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STATISTICS ON INCIDENTS IN OIL AND GAS INDUSTRY FOR LATIN AMERICA AND THE CARIBBEAN

2008 STATISTICS FOR ARPEL MEMBER COMPANIES

ARPEL'S REPORT

STATISTICS ON INCIDENTS IN THE OIL AND GAS INDUSTRY FOR LATIN AMERICA AND THE CARIBBEAN

2008 STATISTICS FOR ARPEL MEMBER COMPANIES

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ARPEL
Report on statistics on incidents in the oil and gas industry for Latin America and the Caribbean - 2008 Statistics for ARPEL Member Companies
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1.0 EXECUTIVE SUMMARY

One of the activities of the Environment and Industrial Health and Safety Committee of the Regional Association of Oil and Natural Gas 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 twelfth 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 2008. 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[1] Report Nº 419 on safety performance indicators for year 2008.

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 2008 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, grouped in five functions for the sake of data analysis: Exploration and Production, Refining, Transport[2], Distribution[3], and Others. The definitions of such functions correspond to ARPEL User's

---

[1] *International Association of Oil and Gas Producers*

[2] ***Definition of the Transport function:*** *Gathering systems' operations of crude oil's trunk lines. Transportation through refined and semi-refined products' pipelines. Operations in pipelines stations and others associated with the use of trucks to transport crude oil between both functions. If the trucks are an integral part of another function, they should be covered in that function, not here. Gas gathering and trunk line operations of natural gas transmission lines up to the distribution station. Marine Operations as defined below:*

Ships: *Includes vessels owned, operated and manned under the supervision of the oil company. This may include coastal or transoceanic travel vessels, including international runs. Includes exceptional circumstances of "bare boat" charterers where the vessel is chartered but the crew is provided by the oil company. It does not include "straight charter" vessels where both crew and vessel are hired for specific runs.*

Personnel: *Besides seagoing employees or contractors, includes land-based marine operations people assigned to marine tanker operations. Some companies use personnel from national labor unions who are assigned to specific runs and are supervised and paid by the companies while on the run. Injures and work hours for such personnel should be included. Marine personnel injures should be reported by the same OSHA definitions or the country's legislation (if applicable), as those used for other employees or contractors to allow comparability with other functions.*

Inland waterway tank ship and barge operations and everything associated with marine operations.

[3] ***Definition of the Distribution function:*** *Bulk oil stations and terminals. The retail or wholesale distribution in bulk of oil products in pumps, including trucks and other means of transport. The distribution in bulk of pneumatic tires, batteries, accessories and other products sold in service stations. Operations in products' terminals or wholesale establishments. The administrative, marketing and sales activities which are an integral part of wholesaling are included. The operations with credit cards or petrochemicals' marketing / sales / distribution are not included herein, they shall be included in the category Others. Service stations and mini markets. It includes sales on avenues, road service operations, car wash service, vehicles' repair work and sale of various goods. Field or district staff supervising these stations as well as other marketing administrative services.*

Manual, 4th Edition (2004). Fatality causes are also analyzed for year 2008 and compared to previous years.

Thirteen ARPEL Member Companies reported Contractors data and five reported data on offshore activities, out of sixteen ARPEL Member Companies that reported data for year 2008.

Table 1.0: List of companies that answered to the study of 2008 on Statistics on Incidents of the oil and gas industry in Latin America and the Caribbean.

ANCAP	PETROECUADOR
CHEVRON	PETROPERU
ECOPETROL	PETROTRIN
ENAP	RECOPE
PCJ	YPF (RepsolYPF Group)
PDVSA	STAATSOLIE
PEMEX	TOTAL
PETROBRAS	WINTERSHALL

1.1 Selected results for year 2008

- The total Man-hours (in thousands) reported in this report amounts to 1,927,101, considering both companies and contractors and correspond to 16 Member Companies.
- The Total Incidents Rate (for all functional units) for companies and contractors combined was of 0.748 incidents per 200,000 worked hours (Companies only: 0.745. Contractors only: 0,750). The function with the largest number of incidents was "Refining" for Contractors, with 1.224 incidents per 200,000 worked hours.
- On average for all functional units, the Companies' workers lost 15.79 days per 200,000 hours worked, compared to 16.92 lost workdays by Contractors. The function that lost the largest number of workdays was "Exploration and Production" for Contractors, with 27.74 lost workdays per 200,000 worked hours.
- The incidents' Frequency rate with lost workdays considering all functional units for both Company and Contractors, corresponds to 0.354 cases of lost workdays per 200,000 hours. (Companies only: 0.445. Contractors only: 0.286)
- As in 2007, the oil sector that registered the greatest number of fatalities in year 2008 was "Distribution" for Contractors, with a Rate of 0.021 fatalities per 200,000 worked hours. This value corresponds to more than four times the value for all functions for both Companies and Contractors: 0.005 fatalities per 200,000 worked hours.
- None of the companies participating in this report registered fatalities in "Distribution" and "Others" for the Company's workers during 2008. Likewise, none of the contracting companies registered fatalities in "Transport".
- Fatalities occurred in 2008 were mainly caused by "Car Accidents" causing 18% of fatalities of own employees and contractors.
- Being this the sixth year in which safety proactive indicators are reported, twelve companies reported data for their calculation.

- Considering all the functions, 1.35 task planned observations were carried out per employee during 2008 for the companies' workers. On the other hand, and just as in years 2006 and 2007, "Transport" was the function that received more safety training hours, with 1.68 hours of training per 100 worked hours during 2008.

1.2 Selected comparative results for the term 1997/2008

- The number of reported worked hours exceeds those of previous hears, despite not being from a record number of participating companies.
- The Total Incident's rate (that includes diseases, injuries and fatalities) showed a decreasing general tendency for the first years (until 2002); however, since then, for most of the functional units considering both the Company's workers and Contractors, its value seems to be relatively constant, except for years 2005 and 2006. On average for all the functions - the lowest values of this rate throughout the twelve years correspond to the period from 2002 and 2004, for the company's workers, contractors and combined.
- The number of lost workdays as from 2006 is lower than that corresponding to previous years, for almost all functions of the Company and Combined.
- The Incident's Frequency rate with Lost Workdays showed a global decreasing tendency until 2004, considering the average of all functional units for Contractors. However, it seems to have stabilized in the last years.
- By and large, companies have registered a better performance regarding the fatal incidents rate of their own employees compared with contractors, throughout the twelve years of study. Likewise, the number of fatalities recorded per 200,000 worked hours for the average of all the functions shows a constant decreasing tendency, both for companies' workers and for contractors. On the other hand, "Fires and Explosions" is still the main weighted cause of fatalities for period 2001-2008.
- Offshore activities lost the largest number of workdays per 200,000 worked hours for all the period considered for Contractors (43.03 days).
- Considering both proactive rates (Task Planned Observations Rate and Safety Training Intensity Rate) the value for all functional units has a decreasing tendency for the period 2004-2008.
- 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 1997/2008.

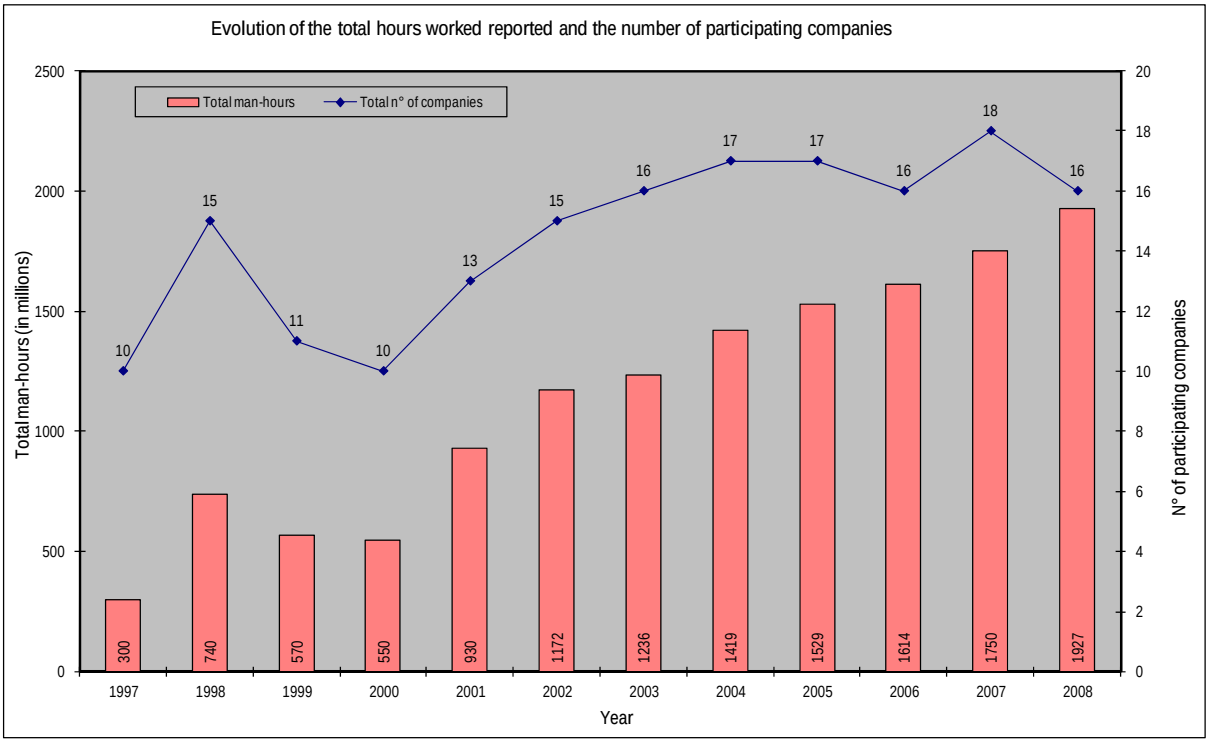
Evolution of the total hours worked reported and the number of participating companies
Total man-hours
Total n° of companies
Total man-hours (in millions)
N° of participating companies
Year
2500
2000
1500
1000
500
0
20
18
16
14
12
10
8
6
4
2
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
300
740
570
550
930
1172
1236
1419
1529
1614
1750
1927
10
15
11
10
13
15
16
17
17
16
18
16

Figure 1.2

2.0 REACTIVE INDICATORS – onshore and offshore activities

2.0 Explanatory notes

Unless the contrary is specified, all incidents' rates are reported as "incidents per 200,000 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 2008

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

$$\text{Total incidents' rate} = \frac{\text{Total recordable cases} \times 200}{\text{Worked hours in thousands}}$$

(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	11	876,519	876,519
Refining	13	322,201	322,201
Transport	10	119,553	119,553
Distribution	11	102,888	102,888
Others	12	505,941	505,941
Total	16	1,927,101	1,927,101

