatalities} \times 1,000}{\text{Worked hours in thousands}}$$

(Please refer to Chapters 6.0 and 10.0 of the User's Manual)

Function	Number of companies that reported data related to this indicator	Total reported man-hours (company and contractors) - in thousands.	Man-hours used for the calculation of this indicator (company and contractors) – in thousands
E&P	9	901,242	901,242
Refining	13	225,614	225,614
Transport – pipelines for liquids	5	16,894	16,894
Transport – pipelines for gases	2	13,582	13,582
<i>Transport – pipelines not separated</i>	3	91,198	91,198
Transport - Maritime	4	25,732	25,732
Distribution	10	97,124	97,124
Others	11	731,102	731,102
<b>Total</b>	15	2,102,488	2,102,488

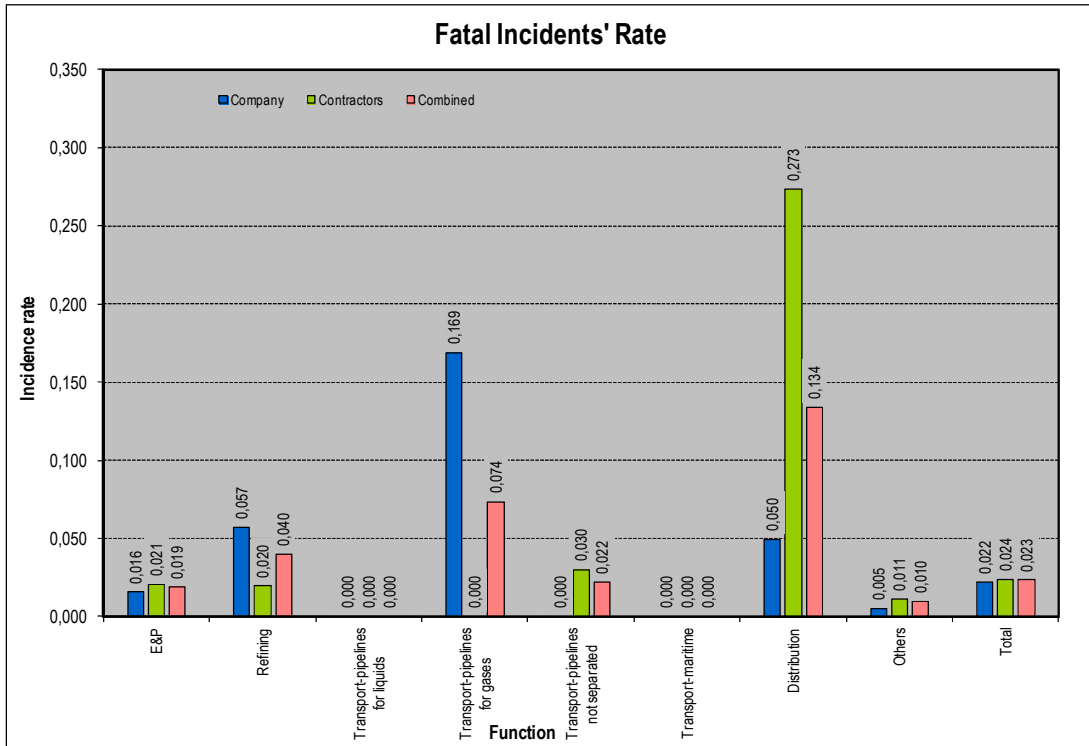


Figure 2.7

## 2.8. Evolution of the fatal incidents' rate (per functional unit)

### 2.8.1 Company data

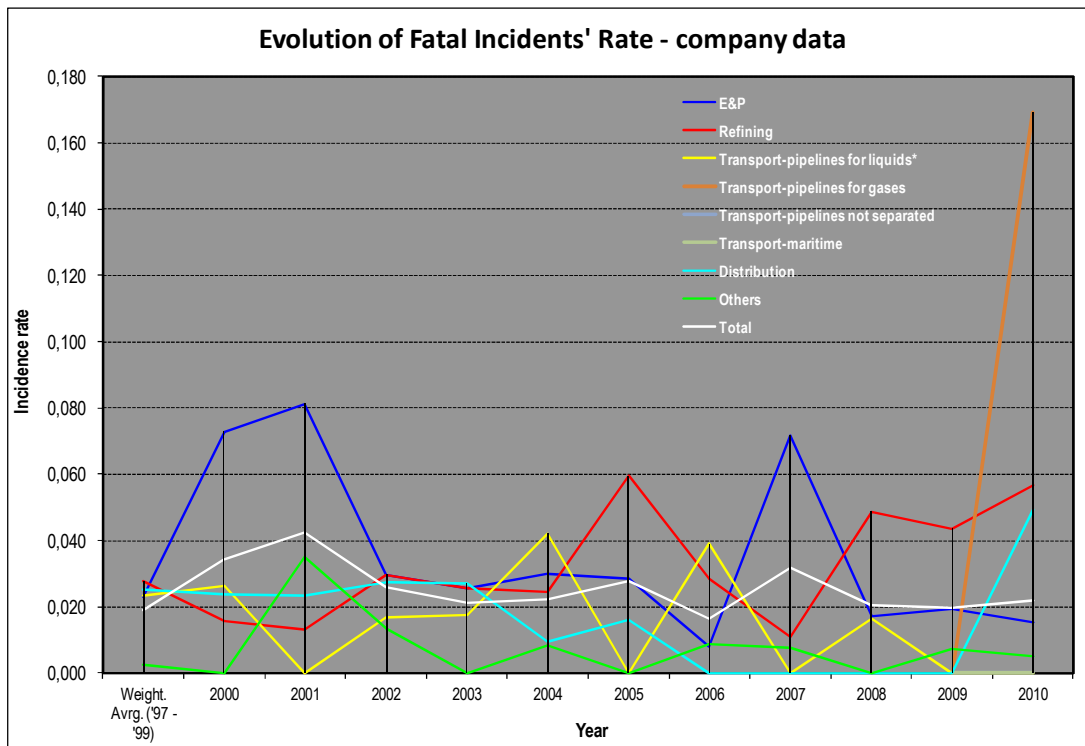


Figure 2.8.1



### 2.8.2 Contractors data

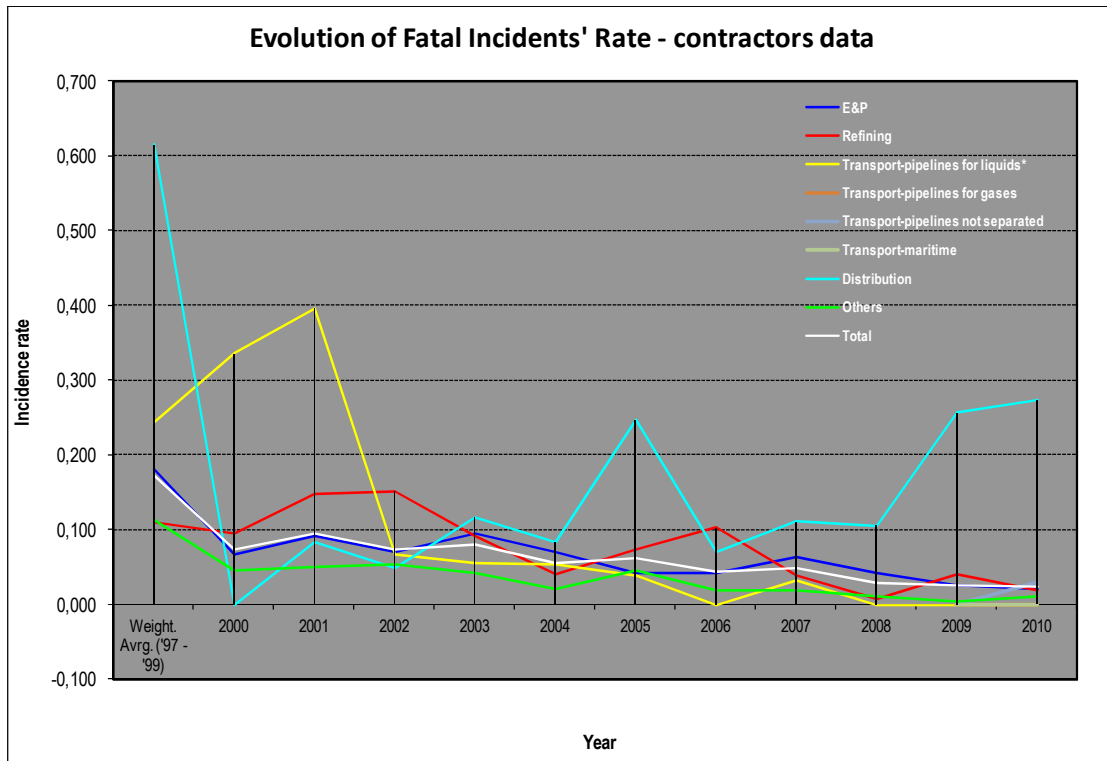


Figure 2.8.2

### 2.8.3 Combined data

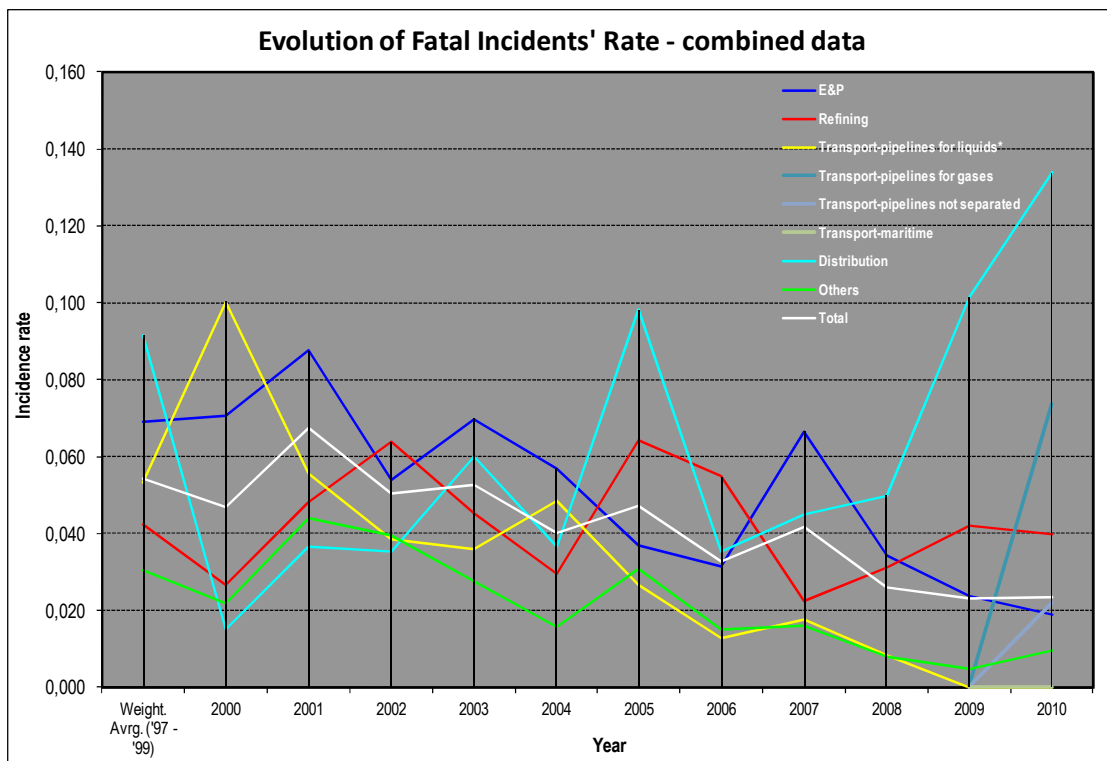


Figure 2.8.3





Figures 2.8.1 to 2.8.3 represent the fatal incidents' rate for term 1997/2010 correspondent to the company's workers, contractors and combined, respectively, calculated as "incidents per 1,000,000 worked hours". The corresponding tabulated results are shown in appendix A. The combined "Total" (figure 2.8.3) represents data reported by the following number of companies according to the year in consideration:

Year	Number of companies that reported data	
	For this indicator	For this indicator
1997	10	10
1998	13	15
1999	8	11
2000	8	10
2001	10	13
2002	15	15
2003	16	16
2004	17	17
2005	17	17
2006	14	16
2007	18	18
2008	16	16
2009	11	13
2010	15	15

The table below shows the OGP<sup>2</sup> fatal incidents' rate reported in its safety performance indicators Report N° 455 for year 2010, and it is compared to the corresponding ARPEL data:

"Exploration and Production"		Category		
		Company	Contractors	Combined
Onshore and offshore	ARPEL	0,022	0,024	0,023
	OGP	0,032	0,026	0,028

## 2.9. Comparative incidence rates (per Company); data for year 2010

This chapter shows the individual codified results of companies for each of the rates seen so far, for all functional units. Each letter represents a company that reported data.

In the cases that both company data and contractors' data was provided, the combined result represents the average between company data and contractors' data. In the cases in which only company's workers data was provided, the combined result equals the result for the company.

<sup>2</sup> OGP only comprises "Exploration and Production", so this is the only function considered when comparing results with ARPEL Statistics. Moreover, this rate is originally reported by OGP as "number of fatalities per 100 million hours worked". For this reason and to make comparisons, results were converted to "number of fatalities per 1,000,000 hours worked"(ARPEL units).



2.9.1 Total incidents' rate per company

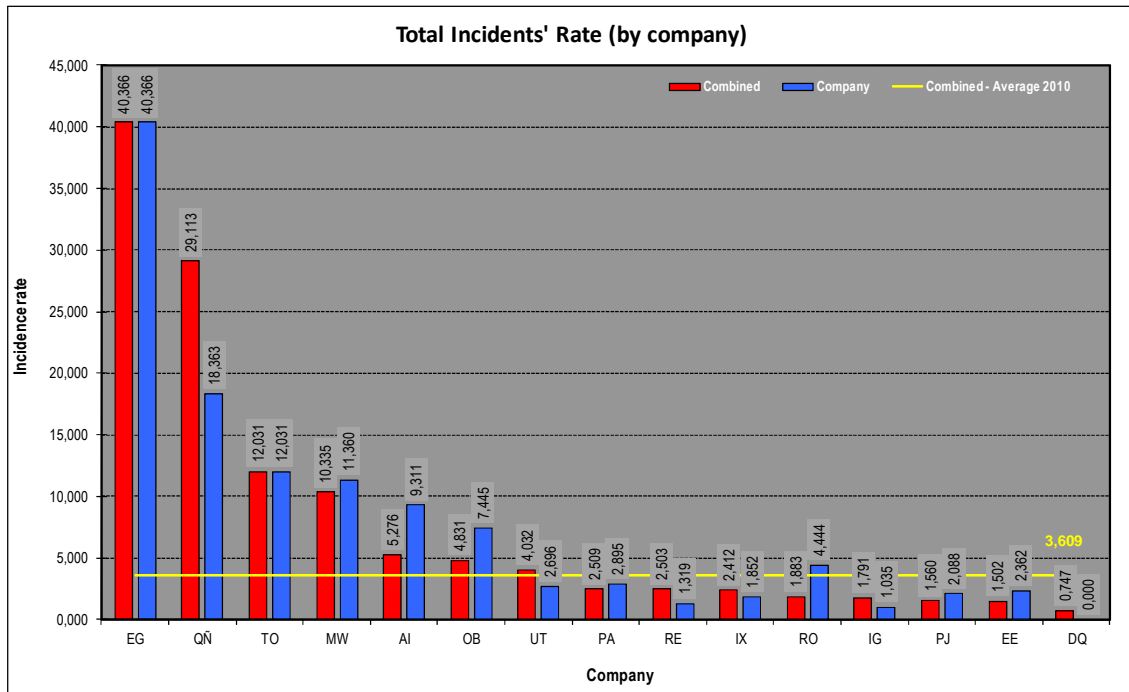


Figure 2.9.1

2.9.2 Incidents' gravity rate per company

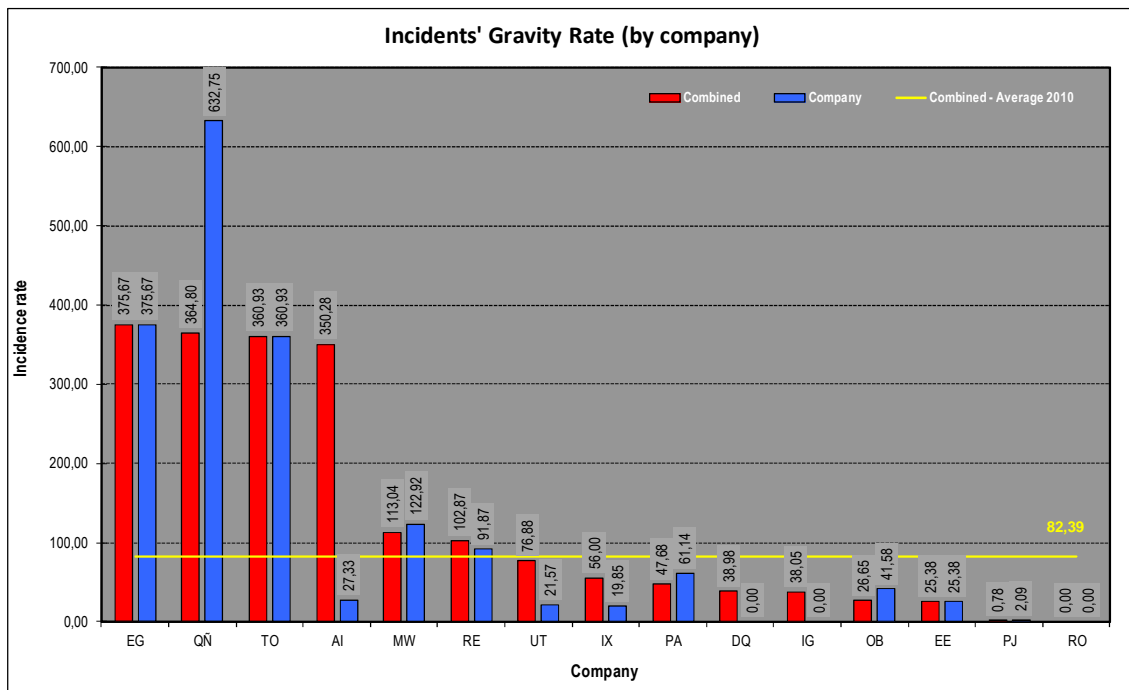


Figure 2.9.2



2.9.3 Incidents' frequency rate with lost workdays per company

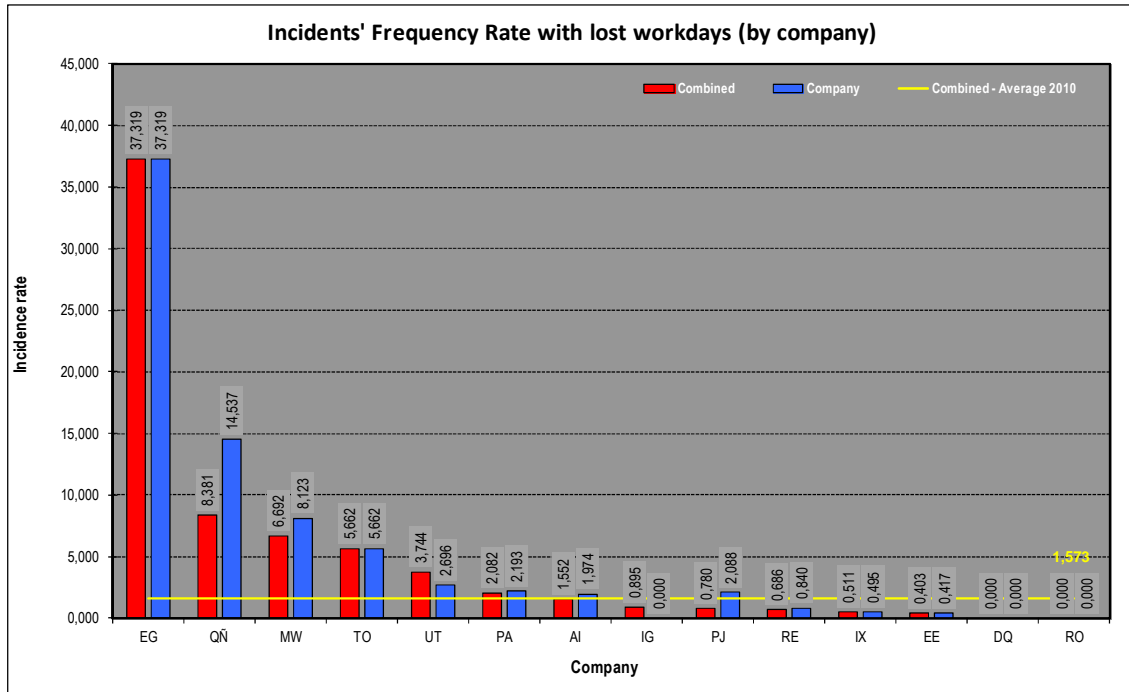


Figure 2.9.3

2.9.4 Fatal incidents' rate per company

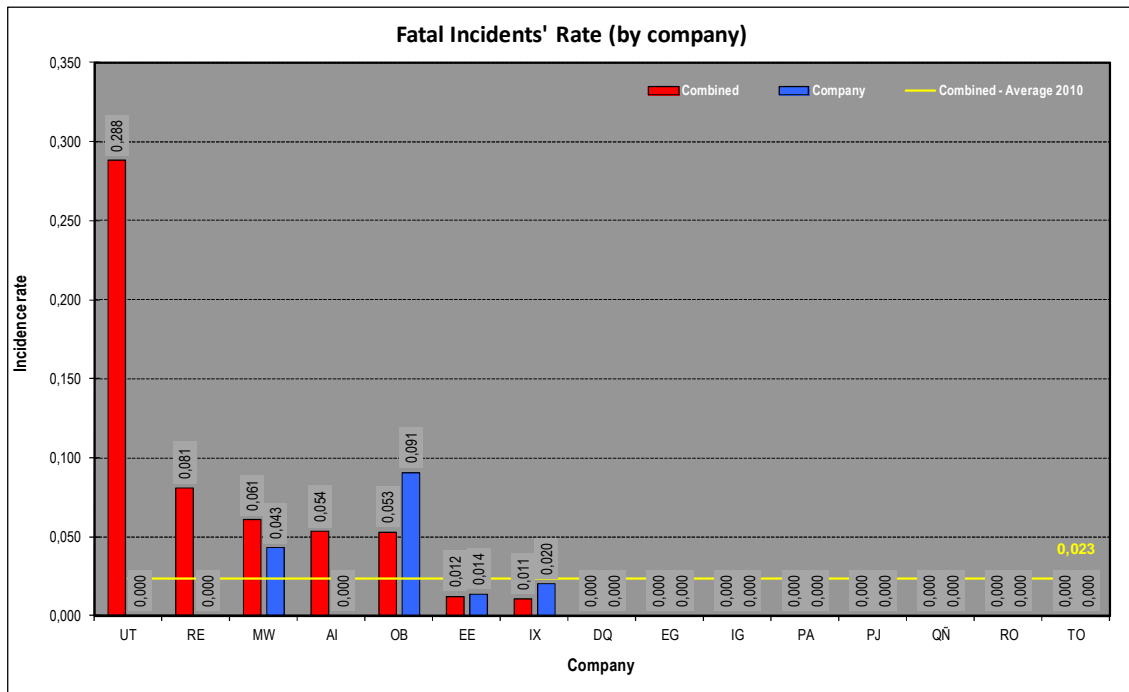


Figure 2.9.4



### 3.0 REACTIVE INDICATORS – offshore activities

The previous chapter presented the results of the four reactive indicators for all activities from those ARPEL Member Companies that reported data, including offshore activities. This chapter presents the results of the same four indicators specifically calculated to offshore activities, where the only functional unit is Exploration and Production.