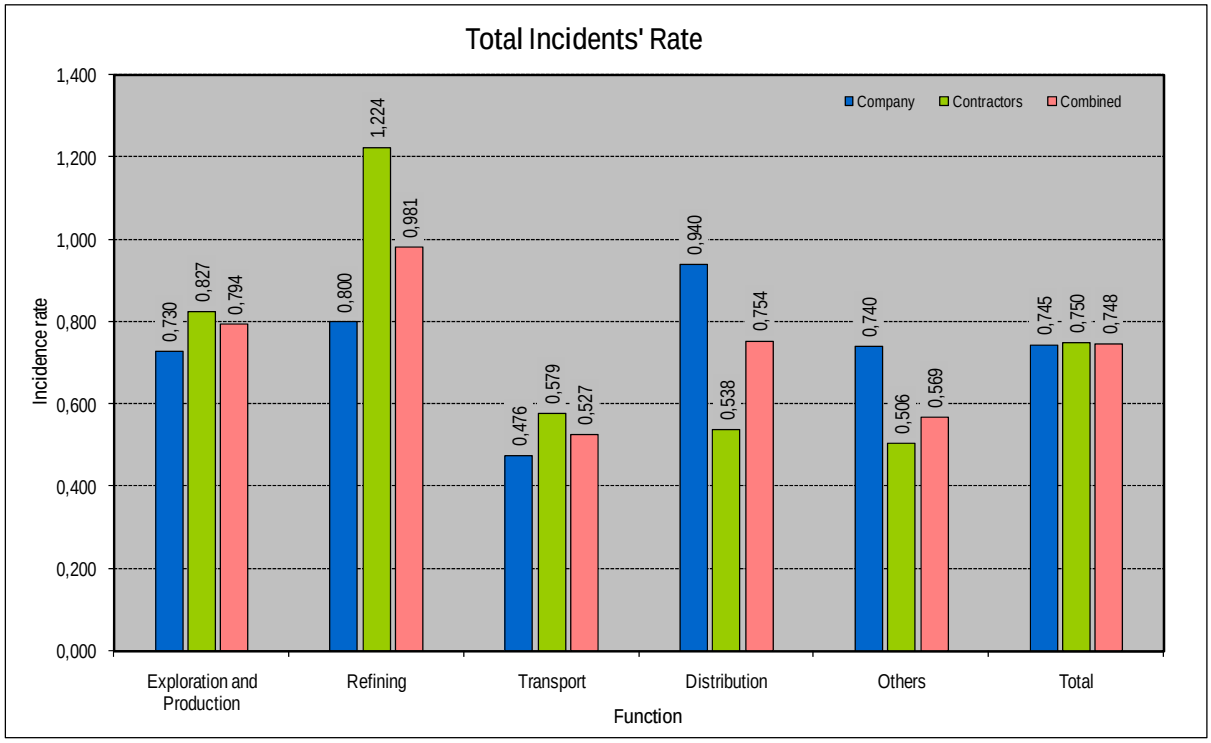

Figure 2.1

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

2.2.1 Company data

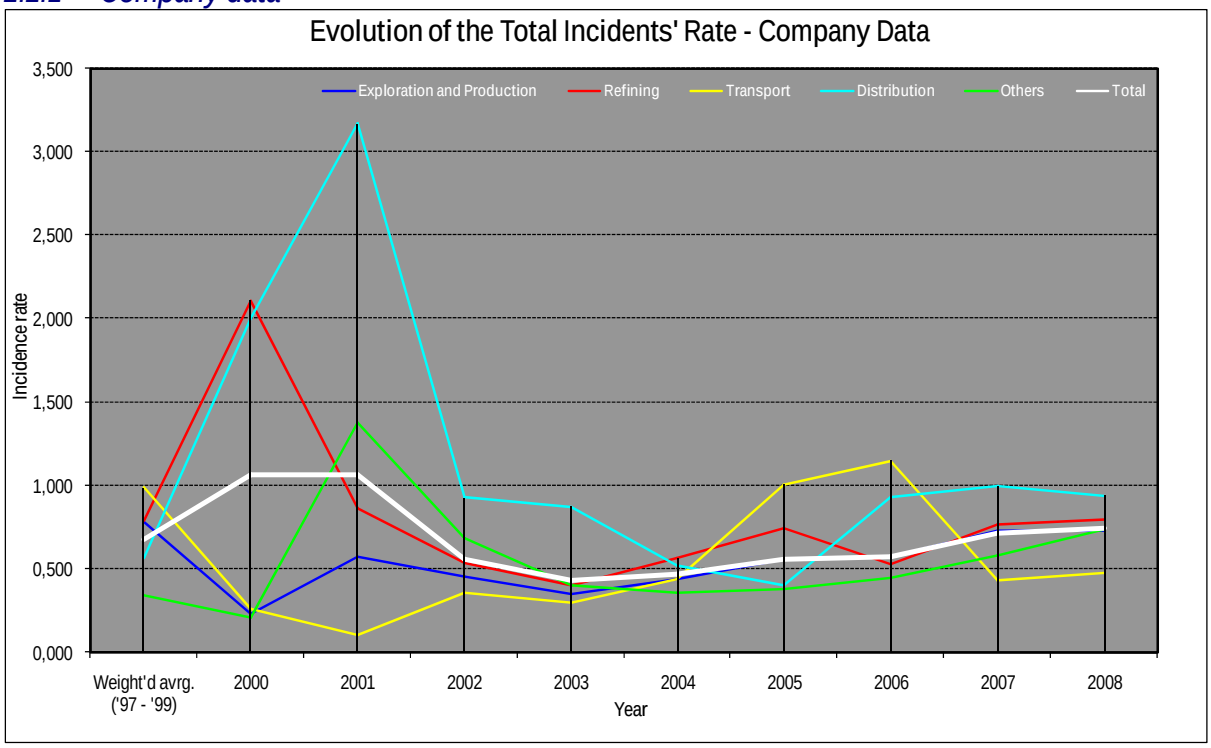

Figure 2.2.1

2.2.2 Contractors data

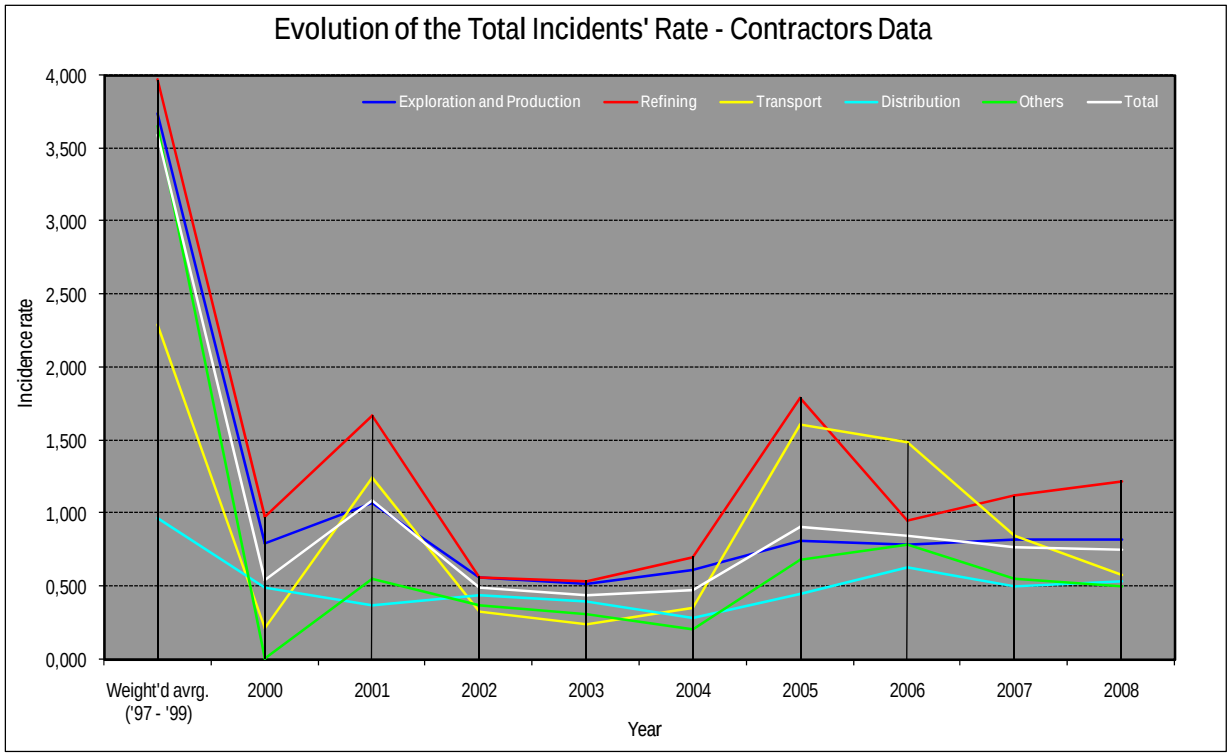

Figure 2.2.2

2.2.3 Combined data

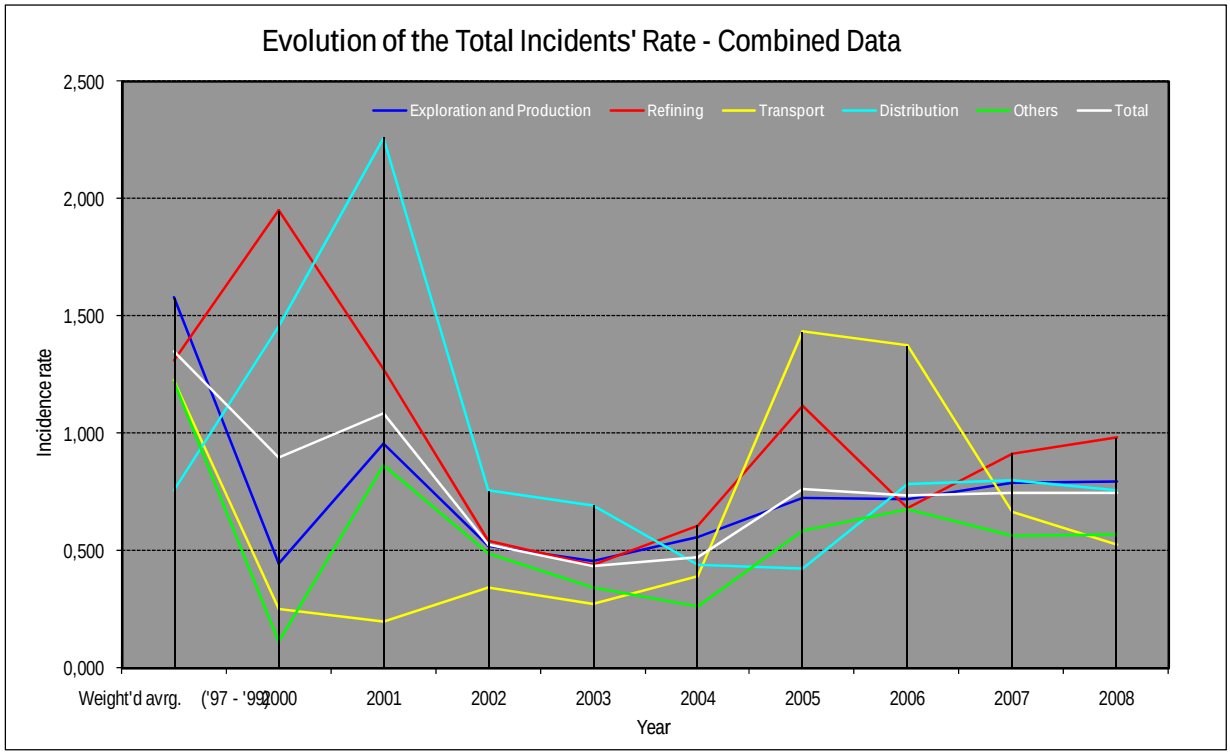

Figure 2.2.3

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 1997/2008. 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:

	Number of companies that reported data	
Year	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

2.3 Incidents' gravity rate (per functional unit); data of year 2008

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

$$\text{Incidents' gravity rate} = \frac{\text{Number of days away from work} \times 200}{\text{Worked hours in thousands}}$$

(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	11	876,519	705,162
Refining	13	322,201	306,462
Transport	10	119,553	117,611
Distribution	11	102,888	91,719
Others	11	505,941	474,931
Total	16	1,927,101	1,699,132