The table below shows the number of ARPEL Member Companies that reported specific data to offshore activities year by year.

Year	N° of companies
1998	2
1999	1
2000	0
2001	0
2002	4
2003	4
2004	4
2005	5
2006	5
2007	6
2008	5
2009	4
2010	4

The tabulated results corresponding to this chapter's graphs are presented in appendix A.



### 3.1. Total offshore incidents' rate

Year	Number of companies that reported data to this indicator	Total worked hours (company and contractors) - in thousands	Worked hours used to calculate this indicator (company and contractors) – in thousands
1998	2	42,960	42,960
1999	1	33,376	33,376
2002	4	100,880	100,880
2003	4	101,741	101,725
2004	4	70,649	70,649
2005	5	101,311	101,311
2006	5	149,545	149,545
2007	6	95,001	95,001
2008	5	82,135	82,135
2009	4	97,968	97,968
2010	4	103,632	103,632

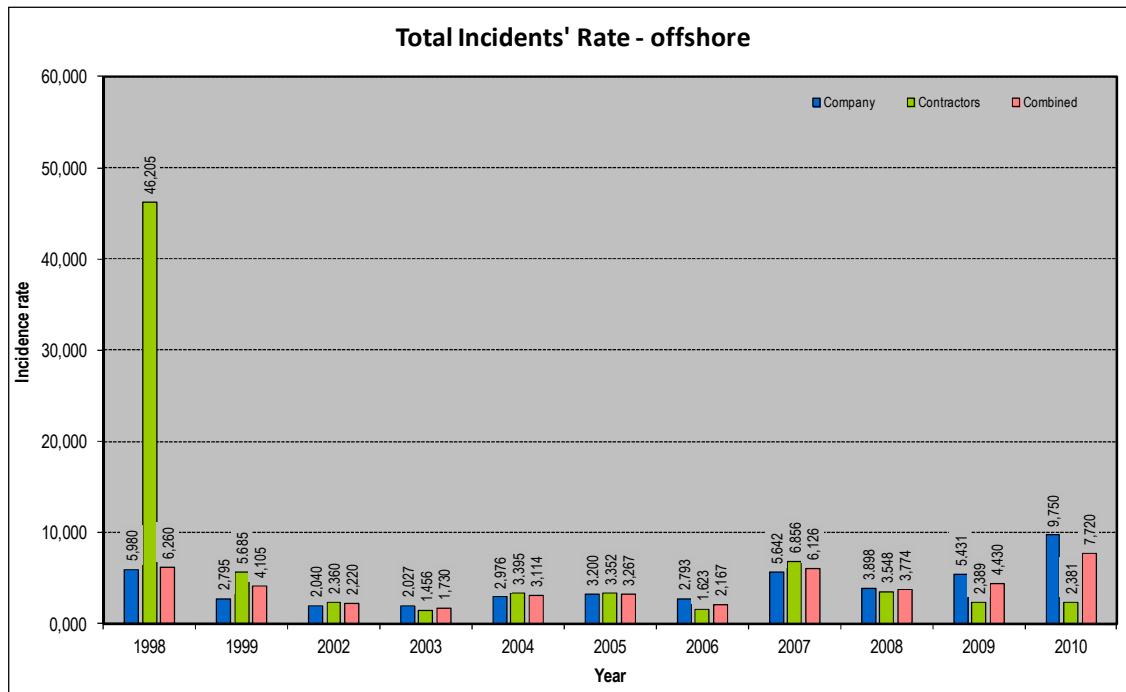


Figure 3.1



### 3.2. Offshore incidents' gravity rate

Year	Number of companies that reported data to this indicator	Total worked hours (company and contractors) - in thousands	Worked hours used to calculate this indicator (company and contractors) – in thousands
1998	1	42,960	40,377
1999	1	33,376	33,376
2002	2	100,880	3,450
2003	4	101,741	50,785
2004	4	70,649	49,084
2005	5	101,311	76,883
2006	5	149,545	149,545
2007	6	95,001	76,477
2008	5	82,135	63,746
2009	4	97,968	77,009
2010	4	103,632	82,897

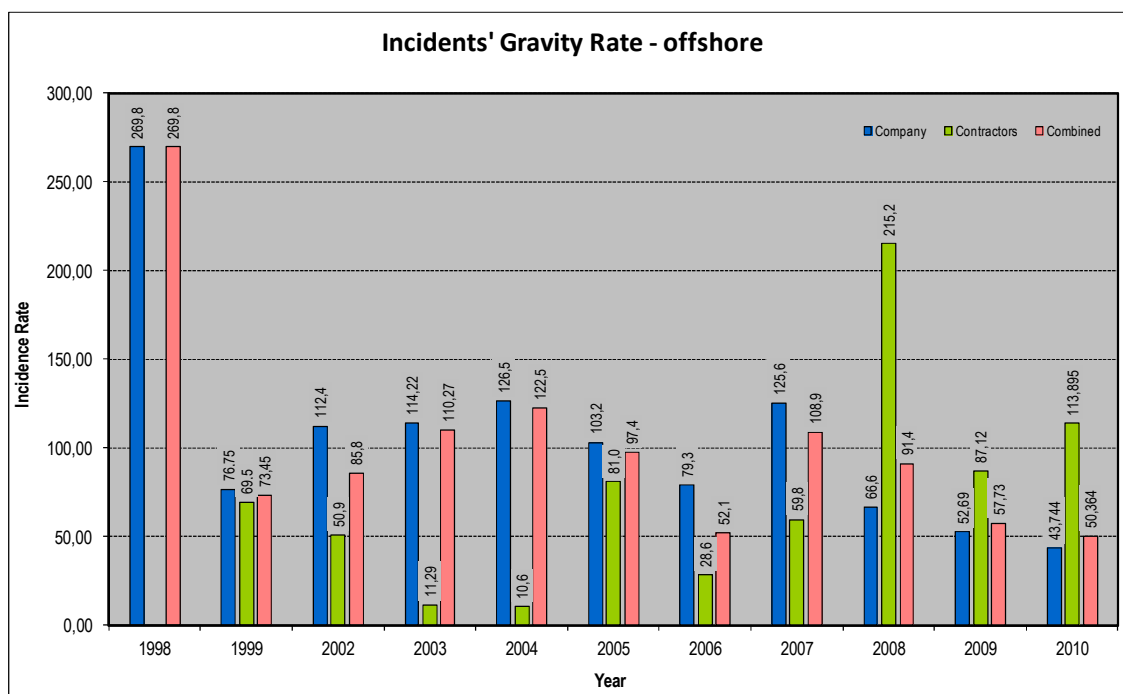


Figure 3.2



### 3.3. Incidents' Frequency Rate with lost workdays - offshore

Year	Number of companies that reported data to this indicator	Total worked hours (company and contractors) - in thousands	Worked hours used to calculate this indicator (company and contractors) – in thousands
1998	2	42,960	42,960
1999	1	33,376	33,376
2002	3	100,880	100,877
2003	4	101,741	50,785
2004	4	70,649	70,649
2005	4	101,311	32,549
2006	5	149,545	149,545
2007	6	95,001	76,477
2008	5	82,135	63,746
2009	4	97,968	97,968
2010	4	103,632	82,897

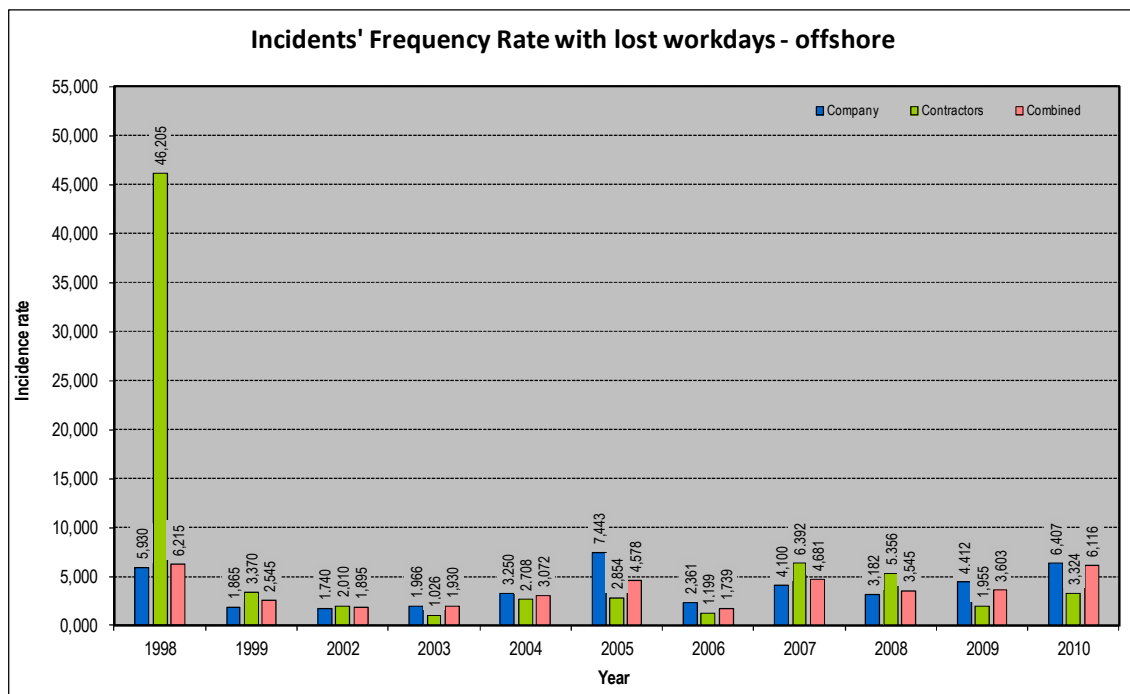


Figure 3.3



### 3.4. Fatal incidents' rate offshore

Year	Number of companies that reported data to this indicator	Total worked hours (company and contractors) - in thousands	Worked hours used to calculate this indicator (company and contractors) – in thousands
1998	2	42,960	42,960
1999	1	33,376	15,123
2002	3	100,880	100,877
2003	4	101,741	101,725
2004	4	70,649	70,649
2005	5	101,311	101,311
2006	5	149,545	149,545
2007	6	95,001	95,001
2008	5	82,135	82,135
2009	4	97,968	97,968
2010	4	103,632	103,632