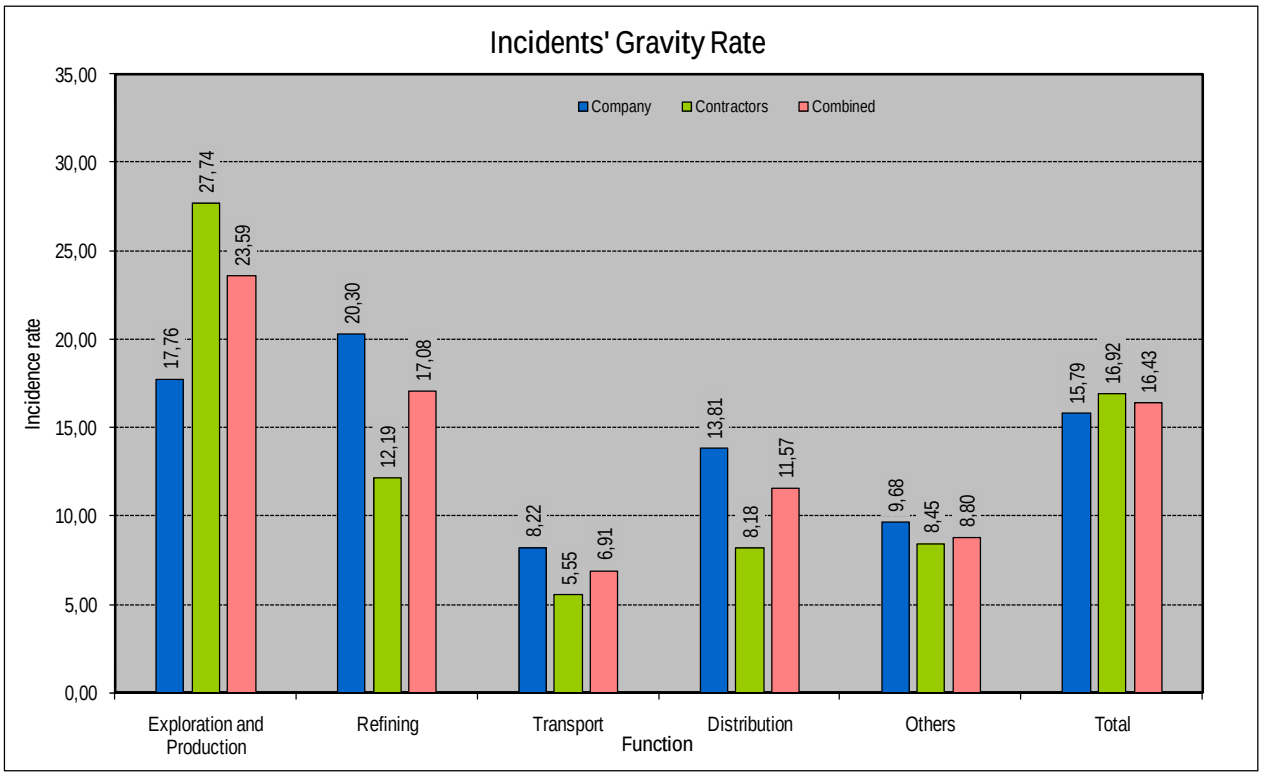

Figure 2.3

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

2.4.1 Company data

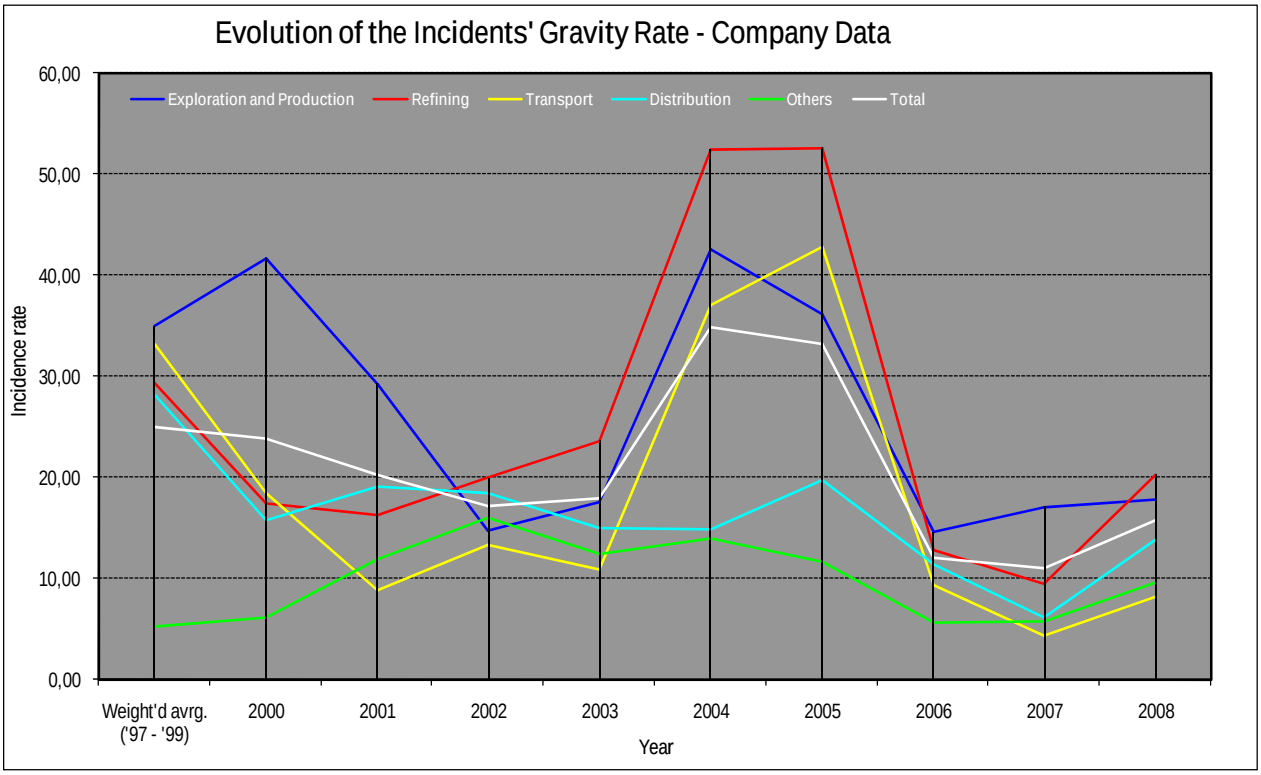

Figure 2.4.1

2.4.2. Contractors data

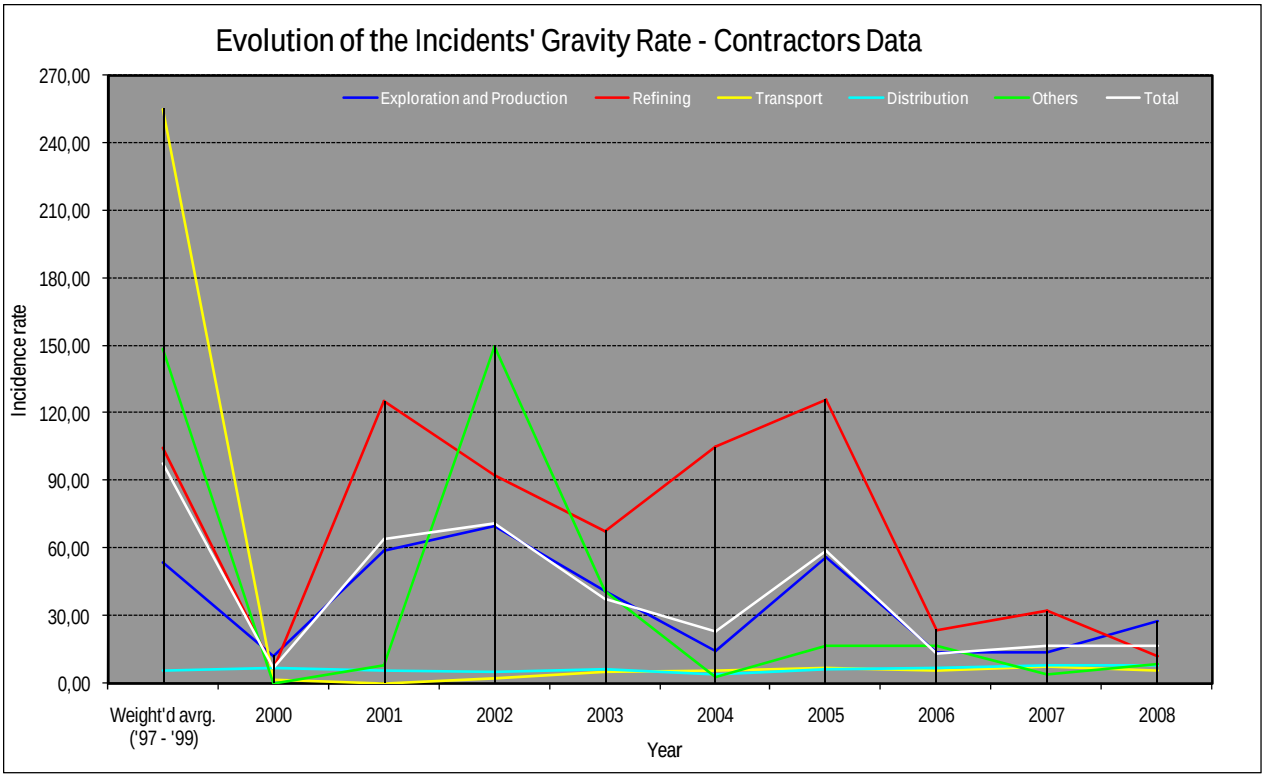

Figure 2.4.2

2.4.3 Combined data

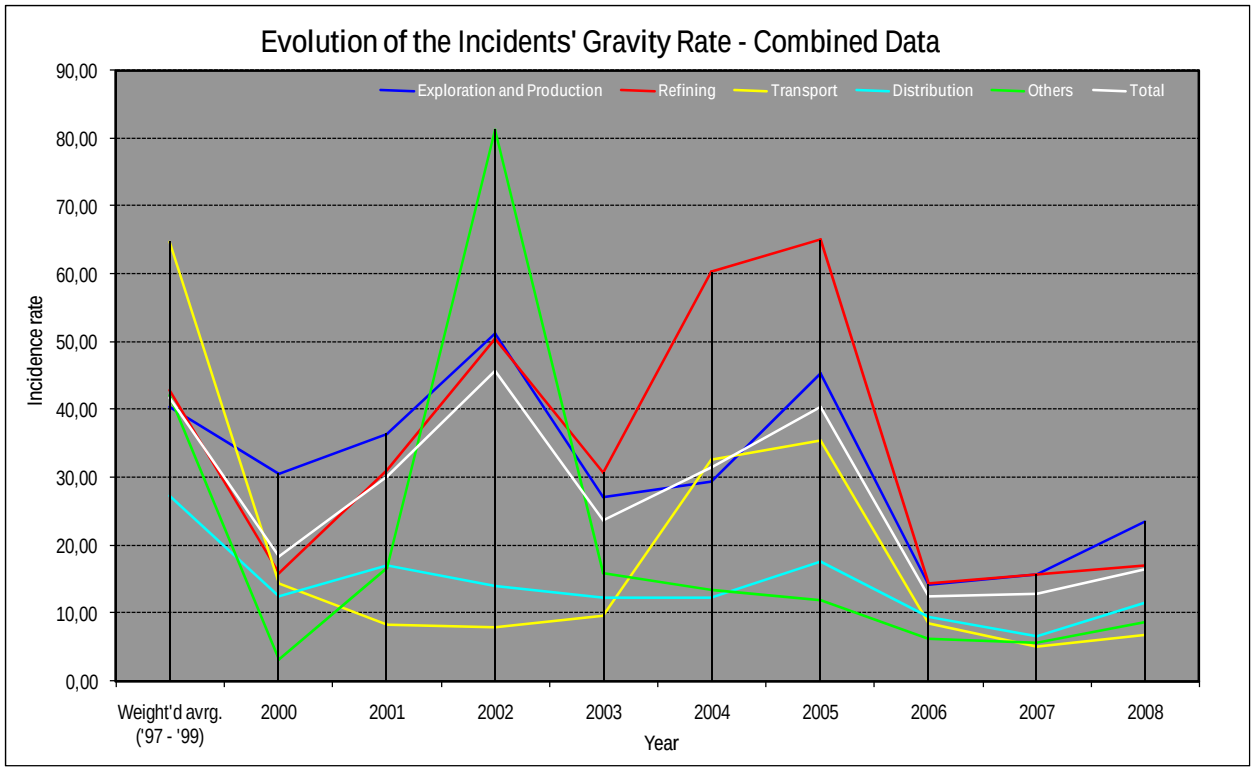

Figure 2.4.3

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 term 1997/2008. The tabulated results corresponding to the twelve 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:

	Number of companies that reported data	
Year	For this indicator	For this report
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

2.5 Incidents' frequency rate with lost workdays (per functional unit); data of year 2008

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

$$\text{Incidents' frequency rate with lost workdays} = \frac{\text{Lost workdays cases} \times 200}{\text{Worked hours in thousands}}$$

(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	11	876,519	705,162
Refining	13	322,201	306,462
Transport	10	119,553	117,611
Distribution	11	102,888	100,140
Others	11	505,941	474,931
Total	16	1,927,101	1,707,744

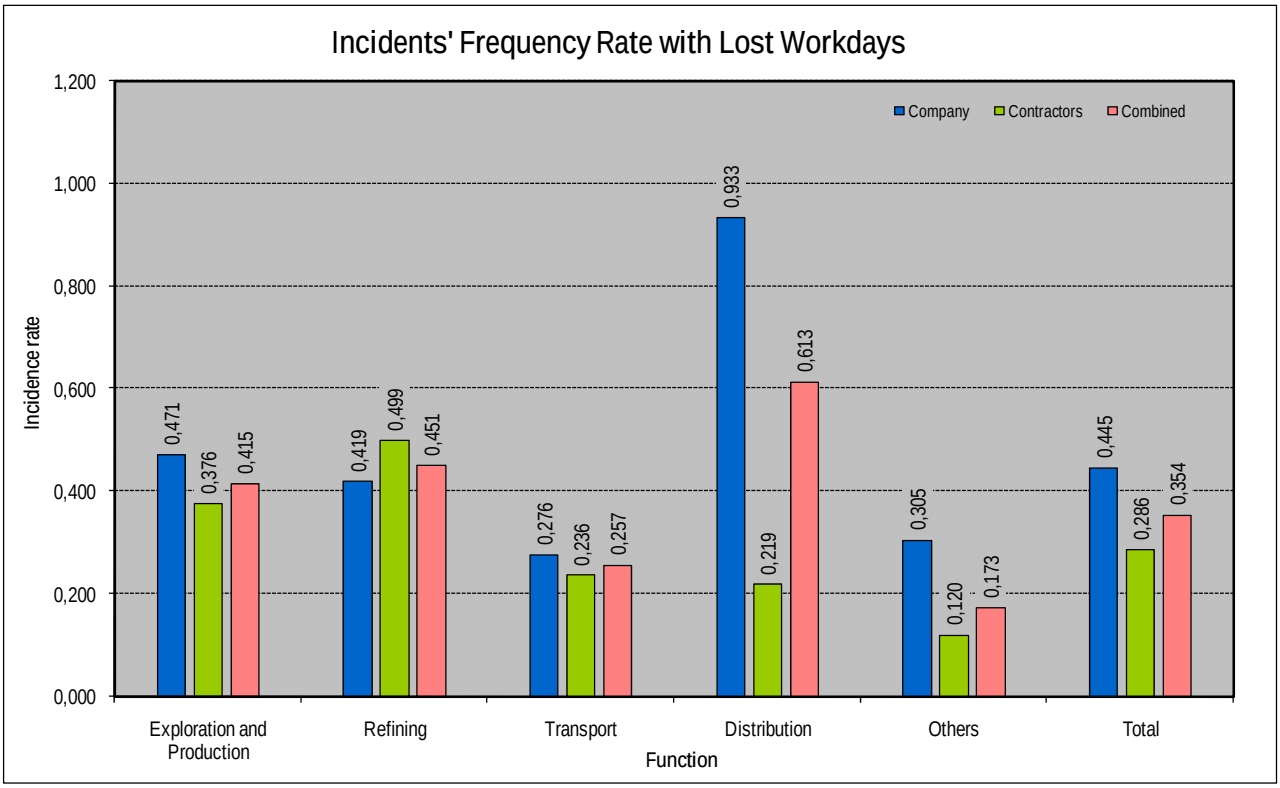

Figure 2.5

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

2.6.1 Company data

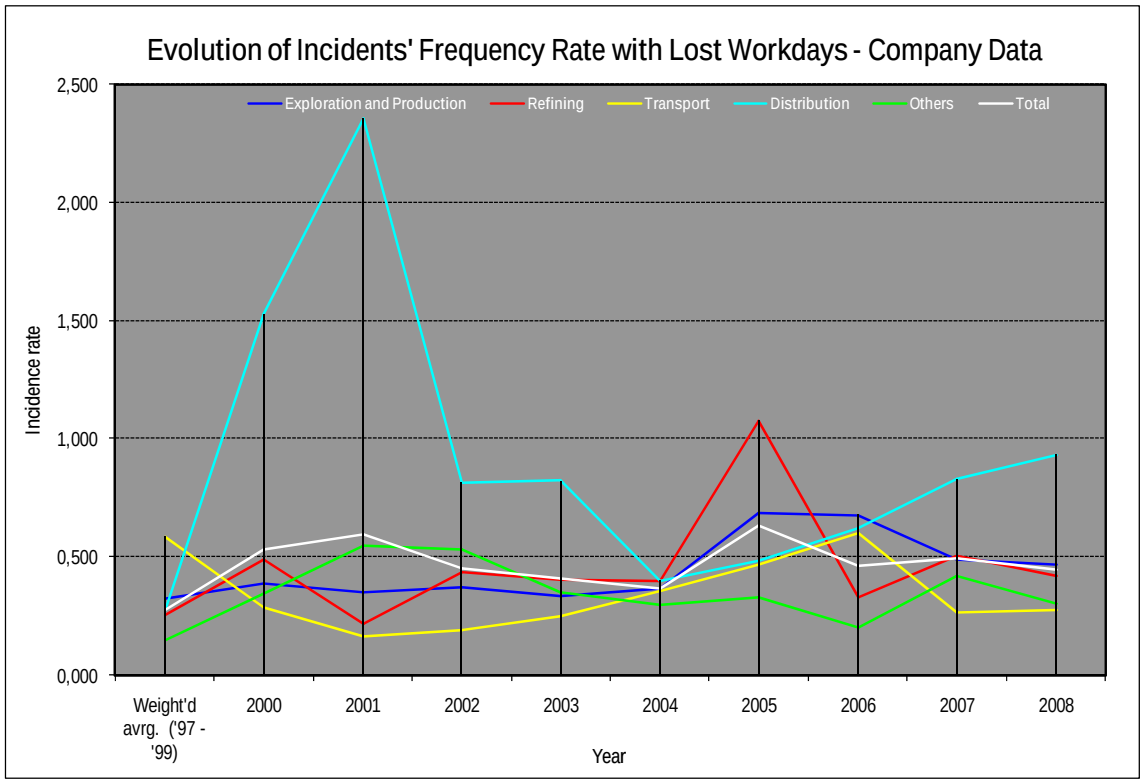

Figure 2.6.1

2.6.2 Contractors data

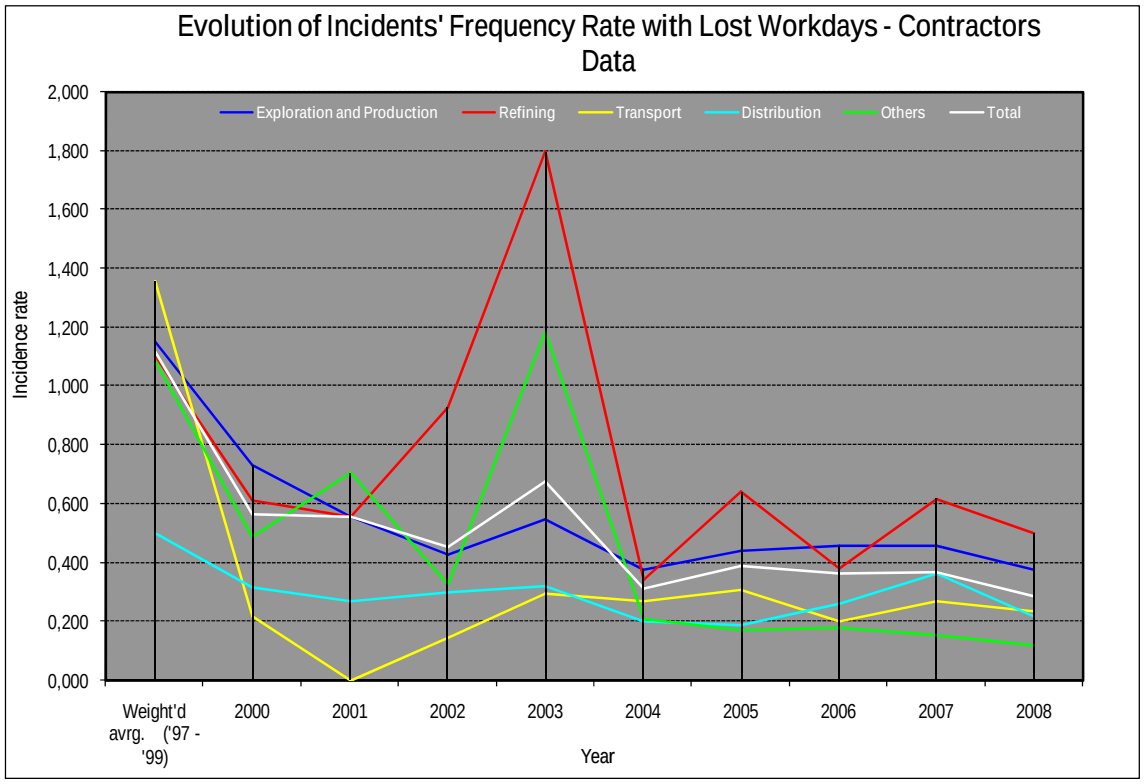

Figure 2.6.2

2.6.3 Combined data

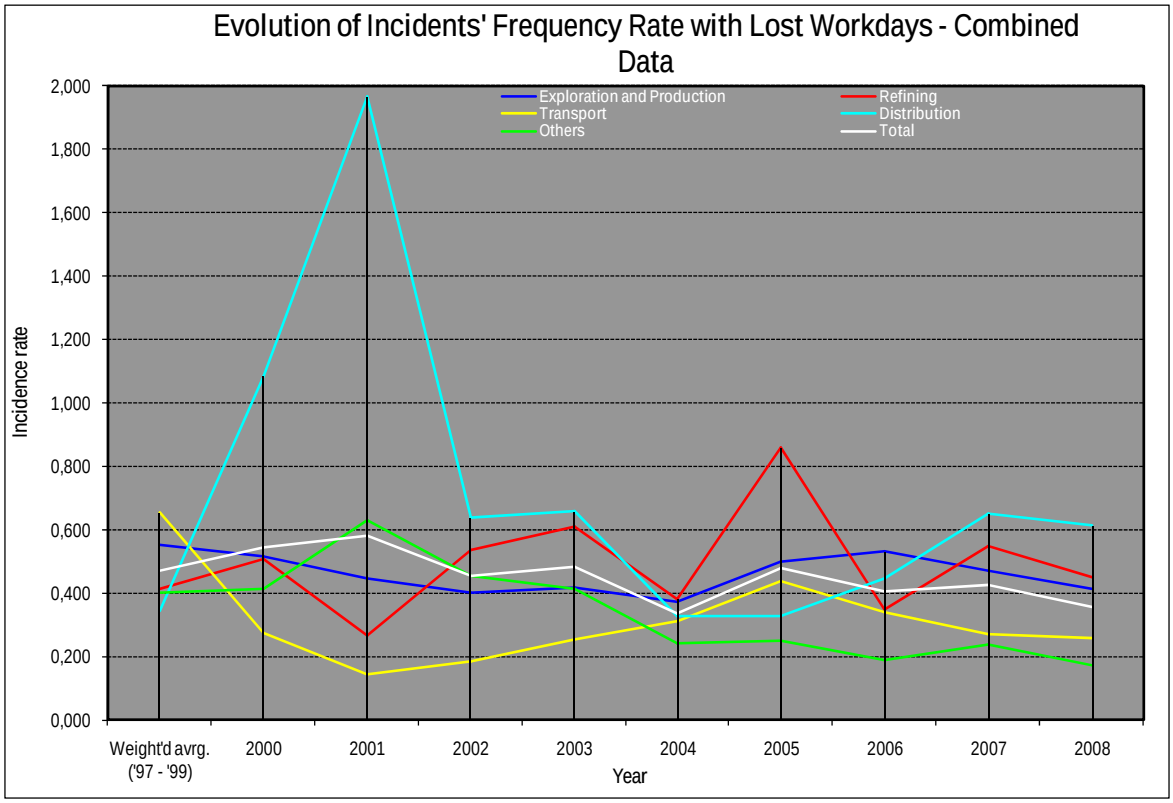

Figure 2.6.3

Figures 2.6.1 to 2.6.3 represent the results of the incidents' frequency rate with lost workdays for term 1997/2008 for the company's workers, contractors and combined, respectively. The correspondent tabulated results are 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:

	Number of companies that reported data	
Year	For this indicator	For this report
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

2.7 Fatal incidents' rate (per functional unit); data of year 2008

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

Fatal incidents' rate = Number of fatalities x 200
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	11	876,519	876,519
Refining	13	322,201	322,201
Transport	10	119,553	119,553
Distribution	11	102,888	100,356
Others	12	505,941	505,941
Total	16	1,927,101	1,924,569

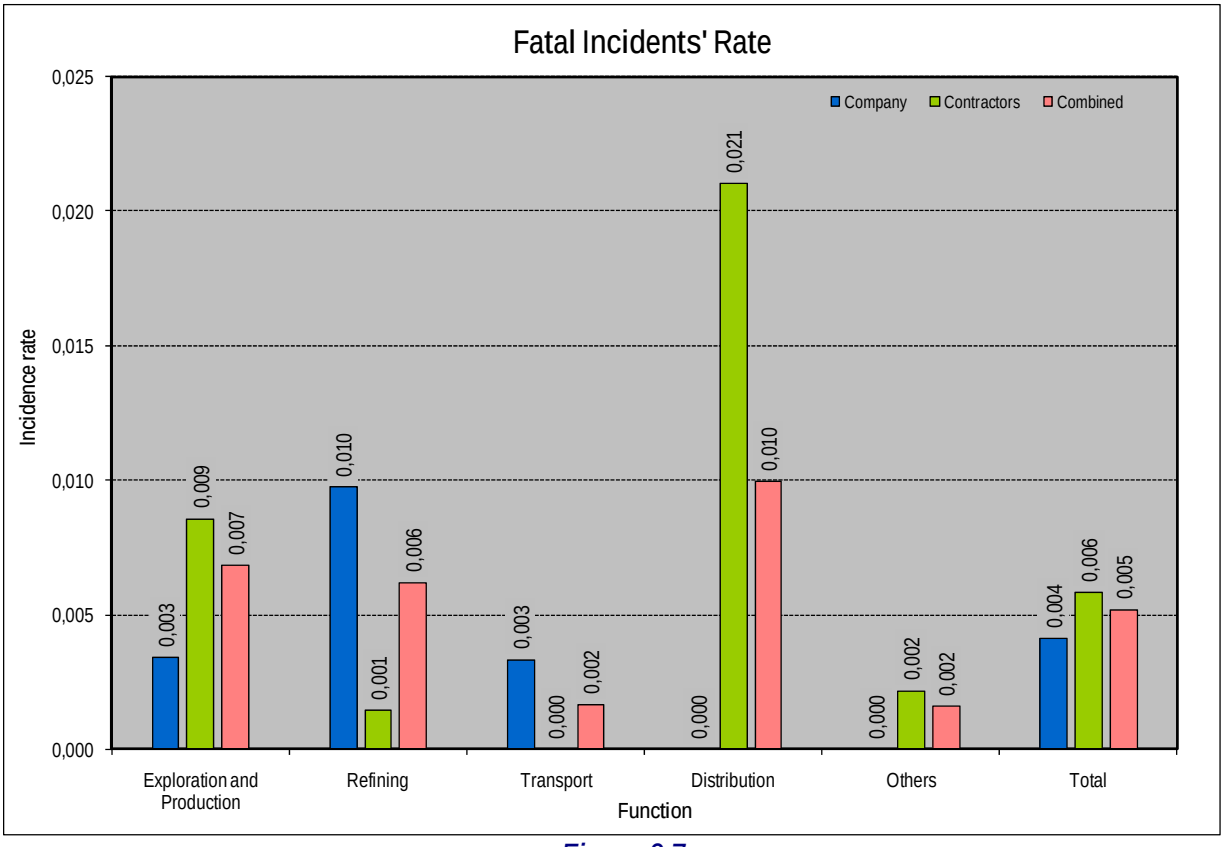

Figure 2.7

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

2.8.1 Company data

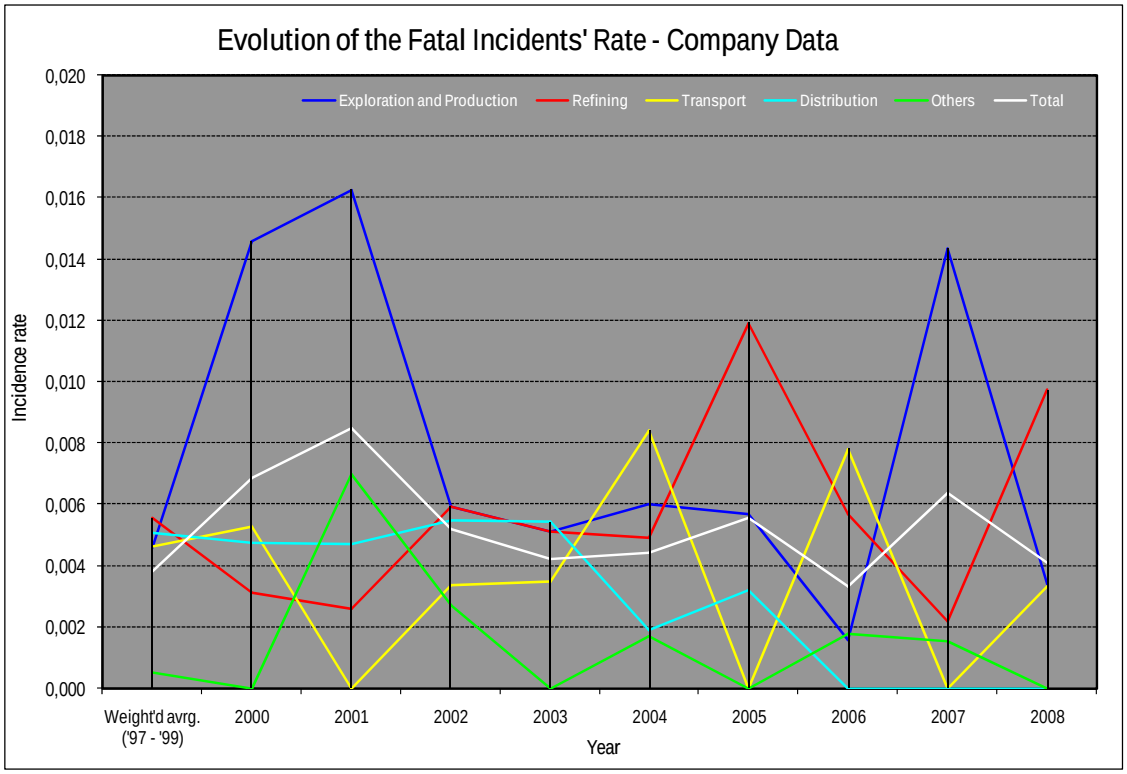

Figure 2.8.1

2.8.2 Contractors data

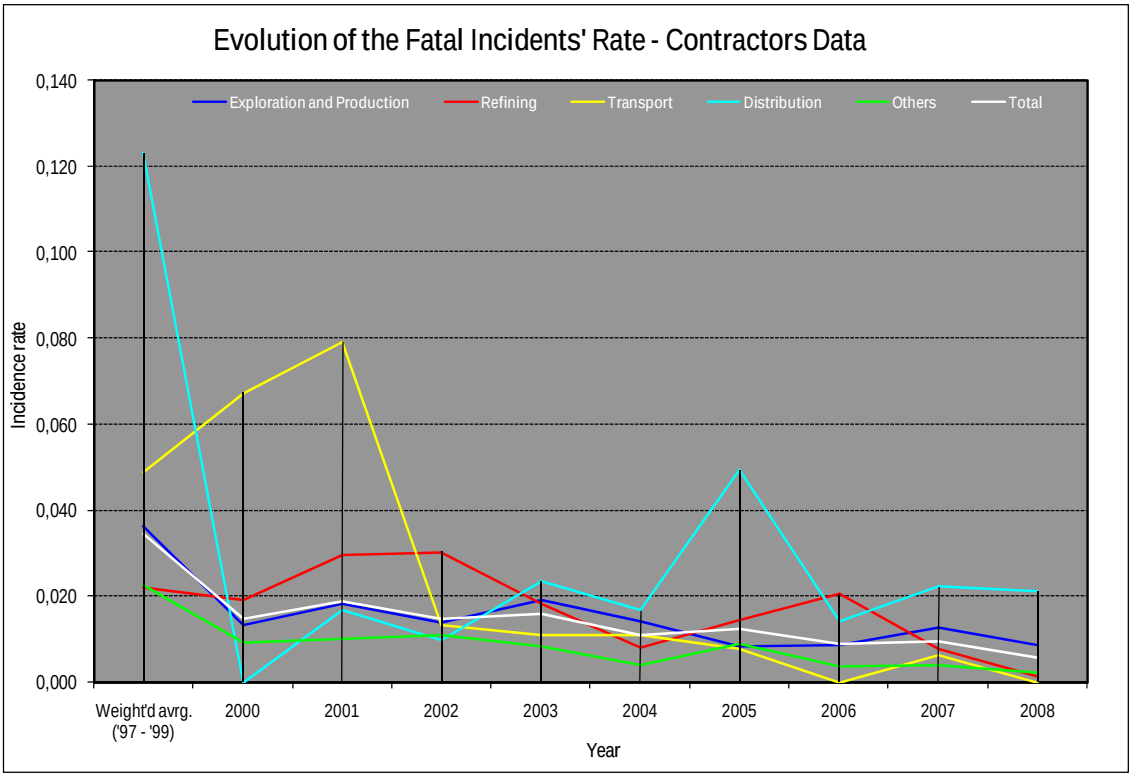

Figure 2.8.2

2.8.3 Combined data

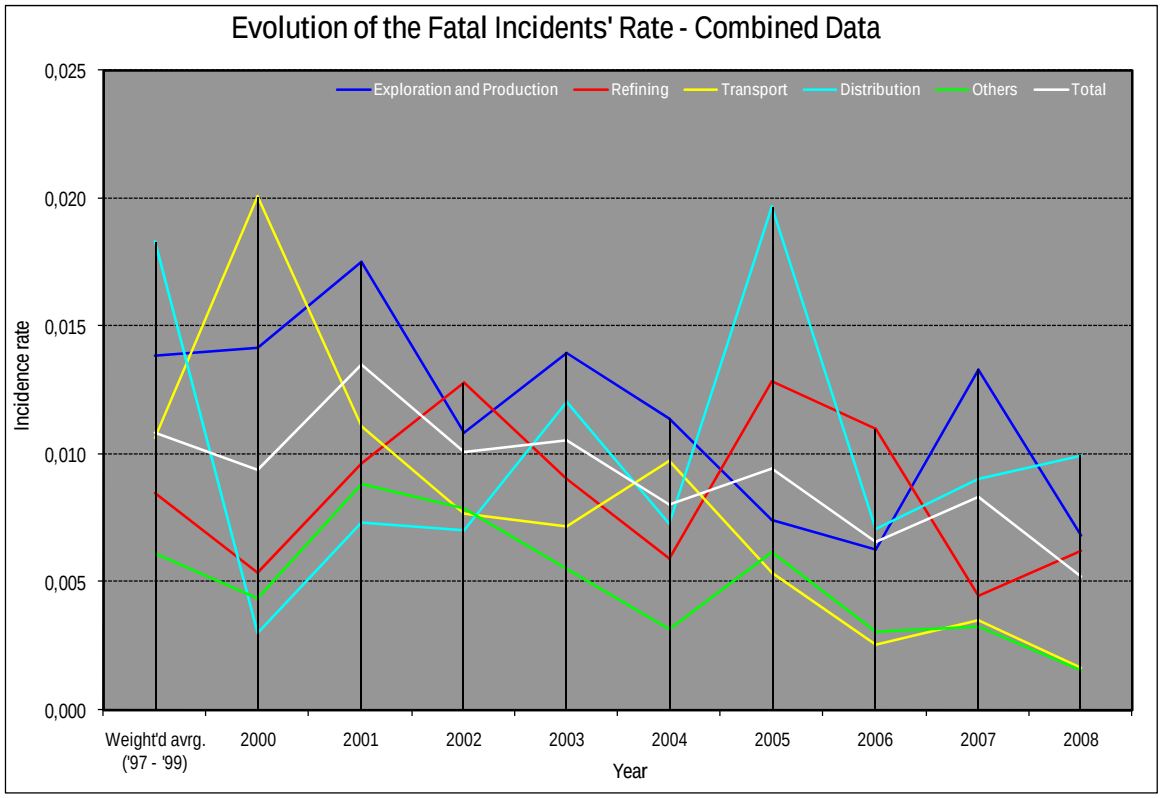

Figure 2.8.3

Figures 2.8.1 to 2.8.3 represent the fatal incidents' rate for term 1997/2008 correspondent to the company's workers, contractors and combined, respectively. The correspondent tabulated results are 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:

	Number of companies that reported data	
Year	For this indicator	For this report
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

The table below shows the OGP[4] fatal incidents' rate reported in its safety performance indicators Report Nº 419 for year 2008, and it is compared to the corresponding ARPEL data:

		Category		
"Exploration and Production"		Company	Contractors	Combined
Onshore and offshore	ARPEL	0.003	0.009	0.007
	OGP	0.006	0.006	0.006

[4] 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 200,000 hours worked"(ARPEL units).