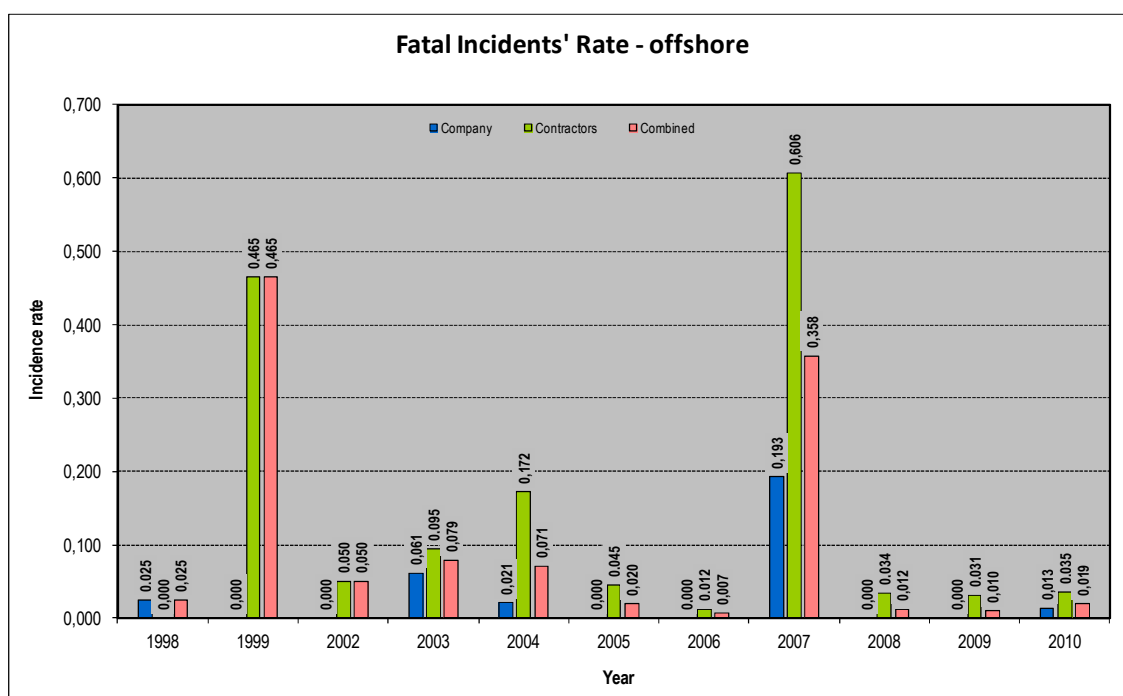


Figure 3.4

Comparing with the statistics in OGP Report Nº 455 on safety performance indicators, the fatal incidents' rate for offshore activities in 2010, for company workers and contractors combined was 0.032<sup>3</sup>, whereas the same rate in ARPEL was 0.019 fatalities per 1,000,000 worked hours.

<sup>3</sup> As the original unit under which OGP reports this rate is "number of fatalities per 100 million hours worked, for comparative reasons, in this report it was converted to "number of fatalities per 1,000,000 hours worked"(ARPEL units).





## 4.0 FATALITY CAUSES

This chapter reports the several fatality causes in the oil industry corresponding to the companies included in this report for 2010. For comparative reasons, the results corresponding to the period 2001 – 2010 are presented as well.

All fatal incidents with a reported cause were taken into account to develop the graphs shown below, either of company workers or contractors, both for onshore and offshore activities. The different causes are presented according to the (absolute and percentage) number of fatalities they caused.

### 4.1. Fatalities causes – year 2010

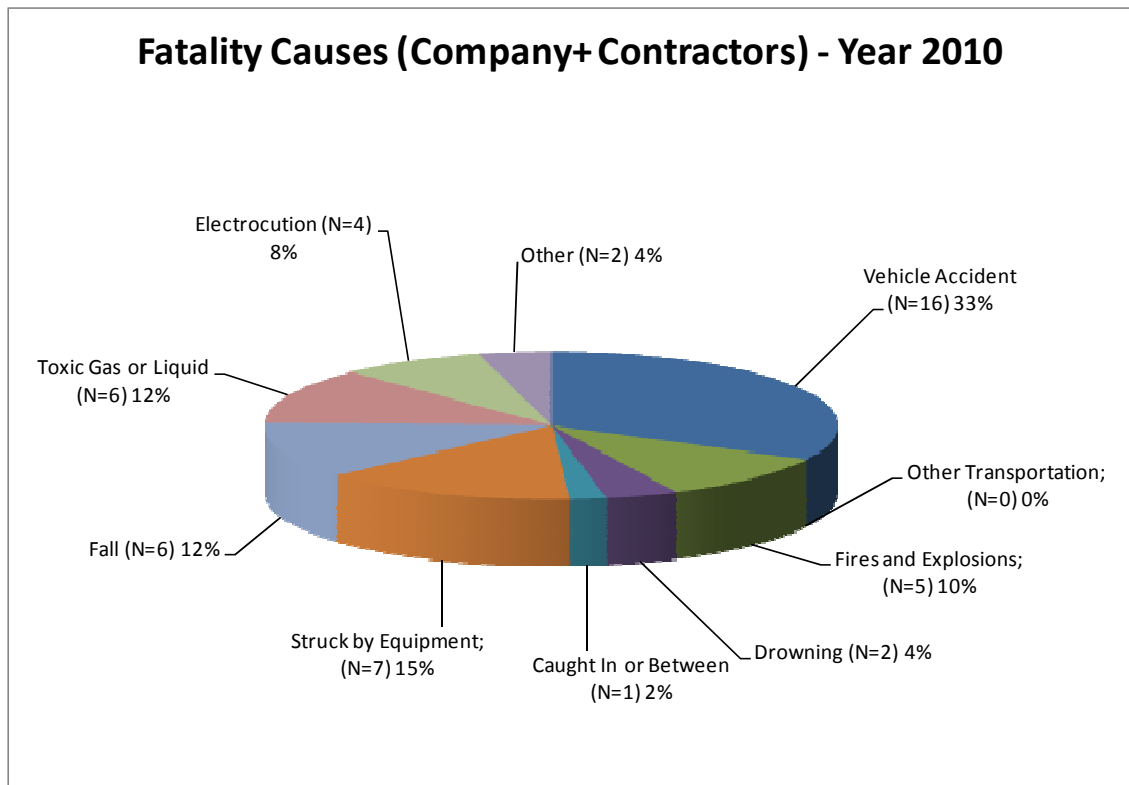


Figure 4.1



#### 4.2. Comparative – fatality causes

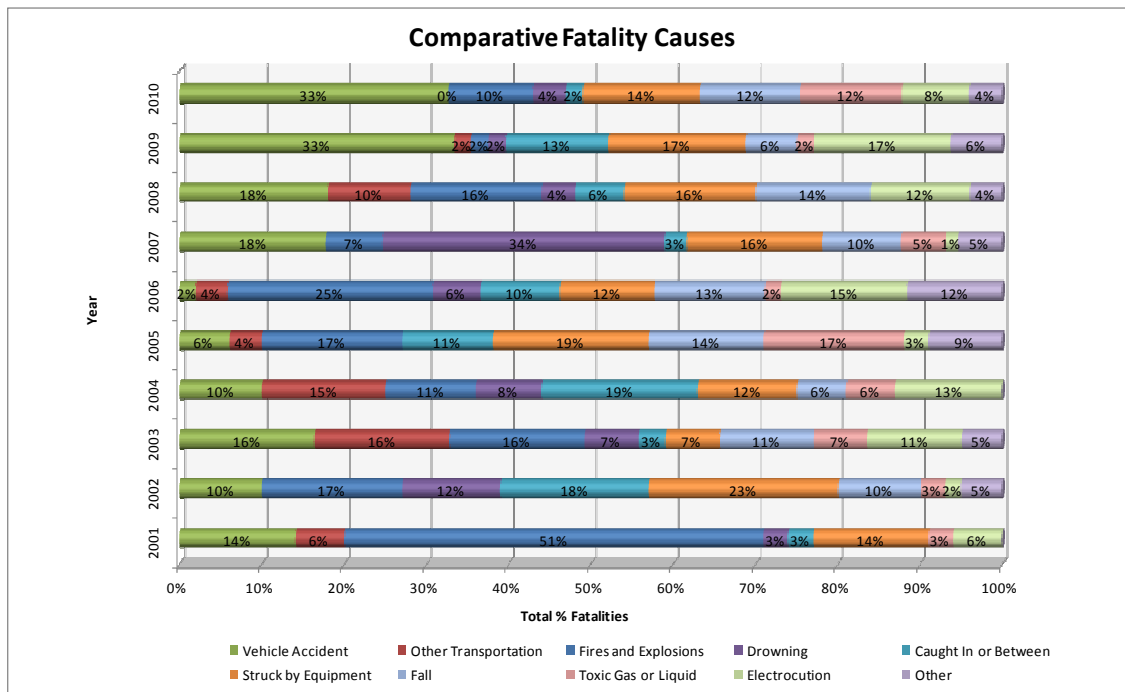


Figure 4.2

Figure 4.1 graphically represents fatality causes according to the absolute and percentage number of fatalities they caused in 2010.

Figure 4.2 compares the relative influence (as a percentage of the total number of fatalities considered each year) of the different fatality causes for the period 2001 – 2010. The table below shows the total number of fatalities with a reported cause per year.

Year	Total fatalities with reported cause
2001	35
2002	58
2003	61
2004	52
2005	70
2006	52
2007	73
2008	50
2009	48
2010	49

“Fires and Explosions” is the main cause of fatalities for the period 2001-2010 (87 cases, 15.9%), followed by “car accidents” (85 cases, 15.5%) and “struck by equipment” (83 cases, 15.3%). The tabulated results corresponding to this chapter's graphs are presented in appendix A.



The table below shows the fatality causes reported by OGP<sup>4</sup> in its safety performance indicators Report N° 455 for 2010, and they are compared to those corresponding to ARPEL:

<b>Function "Exploration &amp; Production"</b>				
<b>Combined result – onshore and offshore</b>				
	<b>Total fatalities</b>	<b>Fatality # 1</b>	<b>Fatality # 2</b>	<b>Fatality # 3</b>
<b>ARPEL 2010</b>	21	"Struck by equipment" (23.5%)	"Car accidents" (17.6%)	"Electrocution" (11.8 %)
<b>OGP 2010</b>	94	"Others" (25%)	"Struck by" (21%)	"Explosion/Burn" (15%)

<sup>4</sup> OGP only comprises "Exploration and Production", so this is the only function considered when comparing results with ARPEL Statistics.