2.9 Comparative incidence rates (per Company); data for year 2008

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

2.9.1 Total incidents' rate per company

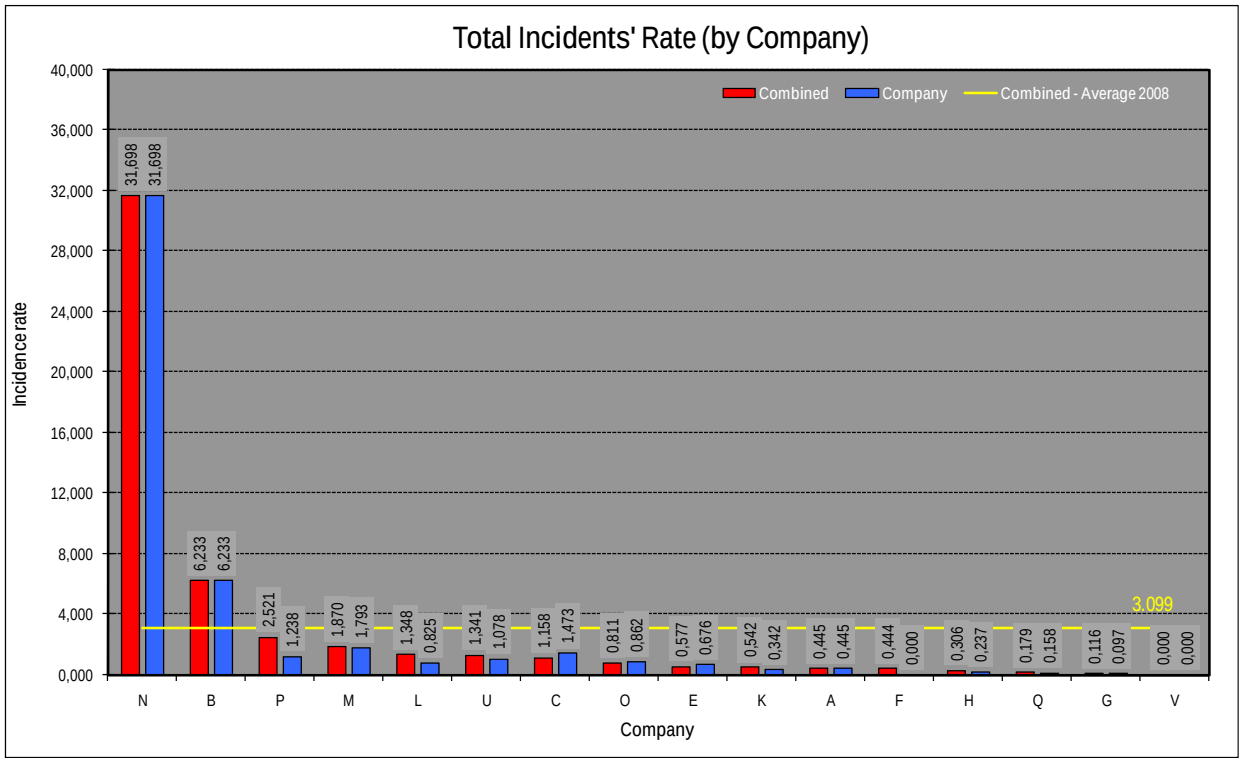

Figure 2.9.1

2.9.2 Incidents' gravity rate per company

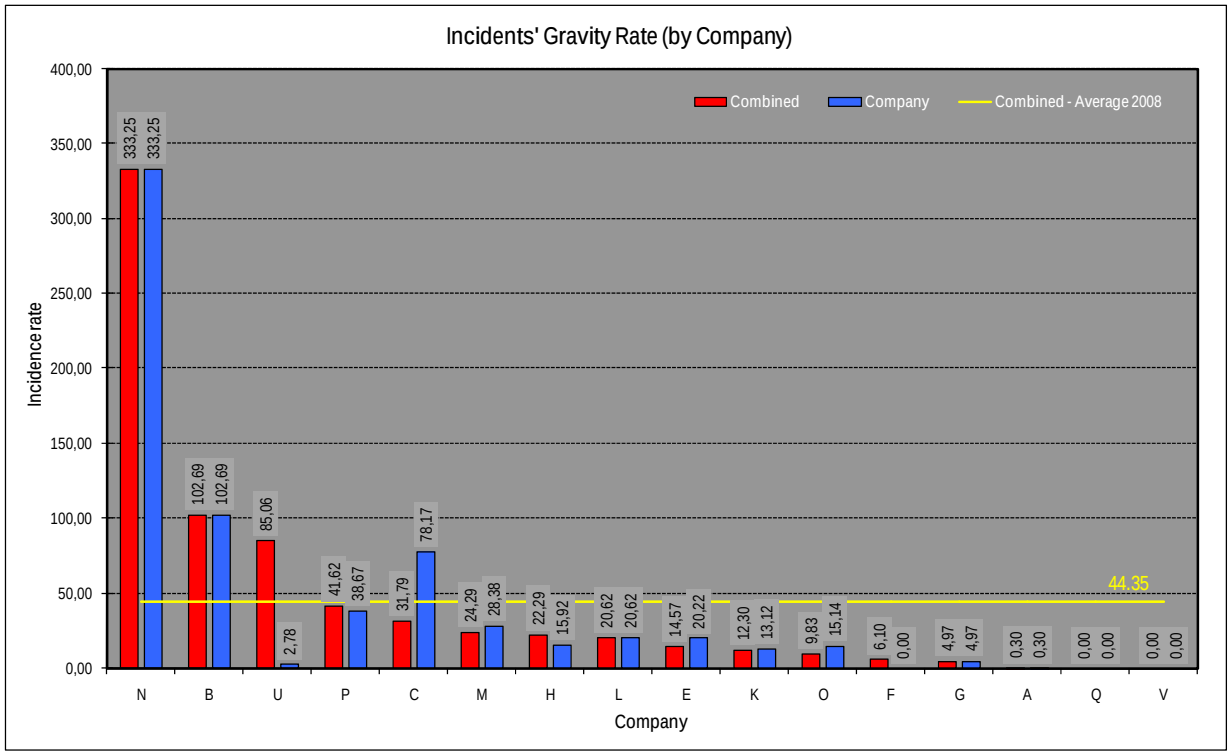

Figure 2.9.2

2.9.3 Incidents' frequency rate with lost workdays per company

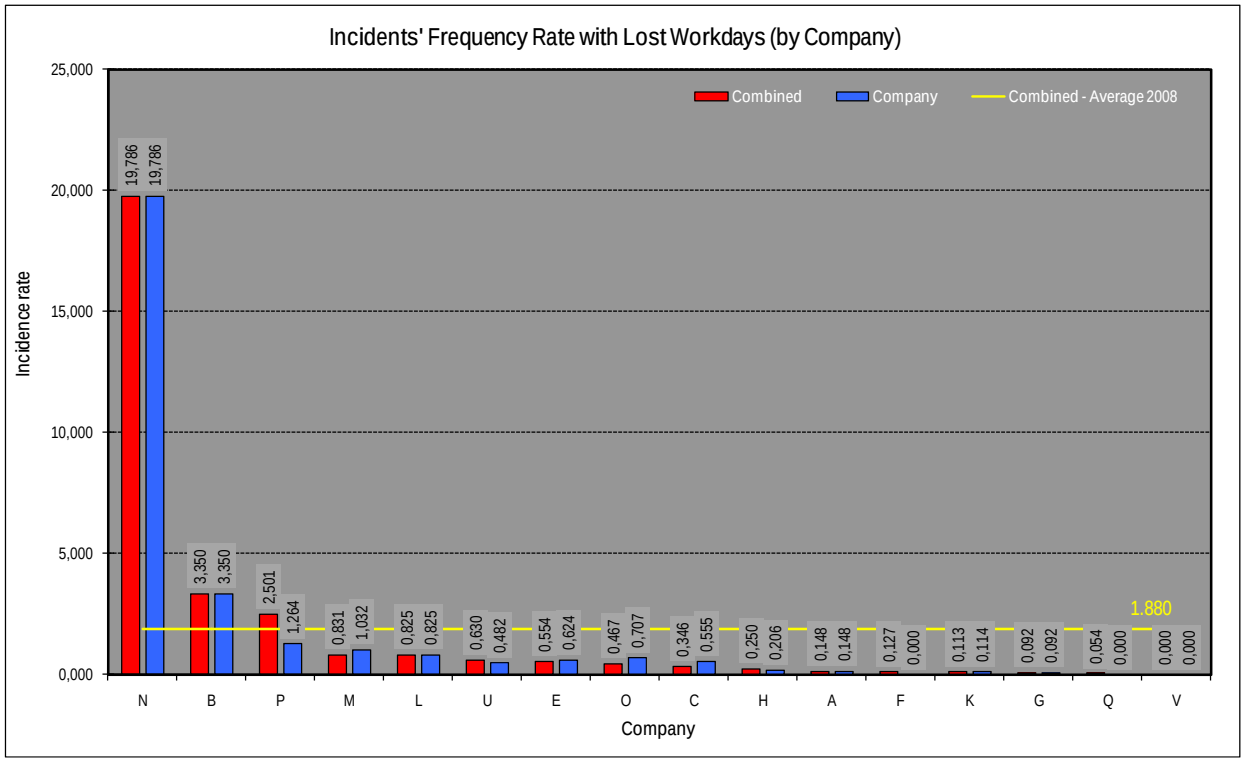

Figure 2.9.3

2.9.4 Fatal incidents' rate per company

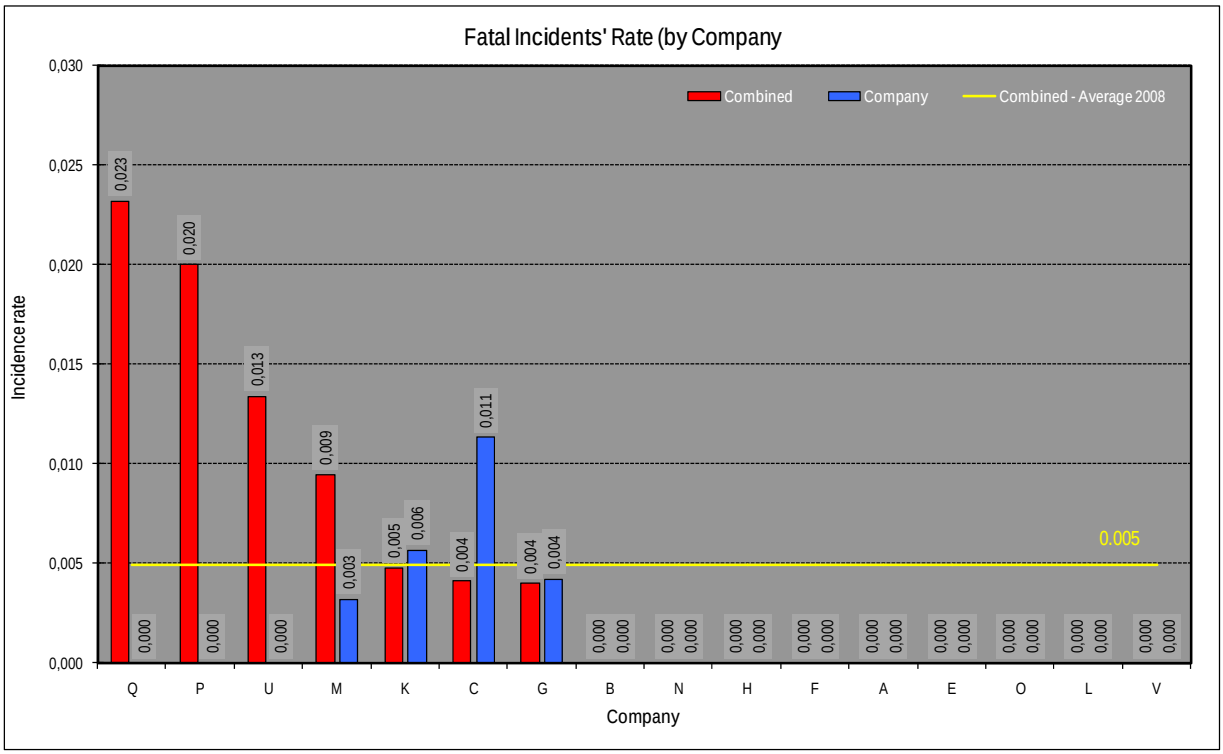

Figure 2.9.4

3.0 REACTIVE INDICATORS – offshore activities

The previous chapter presented the results of the four reactive indicators for all the activities from those ARPEL's 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	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Nº of companies	0	2	1	0	0	4	4	4	5	5	6	5

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

3.1 Total offshore incidents' rate

Year	1998	1999	2002	2003	2004	2005	2006	2007	2008
Number of companies that reported data related to this indicator	2	1	4	4	4	5	5	6	6
Total reported man-hours (company and contractors) - in thousands.	42,960	33,376	100,880	101,741	70,649	101,311	149,545	95,001	82,135
Man-hours used for the calculation of this indicator (company and contractors) – in thousands	42,960	33,376	100,880	101,725	70,649	101,311	149,545	95,001	82,135

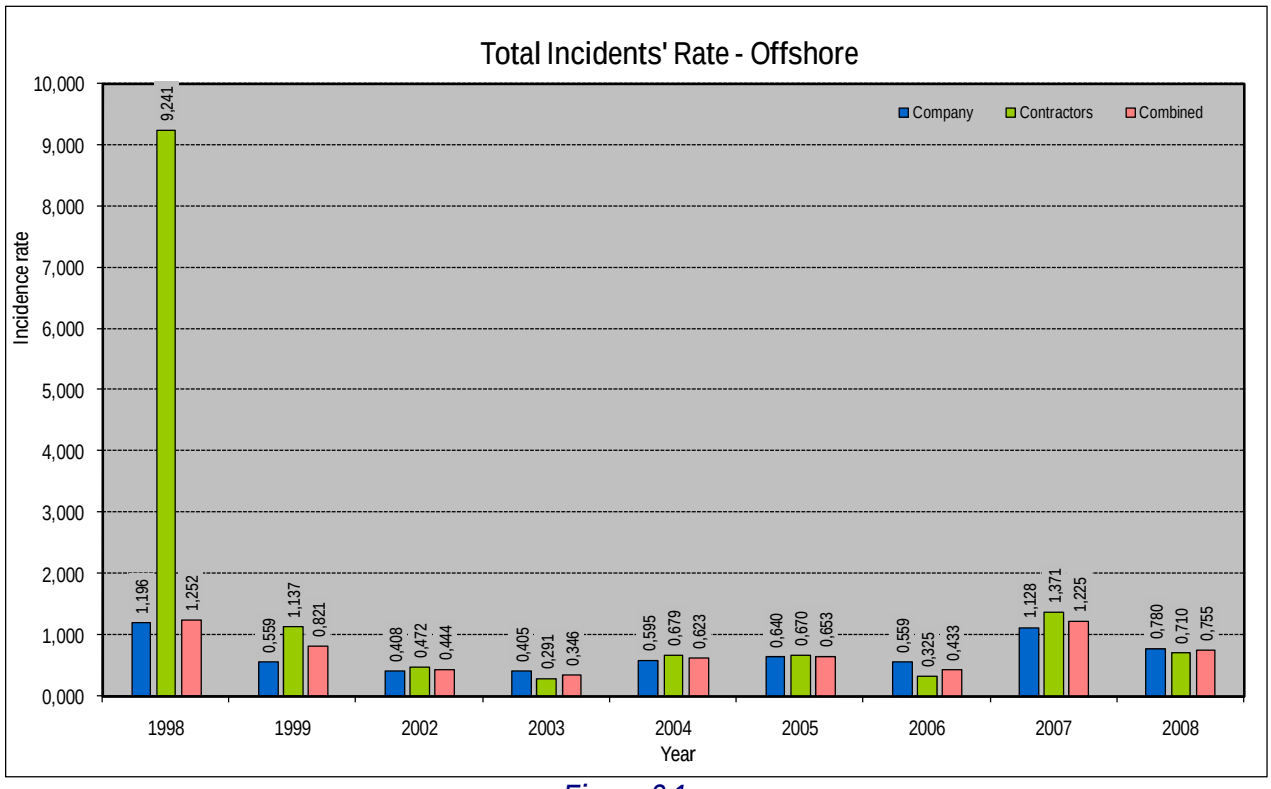

Figure 3.1

3.2 Offshore incidents' gravity rate

Year	1998	1999	2002	2003	2004	2005	2006	2007	2008
Number of companies that reported data related to this indicator	1	1	2	4	4	5	5	6	5
Total reported man-hours (company and contractors) - in thousands.	42,960	33,376	100,880	101,741	70,649	101,311	149,545	95,001	82,135
Man-hours used for the calculation of this indicator (company and contractors) – in thousands	40,377	33,376	3,450	50,785	49,084	76,883	149,545	76,477	63,746