## 5.0 SAFETY PROACTIVE INDICATORS

### 5.1. Tasks planned observations' rate

The tasks planned observations Rate (TPO) is defined by the following formulae:

$$\text{TPO Rate} = \frac{\text{Number of tasks planned observations cumulative of the year}}{\text{Average number of workers in the period}}$$

(Please refer to chapters 6.0 and 10.0 of the User's Manual)

Year 2010			
Function	Number of companies that reported data to this indicator	Average reported number of total workers (company)	Average number of workers used to calculate this rate (company)
E&P	7	153,042	90,438
Refining	10	55,798	28,550
Transport – pipelines for liquids	4	5,155	880
<i>Transport – pipelines not separated</i>	3	11,759	10,753
Transport - Maritime	2	13,991	2,304
Distribution	6	28,169	15,354
Others	8	89,801	38,710
<b>Total</b>	<b>12</b>	<b>360,994</b>	<b>189,024</b>

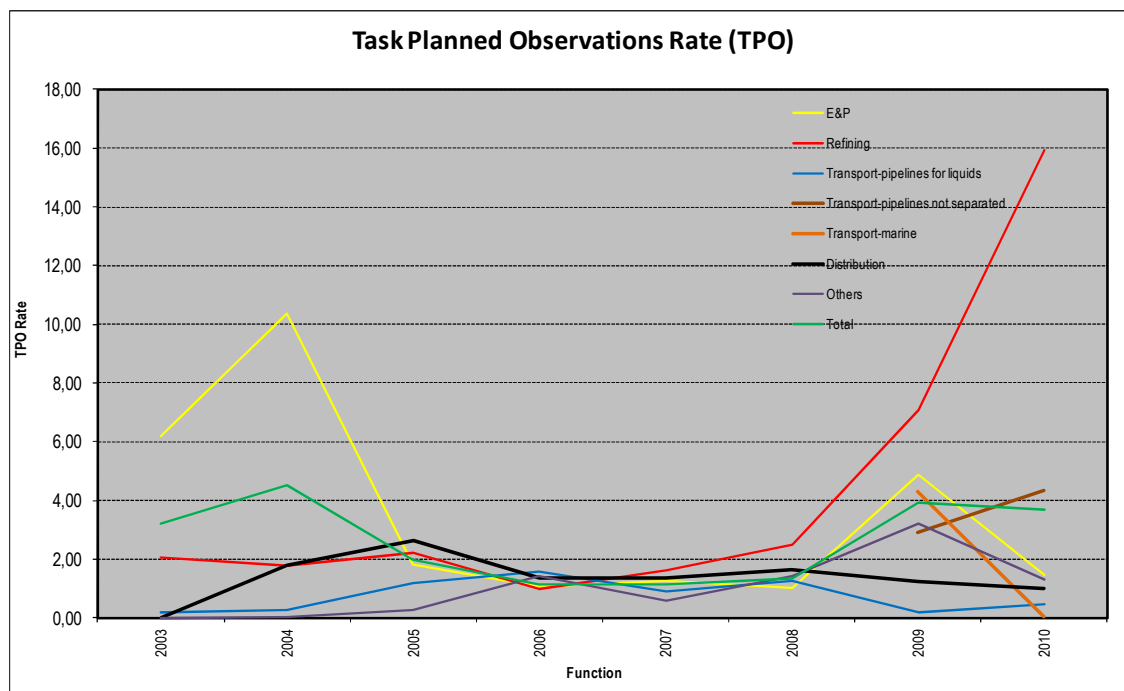


Figure 5.1

## 5.2. Safety training intensity rate

The safety training intensity rate (STI) is defined by the following formulae:

$$\text{STI Rate} = \frac{\text{N}^{\circ} \text{ of cumulative hours of safety training of the year} \times 100}{\text{Hours worked in the same period}}$$

(Please refer to chapters 6.0 and 10.0 of the User's Manual)

Year 2010			
Function	Number of companies that reported data to this indicator	Average reported number of total workers (company)	Average number of workers used to calculate this rate (company)
E&P	7	321,636	144,836
Refining	10	123,321	43,349
Transport – pipelines for liquids	3	11,856	1,785
<i>Transport – pipelines not separated</i>	2	24,627	4,860
Transport - Maritime	2	24,885	4,608
Distribution	6	60,529	23,793
Others	8	195,730	28,225
<b>Total</b>	<b>12</b>	<b>768,500</b>	<b>255,526</b>

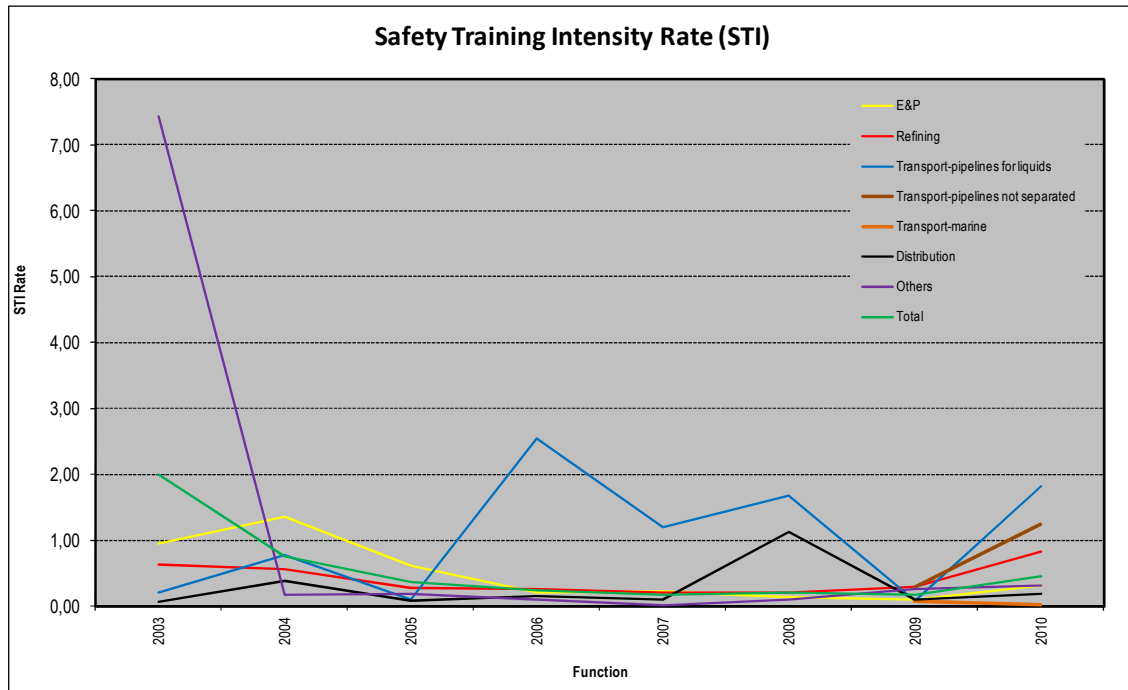


Figure 5.2

Figures 5.1 and 5.2 represent the tasks planned observations rate and safety training intensity rate respectively for years 2003 to 2010, solely for company workers<sup>5</sup>. The corresponding tabulated results are shown in appendix A.

<sup>5</sup> One company reported data for the calculation of the safety proactive indicators for the combined result (company and contractors) during years 2003 and 2004. Since 2005, it could start reporting data only referred to the company's workers.



## 6.0 GLOSSARY OF TERMS ACCORDING TO ARPEL CRITERIA

**a) Case involving lost workdays**

All non fatal cases that result in the worker being away from work at least one business day after the day of the injury or disease. The day on which the worker goes home before the end of his workday is not considered in this item. Fatalities, as well as restricted labor activity days are excluded, since they are recorded separately.

**b) Case involving medical treatment**

All treatment cases of injuries / diseases administered by doctors, registered professionals or non-medical personnel. The medical treatment does not include first aids (one single treatment and the following observation of scratches, cuts, burns, splinters, and other episodes without gravity that generally do not require medical attention) even if a doctor or a registered professional provides them.

**c) Case involving restricted workdays**

All non-fatal cases implying days of restricted activity of the usual tasks after the day of the injury or disease. Fatalities must be excluded.

**d) Company worker**

Any person employed by the reporting company or included in its payroll.

**e) Contractor**

Any person directly involved in the execution of an assigned work for the reporting company, according to a contract.

**f) Fatal incidents' rate**

Total fatalities per 1,000,000 worked hours (see formulae 4 in appendix C).

**g) Incidents' frequency rate with lost workdays**

The number of lost workday cases per 1,000,000 worked hours. Cases of restricted workdays and cases of medical treatment are not included (See Formulae 3 in appendix C).

**h) Incidents' gravity rate**

The number of lost workdays per 1,000,000 worked hours (see Formulae 2 in appendix C). Note that ARPEL definition of lost workdays includes all calendar days (including weekends and holidays). Also see "number of days away from work" on item i.

**i) Number of days away from work**

The total number of days (consecutive or not) after the day when the injury or disease occurred, on which the workers involved (according to the definition of *case involving lost workdays*) should have worked but did not, as a result of the occupational injury or



disease, until the day they get back to work. The day the person starts to work is excluded. **Weekends and holidays are included, even if the employee was not scheduled to work.**

**j) Recordable case - disease**

Any occupational incident resulting from a disease (according to the provided classification by the legislation/regulation [if applicable] of the country where the company reports its activities). Occupational diseases resulting in fatalities are included.

**k) Recordable case - fatality**

A fatality resulting from an occupational injury or disease. The fatality should be loaded to the year in which the injury occurred or the occupational disease was recorded.

**l) Recordable case - injury**

Any occupational incident resulting in an injury (according to the provided classification by the legislation/regulation [if applicable] of the country where the company reports its activities). Occupational injuries resulting in fatalities are included.

**m) Recordable cases - total**

The sum of Recordable cases – Injury, Recordable cases – Disease and Recordable cases – Fatalities.

**n) Safety training intensity (STI)**

The proportion of the total hours worked in a period dedicated to safety training.

**o) Safety training intensity rate**

The percentage of cumulative safety training hours in the year, over the total hours worked in the same period (see Formulae 6 in appendix C).

**p) Tasks planned observations (TPO)**

"Tasks planned observations" (TPO) are safety observations performed according to a systematic method. They constitute a recorded visual analysis in which the sequence of tasks, maneuvers and operations required to obtain a certain result of the service which is pre-established within the company, is studied by well trained and qualified personnel. The referred study includes hazard identification and risk management during normal task performance and comprises observations of immediate and basic aspects as well as systematic ones. Observations are recorded in a pre-established form according to a given procedure to determine all deviations that result in an increased probability of any human resources or material loss.

**q) Tasks planned observations' rate**

The quotient between the number of tasks planned observations accrued during the year and the average number of workers in the same period (see Formulae 5 in appendix C).





**r) Total incidents' rate**

The total rate (Recordable cases) of injuries, occupational diseases or fatalities per 1,000,000 worked hours (see Formulae 1 in appendix C).

**s) Work relatedness**

An injury or disease is to be considered to be work-related if an event or exposure in the work environment caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or disease. Work-relatedness is defined for injuries and diseases resulting from events or exposures occurred in the work environment, defining the work environment as the physical place where one or more employees work or are present due to work reasons. The work environment includes not only physical locations, but also the equipment or materials used by the employee during the course of his/her work.