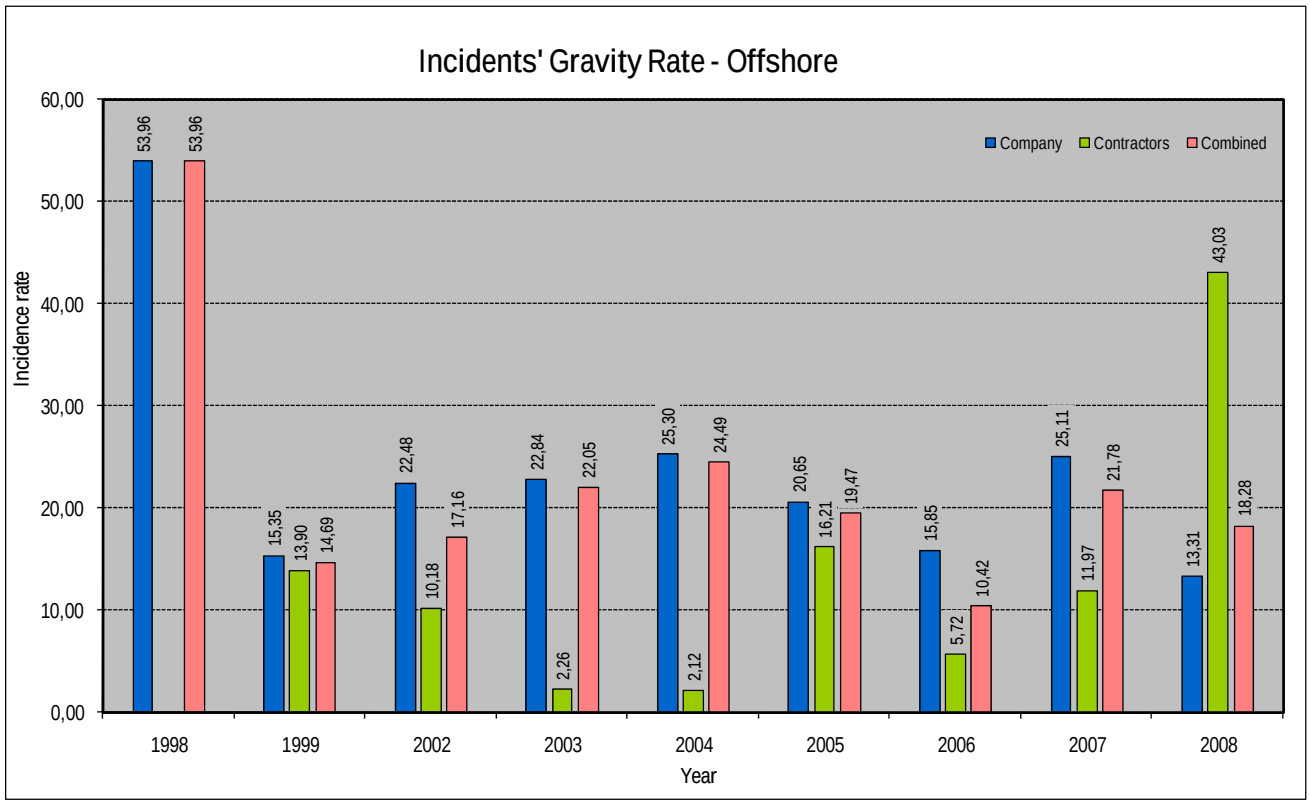

Figure 3.2

3.3 Incidents' frequency rate with lost workdays offshore

Year	1998	1999	2002	2003	2004	2005	2006	2007	2008
Number of companies that reported data related to this indicator	2	1	3	4	4	4	5	6	5
Total reported man-hours (company and contractors) - in thousands.	42,960	33,376	100,880	101,741	70,649	101,311	149,545	95,001	82,135
Man-hours used for the calculation of this indicator (company and contractors) – in thousands	42,960	33,376	100,877	50,785	70,649	32,549	149,545	76,477	63,746

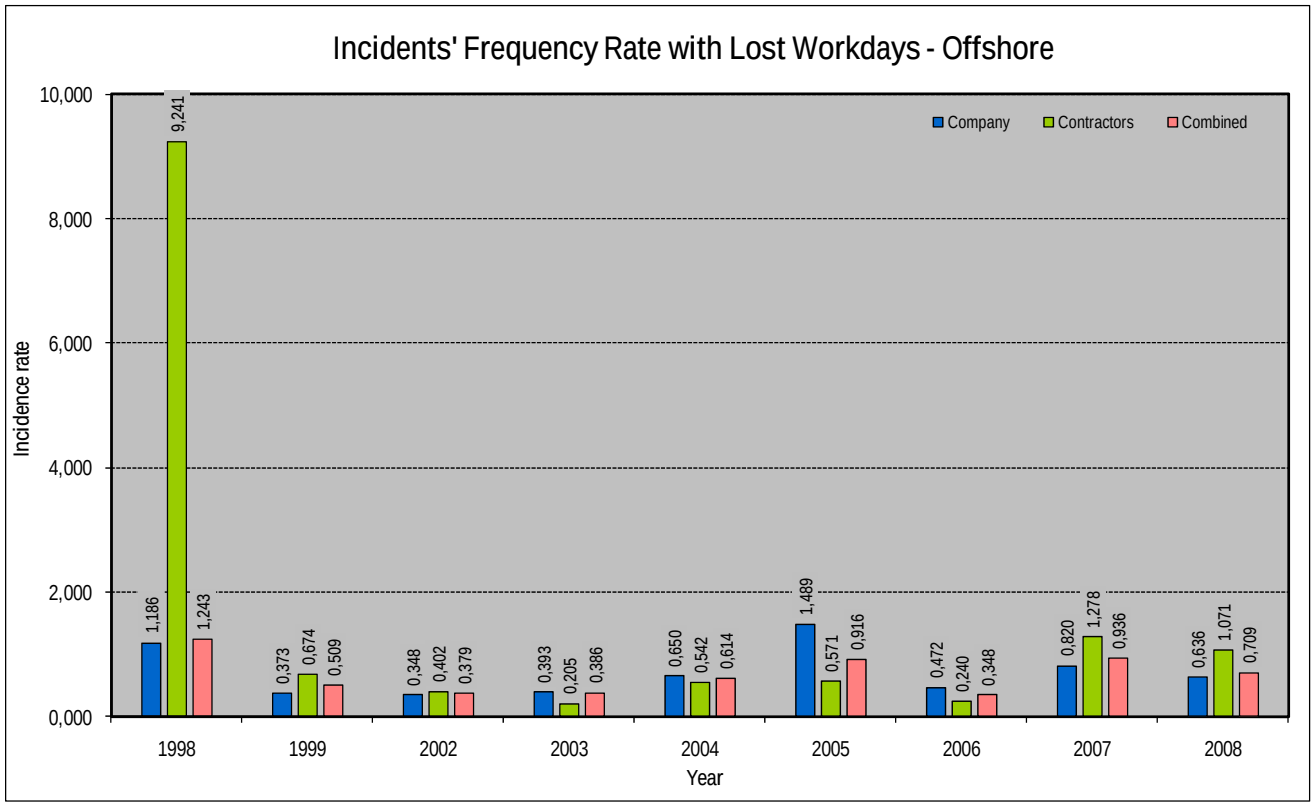

Figure 3.3

3.4 Fatal incidents' rate offshore

Year	1998	1999	2002	2003	2004	2005	2006	2007	2008
Number of companies that reported data related to this indicator	2	1	3	4	4	5	5	6	5
Total reported man-hours (company and contractors) - in thousands.	42.960	33.376	100.880	101.741	70.649	101.311	149.545	95.001	82.135
Man-hours used for the calculation of this indicator (company and contractors) – in thousands	42.960	15.123	100.877	101.725	70.649	101.311	149.545	95.001	82.135

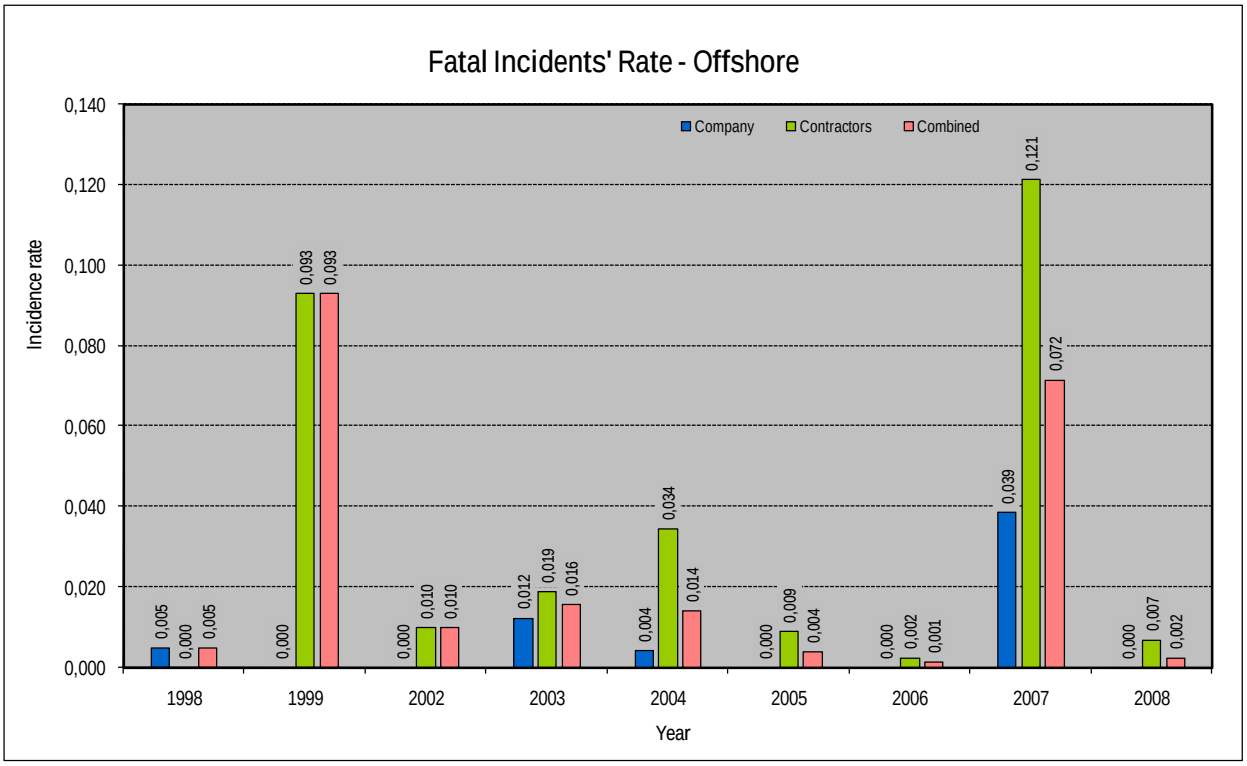

Figure 3.4

Comparing with OGP statistics reported in its Report Nº 419 on safety performance indicators, the fatal incidents' rate for offshore activities in year 2008, for the combination of company workers and contractors of OGP was 0.005[5], whereas the same rate in ARPEL was 0.002 fatalities per 200,000 worked hours.

[5] 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 200,000 hours worked"(ARPEL units).

4.0 FATALITY CAUSES

This chapter reports the various fatality causes in the oil industry corresponding to the companies included in this report for year 2008. For comparative reasons, the results corresponding to the period 2001 – 2007 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 number (absolute and percentage) of fatalities they caused.

4.1 Fatality causes – year 2008

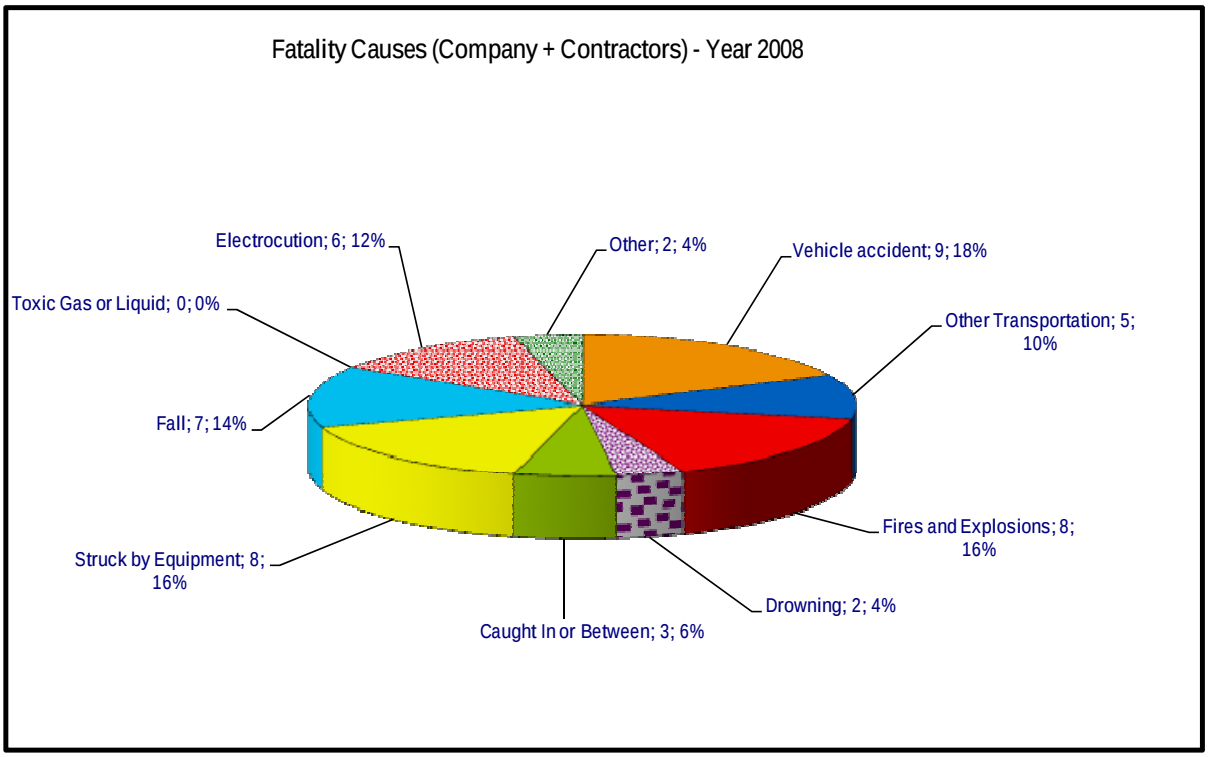

Figure 4.1

4.2 Comparative – fatality causes

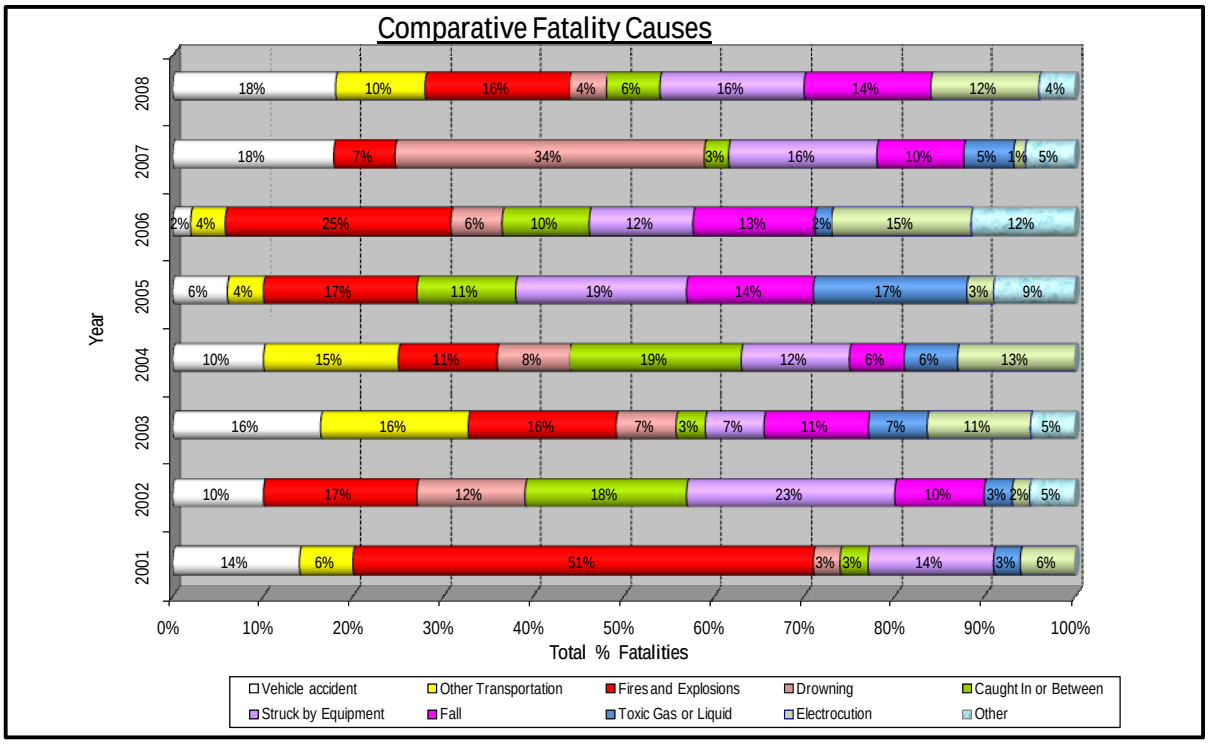

Figure 4.2

Figure 4.1 graphically represents fatality causes according to the absolute and percentage number of fatalities they caused in year 2008.

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 – 2008. The table below shows the total number of fatalities with a reported cause per each year.

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

Figure 4.2 shows that the three causes that in average represented the larger percentage of fatal incidents in the last eight years were “Fires and Explosions" in the first place, “Struck by equipment” in the second place and "Car accidents" in the third place. The average values in period 2001 – 2008 weighted according to the total number of fatalities considered for each year are: 18.0%, 15.0% and 11.8% respectively. The tabulated results corresponding to this chapter's graphs are presented in APPENDIX A.

The table below shows the fatality causes reported by OGP[6] in its safety performance indicators Report Nº 419 for year 2008, and they are compared to those corresponding to ARPEL:

	Function "Exploration & Production" – Combined result – onshore and offshore			
	Total fatalities	Fatality # 1	Fatality # 2	Fatality # 3
ARPEL 2008	28	"Other transports" and "Fires and Explosions" (17.9% each)	"Struck by equipment" and "Fall" (14.3% each)	Electrocution (10.7%)
OGP 2008	103	Car accidents (25.0%)	Struck by (23.0%)	Fires and explosions (18.0%)

[6] 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:

TPO Rate = Number of tasks planned observations cumulative of the year / Average number of workers in the period

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

Year 2008			
Function	Number of companies that reported data related to this indicator	Average reported number of total workers (company)	Average number of workers used for the calculation of this rate (company)
E&P	7	207,022	158,157
Refining	9	102,862	86,582
Transport	6	42,362	12,618
Distribution	6	29,083	13,748
Others	8	65,880	61,018
Total	12	447,208	371,138

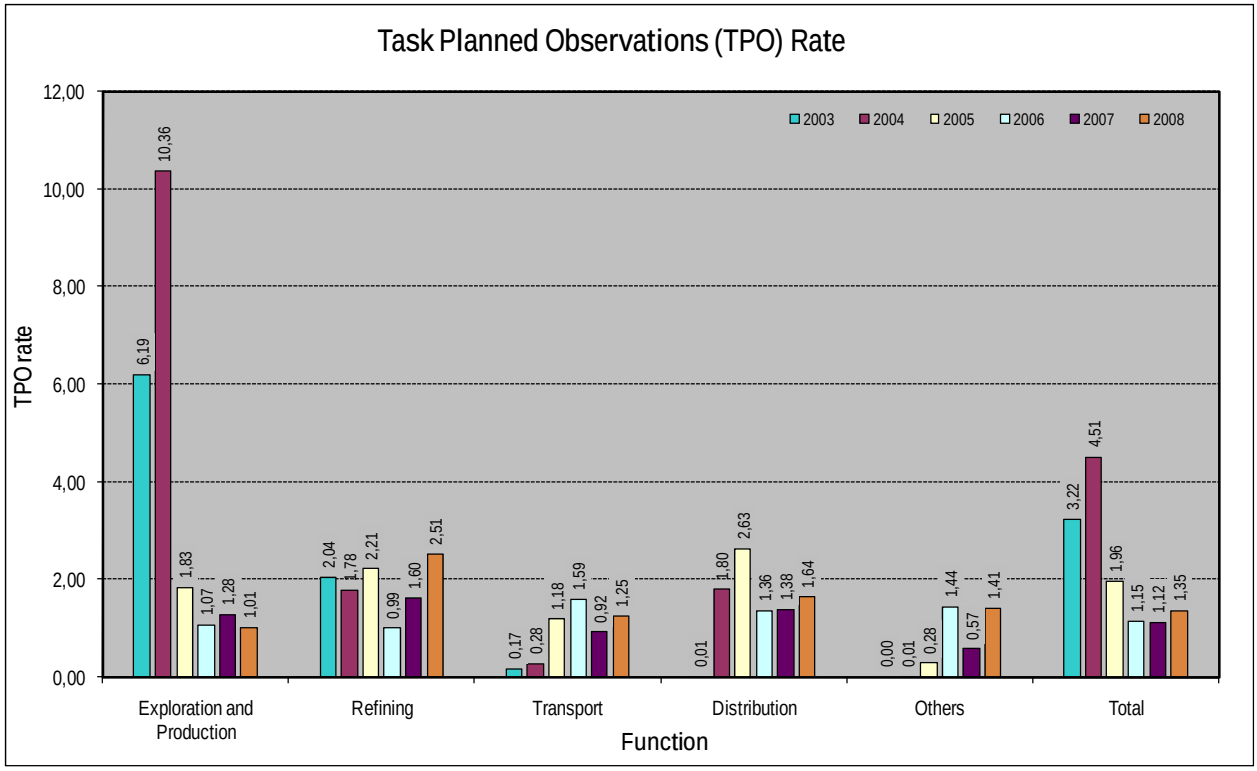

Figure 5.1

5.2 Safety training intensity rate

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

STI Rate = Nº of cumulative hours of safety training of the year x 100
Hours worked in the same period

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

Year 2008			
Function	Number of companies that reported data related to this indicator	Total reported man-hours (company) - in thousands.	Man-hours used for the calculation of this indicator (company) – in thousands
E&P	7	339,589	203,438
Refining	10	195,882	151,549
Transport	6	64,047	8,916
Distribution	6	63,541	19,944
Others	9	139,630	84,014
Total	12	802,689	528,276

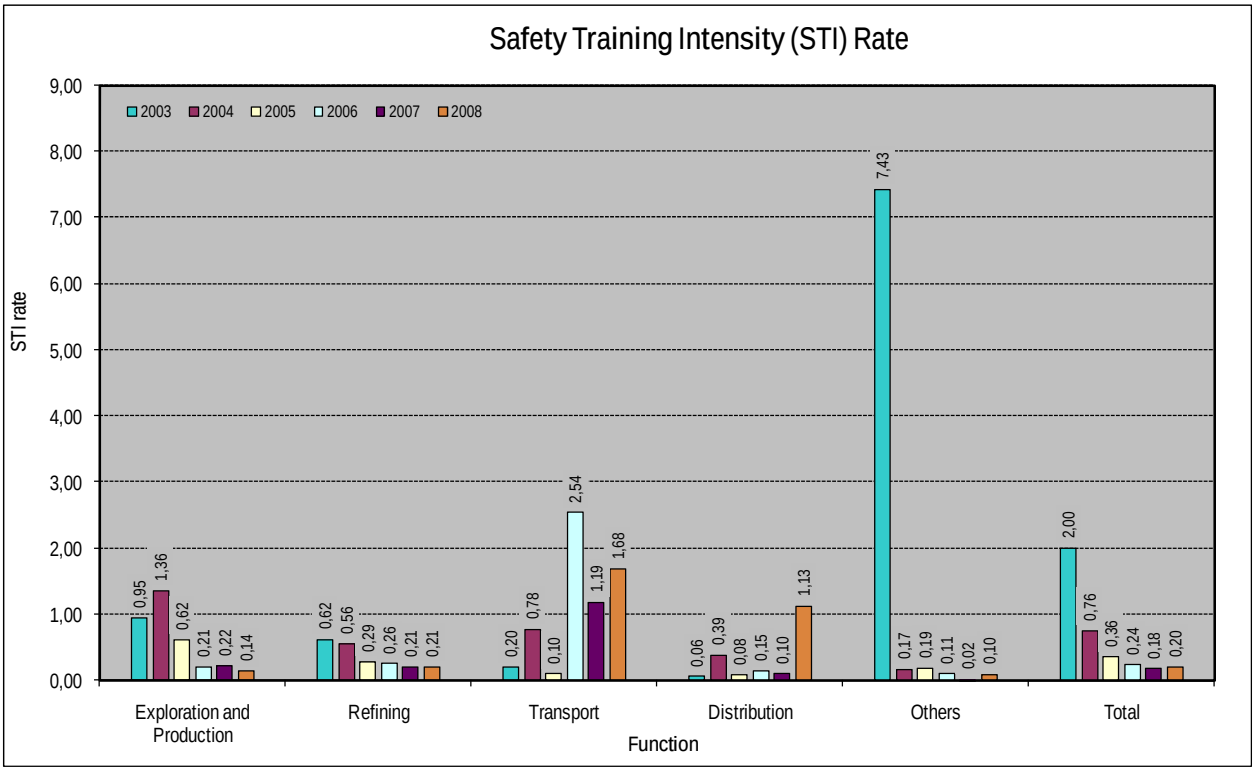

Figure 5.2

Figures 5.1 and 5.2 represent the tasks planned observations rate and safety training intensity rate respectively for years 2003 to 2008, solely for company workers[7]. The correspondent tabulated results are in APPENDIX A.

[7] *One company reported the data for the calculation of the safety proactive indicators for the combined result (company and contractors) during years 2003 and 2004. As from 2005, it could only report such information referred only to the company's workers.*

6.0 GLOSSAY 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 200,000 worked hours (see formulae 4 in APPENDIX C).

g) Incidents' frequency rate with lost workdays

The number of lost workday cases per 200,000 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 200,000 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 200,000 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 - 1995". CONCAWE Safety Management. RA 1250, Report Nº 3/96. Brussels. April, 1997. 16 pages.

2. "European Downstream Oil Industry Safety Performance - statistical summary of reported incidents - 1996". CONCAWE Safety Management. RA 1250, Report Nº 4/97. Brussels. December, 1997. 16 pages.

3. "Summary of U.S. Occupational Injuries, Illnesses, and Fatalities in the Petroleum Industry - 1996". American Petroleum Industry. API Publication 2375. Washington, FD, September, 1997. 46 pages.

4. "E&P Industry Safety Performance Accident Data - 1997". The Oil Industry International Exploration & Production Forum. Report Nº 6.72/281. London, October, 1998. 78 pages.

5. "Safety Performance of the Global E&P Industry – 1998". The Oil Industry International Exploration & Production Forum. Report Nº 6.80/295. London, July, 1999. 85 pages.

6. ARPEL User's Manual – Incidents' statistics in the Oil and Gas Industry in Latin America and the Caribbean - 4th edition, 2004. ARPEL. Montevideo. 30 pages.

7. "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

8. "OGP Safety Performance Indicators – 2008 data". Report Nº 419. May, 2009. 132 pages.

8.0 APPENDIX A

8.1 Tabulated results: totals for companies, contractors and combined

The data used to develop the associated graph for each rate analyzed in chapter 2.0 are presented in the tables below, for period 1997/2008.

Table 8.1.1: Total incidents' rate per functional unit (ARPEL 1997-2008)

Function	Data Category	ARPEL 1997	ARPEL 1998	ARPEL 1999	*ARPEL Weighted average (1997-1999)*	ARPEL 2000	ARPEL 2001	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008
E&P	Compañías	3,966	1,554	0,291	*0,784*	0,233	0,575	0,453	0,348	0,440	0,556	0,573	0,733	0,730
	Contratistas	5,705	4,878	2,173	*3,745*	0,798	1,076	0,564	0,519	0,614	0,812	0,789	0,818	0,827
	Combinadas	5,058	2,701	0,695	*1,579*	0,446	0,954	0,520	0,456	0,556	0,725	0,718	0,789	0,794
Refining	Compañías	3,962	1,001	0,459	*0,790*	2,109	0,867	0,533	0,400	0,563	0,744	0,532	0,764	0,800
	Contratistas	5,514	4,408	3,039	*3,973*	0,974	1,671	0,566	0,540	0,705	1,793	0,948	1,123	1,224
	Combinadas	4,645	1,559	0,758	*1,313*	1,950	1,274	0,543	0,442	0,607	1,117	0,680	0,914	0,981
Transport	Compañías	3,480	2,184	0,432	*0,989*	0,264	0,106	0,357	0,295	0,438	1,008	1,149	0,429	0,476
	Contratistas	4,211	2,296	1,479	*2,291*	0,219	1,243	0,326	0,245	0,351	1,608	1,486	0,852	0,579
	Combinadas	3,777	2,207	0,517	*1,223*	0,253	0,195	0,344	0,271	0,391	1,434	1,375	0,664	0,527
Distribution	Compañías	3,797	1,099	0,136	*0,565*	2,003	3,171	0,928	0,873	0,523	0,405	0,932	0,997	0,940
	Contratistas	n/a	1,781	0,438	*0,972*	0,497	0,373	0,441	0,398	0,288	0,453	0,632	0,506	0,538
	Combinadas	3,797	1,200	0,175	*0,758*	1,454	2,259	0,755	0,693	0,438	0,422	0,783	0,797	0,754
Others	Compañías	1,303	0,926	0,094	*0,344*	0,206	1,376	0,688	0,402	0,357	0,376	0,447	0,581	0,740
	Contratistas	6,459	4,271	2,063	*3,652*	0,009	0,555	0,375	0,315	0,210	0,685	0,792	0,553	0,506
	Combinadas	4,210	2,509	0,348	*1,221*	0,112	0,864	0,488	0,344	0,264	0,587	0,674	0,561	0,569
Total	Compañías	3,439	1,288	0,265	*0,677*	1,064	1,064	0,557	0,433	0,470	0,562	0,574	0,716	0,745
	Contratistas	5,751	4,335	2,200	*3,595*	0,542	1,092	0,497	0,439	0,476	0,908	0,846	0,768	0,750
	Combinadas	4,589	2,246	0,578	*1,349*	0,899	1,083	0,526	0,437	0,474	0,762	0,734	0,748	0,748

Note: For the year 2006, one of the companies reported the functions "Transport" and "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.

Table 8.1.2: Incidents' gravity rate per functional unit (ARPEL 1997-2008)

Function	Data Category	ARPEL 1997	ARPEL 1998	ARPEL 1999	*ARPEL Weighted average (1997-1999)*	ARPEL 2000	ARPEL 2001	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008
E&P	Compañías	43,98	106,65	13,44	*34,94*	41,69	29,28	14,73	17,53	42,55	36,18	14,57	17,05	17,76
	Contratistas	96,35	35,16	47,90	*53,67*	12,21	58,80	69,87	41,28	14,60	56,02	13,85	14,12	27,74
	Combinadas	76,86	82,00	20,84	*40,52*	30,57	36,48	51,31	27,19	29,46	45,31	14,15	15,80	23,59
Refining	Compañías	29,16	47,55	24,13	*29,37*	17,46	16,30	19,94	23,63	52,44	52,60	12,82	9,47	20,30
	Contratistas	63,32	190,14	65,84	*104,71*	6,33	125,29	92,68	67,85	105,02	126,19	23,77	32,17	12,19
	Combinadas	44,19	81,86	28,96	*42,83*	15,90	31,21	50,46	30,79	60,29	65,08	14,41	15,75	17,08
Transport	Compañías	139,86	70,19	13,42	*33,18*	18,53	8,81	13,29	10,89	37,07	42,82	9,38	4,30	8,22
	Contratistas	175,03	328,86	240,20	*255,11*	1,63	0,00	2,04	5,23	5,90	6,79	5,54	7,80	5,55
	Combinadas	154,15	122,76	31,81	*64,76*	14,49	8,36	7,89	9,61	32,68	35,45	8,49	5,20	6,91
Distribution	Compañías	43,74	69,64	14,99	*28,27*	15,74	19,07	18,41	14,96	14,90	19,69	11,36	6,10	13,81
	Contratistas	n/a	13,32	1,26	*6,05*	6,71	5,65	5,28	6,29	3,91	6,16	6,92	8,17	8,18
	Combinadas	43,74	61,29	13,24	*27,42*	12,45	17,17	14,02	12,35	12,42	17,59	9,49	6,66	11,57
Others	Compañías	12,16	16,53	1,45	*5,28*	6,15	11,95	16,01	12,47	14,02	11,69	5,63	5,82	9,68
	Contratistas	143,52	176,43	132,04	*148,43*	0,00	8,06	149,93	41,28	2,76	16,68	16,90	3,83	8,45
	Combinadas	86,21	92,19	18,28	*42,07*	3,21	16,80	81,27	16,04	13,41	11,94	6,20	5,61	8,80
Total	Compañías	41,70	66,13	11,69	*25,00*	23,84	20,28	17,12	17,91	34,82	33,20	12,06	10,99	15,79
	Contratistas	103,74	128,31	74,91	*97,67*	6,99	64,03	71,28	37,65	23,04	59,09	13,05	16,71	16,92
	Combinadas	72,56	85,68	21,92	*41,69*	18,51	30,19	45,77	23,66	31,48	40,40	12,47	12,82	16,43

Note 1: ARPEL includes weekends and holidays in the definition of the number of days away from work.