**t) Worked hours**

Hours worked by both the company workers and contractors' workers (separately recorded).



## 7.0 REFERENCES AND BIBLIOGRAPHY

The following material was used to develop the present report:

1. "European Downstream Oil Industry Safety Performance - statistical summary of reported incidents - 1996". CONCAWE Safety Management. RA 1250, Report Ner. 4/97. Brussels. December, 1997.
2. "Summary of U.S. Occupational Injuries, Illnesses, and Fatalities in the Petroleum Industry - 1996". American Petroleum Institute. API Publication #2375. Washington, DF, September, 1997.
3. ARPEL User's Manual – Safety Benchmarking in the Oil and Gas Industry in Latin America and the Caribbean – 5th edition, 2012. ARPEL. Montevideo.
4. "Occupational Safety and Health Administration – Regulations (Standards – 29CFR) - Determination of work relatedness -1904.5" - [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9636](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9636)
5. "OGP Safety Performance Indicators – 2010 data". Report No. 455. May, 2011. 132 pag.



## 8.0 APPENDIX A

### 8.1. Tabulated results: totals for companies, contractors and combined

Data used to develop the associated graph for each rate analyzed in chapter 2.0 is presented in the tables below, for the period 1997/2010.

**Table 8.1.1: Total incidents' rate per functional unit (ARPEL 1997-2010)**

Function	Data Category	Weighted average (1997-1999)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E&P	Company	3.920	1.167	2.875	2.266	1.742	2.202	2.779	2.865	3.663	3.648	4.184	6.234
	Contractors	18.723	3.989	5.379	2.818	2.597	3.070	4.060	3.946	4.092	4.134	3.083	3.038
	Combined	7.895	2.231	4.770	2.602	2.281	2.780	3.626	3.592	3.947	3.971	3.467	4.179
Refining	Company	3.948	10.543	4.337	2.667	1.999	2.815	3.719	2.660	3.822	4.000	3.642	6.398
	Contractors	19.867	4.872	8.356	2.832	2.699	3.523	8.967	4.741	5.613	6.118	4.706	4.272
	Combined	6.567	9.748	6.368	2.713	2.209	3.036	5.585	3.402	4.568	4.904	4.080	5.434
Transport – pipelines for liquids	Company	4.947	1.319	0.529	1.786	1.475	2.192	5.042	5.744	2.143	2.380	2.177	3.458
	Contractors	11.454	1.093	6.215	1.631	1.225	1.754	8.042	7.431	4.261	2.893	2.162	0.992
	Combined	6.113	1.265	0.975	1.719	1.353	1.956	7.169	6.877	3.321	2.635	2.173	2.723
Transport – pipelines for gases	Company											1.606	12.170
	Contractors											8.229	5.218
	Combined											5.065	8.246
Transport – pipelines not separated	Company											1.203	3.695
	Contractors											2.862	2.869
	Combined											2.342	3.092
Transport - maritime	Company											2.177	3.978
	Contractors											4.790	0.000
	Combined											2.446	3.847
Distribution	Company	2.827	10.013	15.857	4.642	4.364	2.617	2.024	4.662	4.985	4.700	7.881	5.485
	Contractors	81.183	2.483	1.867	2.203	1.991	1.439	2.266	3.162	2.530	2.691	2.970	2.104
	Combined	3.791	7.268	11.296	3.773	3.467	2.189	2.110	3.917	3.987	3.771	5.934	4.211
Others	Company	1.721	1.030	6.879	3.441	2.011	1.784	1.880	2.235	2.903	3.701	2.403	2.350
	Contractors	99.334	0.046	2.775	1.877	1.573	1.050	3.425	3.959	2.767	2.530	2.323	2.217
	Combined	6.105	0.559	4.318	2.441	1.718	1.320	2.933	3.368	2.807	2.846	2.340	2.253
Total	Company	3.383	5.320	5.319	2.784	2.167	2.351	2.811	2.869	3.579	3.723	3.835	5.061
	Contractors	57.270	2.709	5.462	2.484	2.196	2.381	4.542	4.232	3.842	3.748	2.967	2.772
	Combined	6.746	4.494	5.415	2.632	2.183	2.368	3.808	3.671	3.738	3.738	3.287	3.609

Notes:

- For the year 2006, one of the companies reported the former function “Transport” and the function “Distribution” included within “Exploration and Production” and “Refining”. Therefore, for the calculation of 2006 rates, the data of this company corresponding to Transport and Distribution had to be considered as Exploration and Production and Refining instead of separately as for the rest of the companies.
- Until 2008 inclusively, cells corresponding to the function “Transport – pipelines for liquids” represent the former function “Transport”.



**Table 8.1.2: Incidents' gravity rate per functional unit (ARPEL 1997-2010)**

Function	Data Category	Weighted average (1997-1999)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E&P	Company	174.69	208.44	146.42	73.67	87.67	212.76	180.89	72.84	85.26	88.79	76.14	73.58
	Contractors	268.34	61.04	293.98	349.37	206.42	73.01	280.11	69.25	70.60	138.69	84.56	181.49
	Combined	202.58	152.86	182.40	256.55	135.95	147.31	226.57	70.76	78.98	117.96	80.65	129.14
Refining	Company	146.83	87.29	81.49	99.71	118.14	262.20	263.00	64.08	47.37	101.51	60.39	73.25
	Contractors	523.57	31.67	626.47	463.38	339.27	525.09	630.93	118.87	160.86	60.94	40.41	46.48
	Combined	214.17	79.49	156.03	252.28	153.95	301.47	325.39	72.03	78.75	85.39	52.66	61.54
Transport – pipelines for liquids	Company	165.92	92.63	44.05	66.45	54.43	185.34	214.10	46.92	21.50	41.12	11.88	48.25
	Contractors	1275.53	8.15	0.00	10.19	26.14	29.48	33.93	27.68	38.98	27.73	159.98	25.03
	Combined	323.79	72.45	41.82	39.44	48.04	163.41	177.24	42.43	26.02	34.57	51.74	43.87
Transport – pipelines for gases	Company											54.60	52.91
	Contractors											164.62	152.09
	Combined											106.04	103.79
Transport – pipelines not separated	Company											27.37	15.67
	Contractors											16.78	158.03
	Combined											20.10	119.59
Transport - maritime	Company											11.88	36.21
	Contractors											28.37	0.00
	Combined											28.18	36.03
Distribution	Company	141.33	78.70	95.35	92.07	74.80	74.51	98.45	56.82	30.49	69.06	79.82	62.33
	Contractors	30.26	33.56	28.24	26.40	31.47	19.53	30.79	34.62	40.86	40.88	127.18	22.34
	Combined	137.09	62.25	85.83	70.10	61.74	62.09	87.95	47.46	33.28	57.87	97.95	49.75
Others	Company	26.42	30.76	59.75	80.05	62.33	70.12	58.44	28.13	29.10	48.38	17.59	16.70
	Contractors	742.15	0.00	40.31	749.65	206.38	13.80	83.38	84.50	19.15	42.26	48.34	57.39
	Combined	210.37	16.04	84.01	406.35	80.22	67.04	59.71	31.01	28.03	44.01	41.33	46.01
Total	Company	125.00	119.19	101.41	85.61	89.57	174.09	166.01	60.29	54.95	78.95	57.61	54.54
	Contractors	488.33	34.96	320.16	356.41	188.26	115.21	295.43	65.24	83.56	84.60	62.63	102.87
	Combined	208.47	92.56	150.94	228.87	118.29	157.41	202.01	62.33	64.10	82.17	60.50	82.39

Notes:

1. ARPEL includes weekends and holidays in the definition of the number of days away from work.
2. For the year 2006, one of the companies reported the former function “Transport” and the function “Distribution” included within “Exploration and Production” and “Refining”. Therefore, for the calculation of 2006 rates, the data of this company corresponding to Transport and Distribution had to be considered as Exploration and Production and Refining instead of separately as for the rest of the companies.
3. Until 2008 inclusively, cells corresponding to the function “Transport – pipelines for liquids” represent the former function “Transport”.



**Table 8.1.3: Incidents' frequency rate with lost workdays per functional unit (ARPEL 1997-2010)**

Function	Data Category	Weighted average (1997-1999)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E&P	Company	1.625	1.937	1.754	1.858	1.674	1.829	3.447	3.385	2.446	2.355	2.813	3.775
	Contractors	5.765	3.654	2.779	2.133	2.746	1.893	2.210	2.289	2.289	1.878	1.224	1.131
	Combined	2.770	2.585	2.238	2.009	2.094	1.872	2.497	2.650	2.354	2.076	1.777	2.082
Refining	Company	1.290	2.447	1.092	2.186	2.029	2.001	5.394	1.654	2.518	2.095	5.110	2.909
	Contractors	5.512	3.057	2.788	4.638	8.981	1.707	3.206	1.897	3.085	2.497	8.543	1.299
	Combined	2.076	2.532	1.333	2.682	3.038	1.906	4.292	1.738	2.743	2.255	6.523	2.170
Transport – pipelines for liquids	Company	2.933	1.451	0.815	0.967	1.239	1.782	2.348	3.000	1.330	1.381	4.091	2.615
	Contractors	6.776	1.093	0.000	0.718	1.480	1.356	1.550	1.008	1.353	1.182	8.503	0.992
	Combined	3.267	1.365	0.707	0.920	1.276	1.549	2.185	1.694	1.343	1.284	5.477	2.131
Transport – pipelines for gases	Company											0.964	2.705
	Contractors											2.351	3.392
	Combined											1.688	3.092
Transport – pipelines not separated	Company											0.687	0.881
	Contractors											0.667	0.667
	Combined											0.673	0.722
Transport - maritime	Company											4.091	2.210
	Contractors											3.832	0.000
	Combined											1.546	2.137
Distribution	Company	1.372	7.640	11.789	4.089	4.117	2.006	2.420	3.119	4.149	4.664	7.287	3.882
	Contractors	2.498	1.572	1.339	1.497	1.601	1.004	0.946	1.314	1.811	1.093	1.880	0.881
	Combined	1.714	5.429	9.830	3.184	3.292	1.642	1.634	2.223	3.246	3.066	5.143	2.750
Others	Company	0.732	1.724	2.755	2.652	1.756	1.499	1.648	1.013	2.100	1.525	1.384	0.871
	Contractors	5.424	2.428	3.521	1.619	5.919	1.050	0.852	0.907	0.769	0.601	0.546	0.583
	Combined	1.995	2.061	3.144	2.262	2.071	1.212	1.241	0.943	1.195	0.865	0.728	0.660
Total	Company	1.398	2.668	2.973	2.276	2.054	1.838	3.183	2.313	2.479	2.226	3.387	2.738
	Contractors	5.579	2.817	2.783	2.260	3.390	1.555	1.952	1.817	1.834	1.431	1.733	0.904
	Combined	2.360	2.715	2.907	2.269	2.410	1.679	2.402	2.023	2.120	1.771	2.343	1.573

Notes:

1. For the year 2006, one of the companies reported the former function "Transport" and the function "Distribution" included within "Exploration and Production" and "Refining". Therefore, for the calculation of 2006 rates, the data of this company corresponding to Transport and Distribution had to be considered as Exploration and Production and Refining instead of separately as for the rest of the companies.
2. Until 2008 inclusively, cells corresponding to the function "Transport – pipelines for liquids" represent the former function "Transport".



**Table 8.1.4: Fatal incidents' rate per functional unit (ARPEL 1997-2010)**

Function	Data Category	Weighted average (1997-1999)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
E&P	Company	0.023	0.073	0.081	0.030	0.026	0.030	0.029	0.008	0.072	0.017	0.019	0.016
	Contractors	0.182	0.067	0.092	0.070	0.096	0.070	0.041	0.043	0.064	0.043	0.026	0.021
	Combined	0.069	0.071	0.088	0.054	0.070	0.057	0.037	0.031	0.067	0.034	0.024	0.019
Refining	Company	0.028	0.016	0.013	0.030	0.026	0.025	0.060	0.028	0.011	0.049	0.044	0.057
	Contractors	0.111	0.096	0.148	0.151	0.091	0.041	0.073	0.103	0.038	0.007	0.040	0.020
	Combined	0.042	0.027	0.048	0.064	0.045	0.030	0.064	0.055	0.022	0.031	0.042	0.040
Transport – pipelines for liquids	Company	0.023	0.026	0.000	0.017	0.018	0.042	0.000	0.039	0.000	0.017	0.000	0.000
	Contractors	0.243	0.336	0.396	0.067	0.055	0.054	0.038	0.000	0.032	0.000	0.000	0.000
	Combined	0.053	0.100	0.056	0.038	0.036	0.049	0.027	0.013	0.018	0.008	0.000	0.000
Transport – pipelines for gases	Company											0.964	2.705
	Contractors											2.351	3.392
	Combined											1.688	3.092
Transport – pipelines not separated	Company											0.687	0.881
	Contractors											0.667	0.667
	Combined											0.673	0.722
Transport - maritime	Company											4.091	2.210
	Contractors											3.832	0.000
	Combined											1.546	2.137
Distribution	Company	0.025	0.024	0.024	0.027	0.027	0.010	0.016	0.000	0.000	0.000	0.000	0.050
	Contractors	0.615	0.000	0.084	0.049	0.117	0.084	0.247	0.071	0.111	0.105	0.257	0.273
	Combined	0.092	0.015	0.037	0.035	0.060	0.036	0.098	0.035	0.045	0.050	0.101	0.134
Others	Company	0.003	0.000	0.035	0.014	0.000	0.009	0.000	0.009	0.008	0.000	0.007	0.005
	Contractors	0.113	0.046	0.051	0.054	0.041	0.020	0.045	0.019	0.020	0.011	0.004	0.011
	Combined	0.031	0.022	0.044	0.040	0.028	0.016	0.031	0.015	0.016	0.008	0.005	0.010
Total	Company	0.019	0.034	0.043	0.026	0.021	0.022	0.028	0.017	0.032	0.021	0.020	0.022
	Contractors	0.173	0.074	0.095	0.074	0.080	0.055	0.061	0.044	0.048	0.029	0.025	0.024
	Combined	0.054	0.047	0.067	0.050	0.053	0.040	0.047	0.033	0.042	0.026	0.023	0.023

Notes:

1. For the year 2006, one of the companies reported the former function “Transport” and the function “Distribution” included within “Exploration and Production” and “Refining”. Therefore, for the calculation of 2006 rates, the data of this company corresponding to Transport and Distribution had to be considered as Exploration and Production and Refining instead of separately as for the rest of the companies.
2. Until 2008 inclusively, cells corresponding to the function “Transport – pipelines for liquids” represent the former function “Transport”.



## 8.2. Tabulated results: Offshore activities for companies, contractors and combined

Data used to develop the associated graph for each rate analyzed in chapter 3.0 is presented in the tables below, for the period 1997/2010.

**Table 8.2.1: Incidents' rate per functional unit – offshore activities (ARPEL 1997-2010)**

Indicator	Data Category	1998	1999	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Incidents' Rate	Companies	5.980	2.795	2.040	2.027	2.976	3.200	2.793	5.642	3.898	5.431	9.750
	Contractors	46.205	5.685	2.360	1.456	3.395	3.352	1.623	6.856	3.548	2.389	2.381
	Combined	6.260	4.105	2.220	1.730	3.114	3.267	2.167	6.126	3.774	4.430	7.720
Incidents' Gravity Rate	Companies	269.800	76.750	112.400	114.219	126.483	103.236	79.261	125.550	66.568	52.695	43.744
	Contractors	n/a	69.500	50.900	11.288	10.576	81.041	28.584	59.844	215.165	87.119	113.895
	Combined	269.800	73.450	85.800	110.269	122.464	97.369	52.125	108.882	91.378	57.733	50.364
Incidents' Frequency Rate with Lost Workdays	Companies	5.930	1.865	1.740	1.966	3.250	7.443	2.361	4.100	3.182	4.412	6.407
	Contractors	46.205	3.370	2.010	1.026	2.708	2.854	1.199	6.392	5.356	1.955	3.324
	Combined	6.215	2.545	1.895	1.930	3.072	4.578	1.739	4.681	3.545	3.603	6.116
Fatal Incidents' Rate	Companies	0.025	n/a	n/a	0.061	0.021	0.000	0.000	0.193	0.000	0.000	0.013
	Contractors	0.000	0.465	0.050	0.095	0.172	0.045	0.012	0.606	0.034	0.031	0.035
	Combined	0.025	0.465	0.050	0.079	0.071	0.020	0.007	0.358	0.012	0.010	0.019

Notes:

- Item 2: ARPEL includes weekends and holidays in the definition of the number of days away from work.

## 8.3. Tabulated results – Safety proactive indicators

Data used to develop the associated graph for each rate analyzed in chapter 5.0 is presented in the tables below, for the period 2003/2010.

**Table 8.3.1: Tasks planned observations per functional unit - company data (ARPEL 2003-2010)**

Function	2003	2004	2005	2006	2007	2008	2009	2010
E&P	6.19	10.36	1.83	1.07	1.28	1.01	4.87	1.45
Refining	2.04	1.78	2.21	0.99	1.60	2.51	7.05	15.93
Transport-pipelines for liquid	0.17	0.28	1.18	1.59	0.92	1.25	0.18	0.46
Transport- pipelines for gases							1.60	
<i>Transport-pipelines not separated</i>							2.93	4.34
Transport-maritime							4.29	0.04
Distribution	0.01	1.80	2.63	1.36	1.38	1.64	1.24	1.01
Others	0.00	0.01	0.28	1.44	0.57	1.41	3.23	1.29
<b>Total</b>	<b>3.22</b>	<b>4.51</b>	<b>1.96</b>	<b>1.15</b>	<b>1.12</b>	<b>1.35</b>	<b>3.93</b>	<b>3.70</b>



**Table 8.3.2: Safety training intensity rate per functional unit - company data (ARPEL 2003-2010)**

Function	2003	2004	2005	2006	2007	2008	2009	2010
E&P	0.95	1.36	0.62	0.21	0.22	0.14	0.10	0.32
Refining	0.62	0.56	0.29	0.26	0.21	0.21	0.30	0.83
Transport-pipelines for liquid	0.20	0.78	0.10	2.54	1.19	1.68	0.09	1.82
Transport- pipelines for gases							0.17	
<i>Transport-pipelines not separated</i>							0.29	1.24
Transport-maritime							0.08	0.02
Distribution	0.06	0.39	0.08	0.15	0.10	1.13	0.10	0.19
Others	7.43	0.17	0.19	0.11	0.02	0.10	0.26	0.32
<b>Total</b>	<b>2.00</b>	<b>0.76</b>	<b>0.36</b>	<b>0.24</b>	<b>0.18</b>	<b>0.20</b>	<b>0.17</b>	<b>0.45</b>

Notes:

1. For the period 2006 to 2008, one of the companies reported the former function “Transport” and the function “Distribution” included within “Exploration and Production” and “Refining”. Therefore, for the calculation of that period’s proactive rates, data of that company corresponding to Transport and Distribution had to be considered as Exploration and Production and Refining instead of separately as for the rest of the companies.
2. One company reported the data for the calculation of the safety proactive indicators for the combined result (company and contractors) during 2003 and 2004. Since 2005, it could start reporting data only referred to the company’s workers.

#### 8.4. Tabulated results – fatality causes – ARPEL 2001-2010

**Table 8.4.1: Fatality causes – totals for ARPEL Member Companies and their contractors – term 2001/2010**

Fatality Causes	Percentage of Fatalities									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Vehicle accident	14%	10%	16%	10%	6%	2%	18%	18%	33%	33%
Other Transportation	6%	0%	16%	15%	4%	4%	0%	10%	2%	0%
Fires and Explosions	51%	17%	16%	11%	17%	25%	7%	16%	2%	10%
Drowning	3%	12%	7%	8%	0%	6%	34%	4%	2%	4%
Caught In or Between	3%	18%	3%	19%	11%	10%	3%	6%	13%	2%
Struck by Equipment	14%	23%	7%	12%	19%	12%	16%	16%	17%	14%
Fall	0%	10%	11%	6%	14%	13%	10%	14%	6%	12%
Toxic Gas or Liquid	3%	3%	7%	6%	17%	2%	5%	0%	2%	12%
Electrocution	6%	2%	11%	13%	3%	15%	1%	12%	17%	8%
Other	0%	5%	5%	0%	9%	12%	5%	4%	6%	4%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>





## 9.0 APPENDIX B

### 9.1. ARPEL Member Companies data: totals for companies – year 2010

This table gathers all data of ARPEL Member Companies that reported for 2010. The incidents' rates' indicators used are calculated.

**Table 9.1: ARPEL Member Companies data – totals for companies (including offshore activities); 2010 data**

Function	Average number of employees	Hours worked (in thousands)	Recordable cases				Extent and outcome of injuries and illnesses				Incident Rates			
			a	B	c	d	e	f	g	h	i	j	k	l
			Injuries	Illness	Fatalities	Total	Cases of:			Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
Restricted workdays	Lost workdays	Medical treatment												
E&P	153,042	321,636	1,808	192	5	2,005		1201		23,666	6.234	73.580	3.775	0.016
Refining	55,798	123,321	638	144	7	789		349		9,033	6.398	73.248	2.909	0.057
Transport-pipelines for liquid	5,155	11,856	41	0	0	41		31		572	3.458	48.247	2.615	0.000
Transport-pipelines for gases	3,279	5,916	16	55	1	72		16		313	12.170	52.907	2.705	0.169
<i>Transport-pipelines not separated</i>	11,759	24,627	89	2	0	91		20		386	3.695	15.674	0.881	0.000
Transport-maritime	13,991	24,885	98	1	0	99		55		901	3.978	36.207	2.210	0.000
Distribution	28,169	60,529	328	1	3	332		233		3,773	5.485	62.334	3.882	0.050
Others	89,801	195,730	423	36	1	460		169		3,268	2.350	16.696	0.871	0.005
<b>Total</b>	<b>360,994</b>	<b>768,500</b>	<b>3,441</b>	<b>431</b>	<b>17</b>	<b>3,889</b>		<b>2074</b>		<b>41,912</b>	<b>5.061</b>	<b>54.537</b>	<b>2.738</b>	<b>0.022</b>

Notes:

- Item 5(h) (number of days away from work) includes all calendar days (including weekends and holidays).
- Since some companies reported incomplete data, the calculation of each rate is performed only with the worked hours corresponding to such rate and which do not necessarily coincide with the value in column 3 (total reported). Therefore, it is not possible to obtain each rate's value by directly applying the calculation formulae from the data in tables 9.1 to 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 to 9.4), but it did not report data to calculate the incidents' gravity rate; then the 10,000 hours cannot be used for the calculation of this rate (this company could not be considered to calculate the incidents' gravity rate and the worked hours this company reported were not considered to calculate the rate).
- Recordable cases (column 4): The total does not necessarily match the sums of "Injuries" + "Diseases" + "Fatalities" since there were companies that reported the total recordable cases without the corresponding splitting between Injuries, Diseases and Fatalities. Therefore, in these cases the value for the "Total" may be greater than the sum of "Injuries" + "Diseases" + "Fatalities".



## 9.2. ARPEL Member Companies' contractors data: totals for contractors – year 2010

This table gathers all data of ARPEL Member Companies' contractors that reported data for 2010. The incidents' rates' indicators used are calculated.

**Table 9.2: ARPEL Member Companies' contractor's data – totals for contractors (including offshore activities); 2010 data**

Function	Average number of employees	Hours worked (in thousands)	Recordable cases				Extent and outcome of injuries and illnesses				Incident Rates			
			a	b	c	d	e	f	g	h	i	j	k	l
			Injuries	Illness	Fatalities	Total	Cases of:			Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
Restricted workdays	Lost workdays	Medical treatment												
E&P	230,922	579,606	1,749	0	12	1,761		641		61,961	3.038	181.485	1.131	0.021
Refining	48,463	102,293	435	0	2	437		132		4,456	4.272	46.484	1.299	0.020
Transport-pipelines for liquid	2,063	5,039	5	0	0	5		5		69	0.992	25.027	0.992	0.000
Transport-pipelines for gases	3,836	7,666	40	0	0	40		26		948	5.218	152.094	3.392	0.000
Transport-pipelines not separated	30,565	66,571	189	0	2	191		43		10,520	2.869	158.027	0.667	0.030
Transport-maritime	451	847	0	0	0	0		0		0	0.000	0.000	0.000	0.000
Distribution	18,964	36,595	67	0	10	77		32		621	2.104	22.337	0.881	0.273
Others	261,610	535,372	1,181	0	6	1,187		312		28,951	2.217	57.390	0.583	0.011
<b>Total</b>	<b>596,875</b>	<b>1,333,988</b>	<b>3,666</b>	<b>0</b>	<b>32</b>	<b>3,698</b>		<b>1,191</b>		<b>107,526</b>	<b>2.772</b>	<b>102.874</b>	<b>0.904</b>	<b>0.024</b>

Notes:

1. Item 5(h) (number of days away from work) includes all calendar days (including weekends and holidays).
2. Since some companies reported incomplete data, the calculation of each rate is performed only with the worked hours corresponding to such rate and which do not necessarily coincide with the value in column 3 (total reported). Therefore, it is not possible to obtain each rate's value by directly applying the calculation formulae from the data in tables 9.1 to 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 to 9.4), but it did not report data to calculate the incidents' gravity rate; then the 10,000 hours cannot be used for the calculation of this rate (this company could not be considered to calculate the incidents' gravity rate and the worked hours this company reported were not considered to calculate the rate).
3. Recordable cases (column 4): The total does not necessarily match the sums of "Injuries" + "Diseases" + "Fatalities" since there were companies that reported the total recordable cases without the corresponding splitting between Injuries, Diseases and Fatalities. Therefore, in these cases the value for the "Total" may be greater than the sum of "Injuries" + "Diseases" + "Fatalities".



### 9.3. ARPEL Member Companies data: offshore activities - year 2010

This table gathers all data on offshore activities of ARPEL Member Companies that reported data for 2010. The incidents' rates' indicators used are calculated.

**Table 9.3: ARPEL Member Companies' data – offshore activities; 2010 data**

Function	Average number of employees	Hours worked (in thousands)	Recordable cases				Extent and outcome of injuries and illnesses				Incident Rates			
			a	b	c	d	e	f	g	h	i	j	k	l
			Injuries	Illness	Fatalities	Total	Cases of:			Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
E&P	35,337	75,074	696	35	1	732	Restricted workdays	Lost workdays	Medical treatment					
<b>Total</b>	<b>35,337</b>	<b>75,074</b>	<b>696</b>	<b>35</b>	<b>1</b>	<b>732</b>		<b>481</b>		<b>3,284</b>	<b>9.750</b>	<b>43.744</b>	<b>6.407</b>	<b>0.013</b>

**Notes:**

- Item 5(h) (number of days away from work) includes all calendar days (including weekends and holidays).
- Since some companies reported incomplete data, the calculation of each rate is performed only with the worked hours corresponding to such rate and which do not necessarily coincide with the value in column 3 (total reported). Therefore, it is not possible to obtain each rate's value by directly applying the calculation formulae from the data in tables 9.1 to 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 to 9.4), but it did not report data to calculate the incidents' gravity rate; then the 10,000 hours cannot be used for the calculation of this rate (this company could not be considered to calculate the incidents' gravity rate and the worked hours this company reported were not considered to calculate the rate).
- Recordable cases (column 4): The total does not necessarily match the sums of "Injuries" + "Diseases" + "Fatalities" since there were companies that reported the total recordable cases without the corresponding splitting between Injuries, Diseases and Fatalities. Therefore, in these cases the value for the "Total" may be greater than the sum of "Injuries" + "Diseases" + "Fatalities".



### 9.4. ARPEL Member Companies' contractors data: offshore activities - year 2010

This table gathers all data on offshore activities of ARPEL Member Companies' contractors that reported data for 2010. The incidents rates' indicators used are calculated.

**Table 9.4: ARPEL Member Companies' contractors' data – offshore activities; 2010 data**

Function	Average number of employees	Hours worked (in thousands)	Recordable cases				Extent and outcome of injuries and illnesses				Incident Rates			
			a	b	c	d	e	f	g	h	i	j	k	l
			Injuries	Illness	Fatalities	Total	Cases of:			Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
E&P	7,660	28,558	67	0	1	68	Restricted workdays	Lost workdays	Medical treatment					
<b>Total</b>	<b>7,660</b>	<b>28,558</b>	<b>67</b>	<b>0</b>	<b>1</b>	<b>68</b>		<b>26</b>		<b>891</b>	<b>2.381</b>	<b>113.895</b>	<b>3.324</b>	<b>0.038</b>

**Notes:**

- Item 5(h) (number of days away from work) includes all calendar days (including weekends and holidays).
- Since some companies reported incomplete data, the calculation of each rate is performed only with the worked hours corresponding to such rate and which do not necessarily coincide with the value in column 3 (total reported). Therefore, it is not possible to obtain each rate's value by directly applying the calculation formulae from the data in tables 9.1 to 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 to 9.4), but it did not report data to calculate the incidents' gravity rate; then the 10,000 hours cannot be used for the calculation of this rate (this company could not be considered to calculate the incidents' gravity rate and the worked hours this company reported were not considered to calculate the rate).
- Recordable cases (column 4): The total does not necessarily match the sums of "Injuries" + "Diseases" + "Fatalities" since there were companies that reported the total recordable cases without the corresponding splitting between Injuries, Diseases and Fatalities. Therefore, in these cases the value for the "Total" may be greater than the sum of "Injuries" + "Diseases" + "Fatalities".



## 10.0 APPENDIX C

### 10.1. Formula to calculate incidence rates

Formula utilized to calculate each one of the incidence rates' indicators are shown below:

1. Total incidents' rate

$$= \frac{\text{Column4}(d) * 1,000}{\text{Column3}}$$

Where:

Column 4(d) = Total recordable cases

Column 3 = Worked hours (in thousands)

2. Incidents' gravity rate

$$= \frac{\text{Column5}(h) * 1,000}{\text{Column3}}$$

Where:

Column 5(h) = number of days away from work

Column 3 = Worked hours (in thousands)

Note: ARPEL's definition of Column 5(h) includes all calendar days (including weekends and holidays).  
API's definition of Column 5(h) excludes weekends and holidays, unless the employee had to work.

3. Incidents' frequency rate with lost workdays

$$= \frac{\text{Column5}(f) * 1,000}{\text{Column3}}$$

Where:

Column 5(h) = Cases of lost workdays.

Column 3 = Worked hours (in thousands)



4. Fatal incidents' rate

$$= \frac{\text{Column4}(c) * 1,000}{\text{Column3}}$$

Where:

Column 4(c) = number of fatalities

Column 3 = Worked hours (in thousands)

5. Tasks planned observations' rate

$$= \frac{\text{Column2}(a)}{\text{Column2}(b)}$$

Where:

Column 2(a) = tasks planned observations' number (cumulative)

Column 2 (b) = average number of workers

6. Safety training intensity rate

$$= \left[ \frac{\text{Column3}(d)}{\text{Column3}(e) * 1000} \right] * 100$$

Where:

Column 3(d) = safety training hours (cumulative)

Column 3(e) = Worked hours (in thousands)

## Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean

**ARPEL** is a non-profit association gathering oil, gas and biofuels sector companies and institutions in Latin America and the Caribbean. Founded in 1965 as a vehicle of cooperation and reciprocal assistance among sector companies, its main purpose is to actively contribute to industry integration and competitive growth, and to sustainable energy development in the region.

Its membership currently represents over 90% of the upstream and downstream activities in the region and includes national, international and independent operating companies, providers of technology, goods and services for the value chain, and national and international sector institutions.

Since 1976, ARPEL holds Special Consultative Status with the United Nations Economic and Social Council (ECOSOC). In 2006, the association declared its adherence to the UN Global Compact principles.

### Mission

To foster and facilitate sector integration and development, continuous operational improvement and effective management of environmental and social issues, by:

- sharing, enhancing and disseminating best practices;
- carrying out studies that translate in information of value;
- broadening knowledge and helping build required competences;
- promoting networking, interaction and cooperation among members and stakeholders.

### Vision

A growing, competitive and integrated oil and gas industry that achieves excellence in its operations and products, and effectively contributes to a sustainable energy development in Latin America and the Caribbean.

### Value proposition

ARPEL offers a unique mean for networking, sharing knowledge, joining efforts and building synergies in favor of the sector's integration, growth and sustainability. Without any distinction, Members have the opportunity to alternatively lead activities and projects, contribute with their know-how to their development, or learn from the experiences of other members.

ARPEL's value is also reflected in its condition of strategic information center about sector activities in the region and cost-effective vehicle for the development of publications on best practices and benchmarking, as well as on sectoral studies and executive reports aimed at diverse stakeholders. The Association additionally stands out for its regional conferences, forums and seminars of high impact in the industry.

ARPEL is a recognized regional body of representation for the sector that seeks to advocate in favor of the common interests of its Membership and to enhance the industry's public image and reputation.

Socio-environmental sustainability  
**Operational excellence**  
Sectoral development

**July 2012**

### Member Companies



### Institutional Members



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