Note 2: For the year 2006, one of the companies reported the functions "Transport" and "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.

Table 8.1.3: Incidents' frequency rate with lost workdays per functional unit (ARPEL 1997-2008)

Function	Data Category	ARPEL 1997	ARPEL 1998	ARPEL 1999	*ARPEL Weighted average (1997-1999)*	ARPEL 2000	ARPEL 2001	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008
E&P	Compañías	0,686	0,849	0,143	*0,325*	0,387	0,351	0,372	0,335	0,366	0,689	0,677	0,489	0,471
	Contratistas	1,575	1,398	0,814	*1,153*	0,731	0,556	0,427	0,549	0,379	0,442	0,458	0,458	0,376
	Combinadas	1,244	1,038	0,287	*0,554*	0,517	0,448	0,402	0,419	0,374	0,499	0,530	0,471	0,415
Refining	Compañías	0,905	0,358	0,174	*0,258*	0,489	0,218	0,437	0,406	0,400	1,079	0,331	0,504	0,419
	Contratistas	1,682	1,366	0,685	*1,102*	0,611	0,558	0,928	1,796	0,341	0,641	0,379	0,617	0,499
	Combinadas	1,247	0,601	0,233	*0,415*	0,506	0,267	0,536	0,608	0,381	0,858	0,348	0,549	0,451
Transport	Compañías	1,723	1,402	0,254	*0,587*	0,290	0,163	0,193	0,248	0,356	0,470	0,600	0,266	0,276
	Contratistas	2,218	0,804	n/a	*1,355*	0,219	0,000	0,144	0,296	0,271	0,310	0,202	0,271	0,236
	Combinadas	1,924	1,281	0,254	*0,653*	0,273	0,141	0,184	0,255	0,310	0,437	0,339	0,269	0,257
Distribution	Compañías	1,208	0,547	0,116	*0,274*	1,528	2,358	0,818	0,823	0,401	0,484	0,624	0,830	0,933
	Contratistas	n/a	0,925	0,219	*0,500*	0,314	0,268	0,299	0,320	0,201	0,189	0,263	0,362	0,219
	Combinadas	1,208	0,603	0,129	*0,343*	1,086	1,966	0,637	0,658	0,328	0,327	0,445	0,649	0,613
Others	Compañías	0,416	0,419	0,045	*0,146*	0,345	0,551	0,530	0,351	0,300	0,330	0,203	0,420	0,305
	Contratistas	1,742	1,465	0,558	*1,085*	0,486	0,704	0,324	1,184	0,210	0,170	0,181	0,154	0,120
	Combinadas	1,163	0,914	0,111	*0,399*	0,412	0,629	0,452	0,414	0,242	0,248	0,189	0,239	0,173
Total	Compañías	0,874	0,643	0,124	*0,280*	0,534	0,595	0,455	0,411	0,368	0,637	0,463	0,496	0,445
	Contratistas	1,671	1,364	0,719	*1,116*	0,563	0,557	0,452	0,678	0,311	0,390	0,363	0,367	0,286
	Combinadas	1,270	0,869	0,220	*0,472*	0,543	0,581	0,454	0,482	0,336	0,480	0,405	0,424	0,354

Note: For the year 2006, one of the companies reported the functions "Transport" and "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.

Table 8.1.4: Fatal incidents' rate per functional unit (ARPEL 1997-2008)

Function	Data Category	ARPEL 1997	ARPEL 1998	ARPEL 1999	*ARPEL Weighted average (1997-1999)*	ARPEL 2000	ARPEL 2001	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008
E&P	Compañías	0,009	0,016	0,001	*0,005*	0,015	0,016	0,006	0,005	0,006	0,006	0,002	0,014	0,003
	Contratistas	0,027	0,021	0,051	*0,036*	0,013	0,018	0,014	0,019	0,014	0,008	0,009	0,013	0,009
	Combinadas	0,020	0,017	0,012	*0,014*	0,014	0,018	0,011	0,014	0,011	0,007	0,006	0,013	0,007
Refining	Compañías	0,000	0,009	0,005	*0,006*	0,003	0,003	0,006	0,005	0,005	0,012	0,006	0,002	0,010
	Contratistas	0,006	0,046	0,013	*0,022*	0,019	0,030	0,030	0,018	0,008	0,015	0,021	0,008	0,001
	Combinadas	0,003	0,018	0,006	*0,008*	0,005	0,010	0,013	0,009	0,006	0,013	0,011	0,004	0,006
Transport	Compañías	0,017	0,017	0,000	*0,005*	0,005	0,000	0,003	0,004	0,008	0,000	0,008	0,000	0,003
	Contratistas	0,025	0,050	0,058	*0,049*	0,067	0,079	0,013	0,011	0,011	0,008	0,000	0,006	0,000
	Combinadas	0,020	0,024	0,005	*0,011*	0,020	0,011	0,008	0,007	0,010	0,005	0,003	0,004	0,002
Distribution	Compañías	0,000	0,024	0,000	*0,005*	0,005	0,005	0,005	0,005	0,002	0,003	0,000	0,000	0,000
	Contratistas	n/a	0,185	0,082	*0,123*	0,000	0,017	0,010	0,023	0,017	0,049	0,014	0,022	0,021
	Combinadas	0,000	0,048	0,010	*0,018*	0,003	0,007	0,007	0,012	0,007	0,020	0,007	0,009	0,010
Others	Compañías	0,000	0,002	0,000	*0,001*	0,000	0,007	0,003	0,000	0,002	0,000	0,002	0,002	0,000
	Contratistas	0,024	0,025	0,021	*0,023*	0,009	0,010	0,011	0,008	0,004	0,009	0,004	0,004	0,002
	Combinadas	0,013	0,013	0,003	*0,006*	0,004	0,009	0,008	0,006	0,003	0,006	0,003	0,003	0,002
Total	Compañías	0,004	0,012	0,001	*0,004*	0,007	0,009	0,005	0,004	0,004	0,006	0,003	0,006	0,004
	Contratistas	0,021	0,035	0,040	*0,035*	0,015	0,019	0,015	0,016	0,011	0,012	0,009	0,010	0,006
	Combinadas	0,013	0,019	0,008	*0,011*	0,009	0,013	0,010	0,011	0,008	0,009	0,007	0,008	0,005

Note: For the year 2006, one of the companies reported the functions "Transport" and "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.

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

The data used to develop the associated graph for each rate analyzed in chapter 3.0 are presented in the tables below, for period 1997/2008.

Table 8.2.1: Incidents' rate per functional unit – offshore activities (ARPEL 1997-2008)

Function	Data Category	1 Total Incidents' Rate									2 Incidents' Gravity Rate								
		ARPEL 1998	ARPEL 1999	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008	ARPEL 1998	ARPEL 1999	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008
E&P	Company	1,196	0,559	0,408	0,405	0,595	0,640	0,559	1,128	0,780	53,96	15,35	22,48	22,84	25,30	20,65	15,85	25,11	13,31
	Contractors	9,241	1,137	0,472	0,291	0,679	0,670	0,325	1,371	0,710	n/a	13,90	10,18	2,26	2,12	16,21	5,72	11,97	43,03
	Combined	1,252	0,821	0,444	0,346	0,623	0,653	0,433	1,225	0,755	53,96	14,69	17,16	22,05	24,49	19,47	10,42	21,78	18,28
Total	Company	1,196	0,559	0,408	0,405	0,595	0,640	0,559	1,128	0,780	53,96	15,35	22,48	22,84	25,30	20,65	15,85	25,11	13,31
	Contractors	9,241	1,137	0,472	0,291	0,679	0,670	0,325	1,371	0,710	n/a	13,90	10,18	2,26	2,12	16,21	5,72	11,97	43,03
	Combined	1,252	0,821	0,444	0,346	0,623	0,653	0,433	1,225	0,755	53,96	14,69	17,16	22,05	24,49	19,47	10,42	21,78	18,28

Function	Data Category	3 Incidents' Frequency Rate with Lost Workdays									4 Fatal Incidents' Rate								
		ARPEL 1998	ARPEL 1999	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008	ARPEL 1998	ARPEL 1999	ARPEL 2002	ARPEL 2003	ARPEL 2004	ARPEL 2005	ARPEL 2006	ARPEL 2007	ARPEL 2008
E&P	Company	1,186	0,373	0,348	0,393	0,650	1,489	0,472	0,820	0,636	0,005	n/a	n/a	0,012	0,004	0,000	0,000	0,039	0,000
	Contractors	9,241	0,674	0,402	0,205	0,542	0,571	0,240	1,278	1,071	0,000	0,093	0,010	0,019	0,034	0,009	0,002	0,121	0,007
	Combined	1,243	0,509	0,379	0,386	0,614	0,916	0,348	0,936	0,709	0,005	0,093	0,010	0,016	0,014	0,004	0,001	0,072	0,002
Total	Company	1,186	0,373	0,348	0,393	0,650	1,489	0,472	0,820	0,636	0,005	n/a	n/a	0,012	0,004	0,000	0,000	0,039	0,000
	Contractors	9,241	0,674	0,402	0,205	0,542	0,571	0,240	1,278	1,071	0,000	0,093	0,010	0,019	0,034	0,009	0,002	0,121	0,007
	Combined	1,243	0,509	0,379	0,386	0,614	0,916	0,348	0,936	0,709	0,005	0,093	0,010	0,016	0,014	0,004	0,001	0,072	0,002

Note: 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

The data used to develop the associated graph for each rate analyzed in chapter 5.0 are presented in the tables below, for period 2003/2008.

Table 8.3.1: Tasks planned observations per functional unit - company data (ARPEL 2003-2008)

Functional Unit	TPO rate 2003	TPO rate 2004	TPO rate 2005	TPO rate 2006	TPO rate 2007	TPO rate 2008
Exploration and Production	6,19	10,36	1,83	1,07	1,28	1,01
Refining	2,04	1,78	2,21	0,99	1,60	2,51
Transport	0,17	0,28	1,18	1,59	0,92	1,25
Distribution	0,01	1,80	2,63	1,36	1,38	1,64
Others	0,00	0,01	0,28	1,44	0,57	1,41
Total	3,22	4,51	1,96	1,15	1,12	1,35

Table 8.3.2: Safety training intensity rate per functional unit - company data (ARPEL 2003-2008)

Functional Unit	STI rate 2003	STI rate 2004	STI rate 2005	STI rate 2006	STI rate 2007	STI rate 2008
Exploration and Production	0,95	1,36	0,62	0,21	0,22	0,14
Refining	0,62	0,56	0,29	0,26	0,21	0,21
Transport	0,20	0,78	0,10	2,54	1,19	1,68
Distribution	0,06	0,39	0,08	0,15	0,10	1,13
Others	7,43	0,17	0,19	0,11	0,02	0,10
Total	2,00	0,76	0,36	0,24	0,18	0,20

Note 1: For the period 2006 to 2008, one of the companies reported the functions “Transport” and “Distribution” included within “Exploration and Production” and “Refining”. Therefore, for the calculation of that period’s proactive rates, the 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.

Note 2: One company reported the data for the calculation of the safety proactive indicators for the combined result (company and contractors) during years 2003 and 2004. As from 2005, it could only report such information referred only to the company’s workers.

8.4 Tabulated results – fatality causes – ARPEL 2003-2008

Table 8.4.1: Fatality causes – totals for ARPEL Member Companies and their contractors – term 2003/2008

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

9.0 APPENDIX B

9.1 ARPEL Member Companies data: totals for companies – year 2008

This table gathers all data of ARPEL Member Companies that reported for year 2008. The incidents' rates' indicators used are calculated.

Table 9.1: ARPEL Member Companies data – totals for companies (including offshore activities); 2008 data

1		2	3	4				5				6			
				Recordable cases				Extent and outcome of injuries and illnesses				Incidence Rates			
				a	b	c	d	e	f	g	h	i	j	k	l
								Cases of:							
Function	Key[1]	Average number of employees	Hours worked (in thousands)	Injuries	Illnesses	Fatalities	Total	Restricted workdays	Lost workdays	Medical Treatment	Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
E&P	1	188.005	292.998	1.001	63	5	1.069	0	690	345	26.015	0,730	17,76	0,471	0,003
Refining	2	98.398	184.738	522	208	9	739	55	387	280	18.752	0,800	20,30	0,419	0,010
Transport	3	40.457	60.092	142	0	1	143	0	83	22	2.471	0,476	8,22	0,276	0,003
Distribution	4	24.567	55.318	123	137	0	260	3	258	227	3.820	0,940	13,81	0,933	0,000
Others	5	63.941	136.726	217	289	0	506	1	207	154	6.567	0,740	9,68	0,305	0,000
Total		415.367	729.872	2.005	697	15	2.717	59	1.625	1.028	57.625	0,745	15,79	0,445	0,004

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 formula from the data in tables 9.1 and 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 and 0.4), 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 2008

This table gathers all data of ARPEL Member Companies' contractors that reported data for year 2008. The incidents' rates' indicators used are calculated.

Table 9.2: ARPEL Member Companies' contractor's data – totals for contractors (including offshore activities); 2008 data

1		2	3	4				5				6			
				Recordable cases				Extent and outcome of injuries and illnesses				Incidence rates			
				a	b	c	d	e	f	g	h	i	j	k	l
								Cases of:							
Function	Key[1]	Average number of employees	Hours worked (in thousands)	Injuries	Illnesses	Fatalities	Total	Restricted workdays	Lost workdays	Medical Treatment	Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
E&P	1	257.110	583.521	2.386	1	25	2.412	9	774	800	57.163	0,827	27,74	0,376	0,009
Refining	2	62.650	137.463	840	0	1	841	0	304	225	7.418	1,224	12,19	0,499	0,001
Transport	3	27.244	59.461	172	0	0	172	3	68	3	1.595	0,579	5,55	0,236	0,000
Distribution	4	25.168	47.570	123	0	5	128	5	49	45	1.488	0,538	8,18	0,219	0,021
Others	5	180.542	369.215	930	0	4	934	1	204	14	14.335	0,506	8,45	0,120	0,002
Total		552.714	1.197.230	4.451	1	35	4.487	18	1.399	1.087	81.999	0,750	16,92	0,286	0,006

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 formula from the data in tables 9.1 and 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 and 0.4), 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".

9.3 ARPEL Member Companies data: offshore activities - year 2008

This table gathers all data of the offshore activities of ARPEL Member Companies that reported data for year 2008. The incidents' rates' indicators used are calculated.

Table 9.3: ARPEL Member Companies' data – offshore activities; 2008 data

1		2	3	4				5				6			
				Recordable cases				Extent and outcome of injuries and illnesses				Incidence Rates			
				a	b	c	d	e	f	g	h	i	j	k	l
								Cases of:							
Function	Key[1]	Average number of employees	Hours worked (in thousands)	Injuries	Illnesses	Fatalities	Total	Restricted workdays	Lost workdays	Medical Treatment	Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
E&P	1	21.452	53.103	188	19	0	207	0	169	48	3.535	0,780	13,31	0,636	0,000
Total		21.452	53.103	188	19	0	207	0	169	48	3.535	0,780	13,31	0,636	0,000

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 formula from the data in tables 9.1 and 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 and 0.4), 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 2008

This table gathers all data of the offshore activities of ARPEL Member Companies' contractors that reported data for year 2008. The incidents' rates' indicators used are calculated.

Table 9.4: ARPEL Member Companies' contractors' data – offshore activities; 2008 data

1		2	3	4				5				6			
				Recordable cases				Extent and outcome of injuries and illnesses				Incidence Rates			
				a	b	c	d	e	f	g	h	i	j	k	l
								Cases of:							
Function	Key[1]	Average number of employees	Hours worked (in thousands)	Injuries	Illnesses	Fatalities	Total	Restricted workdays	Lost workdays	Medical Treatment	Number of days away from work	Total	Gravity	Frequency with lost workdays	Fatalities
E&P	1	33.068	29.032	102	0	1	103	0	57	9	2.290	0,710	43,03	1,071	0,007
Total		33.068	29.032	102	0	1	103	0	57	9	2.290	0,710	43,03	1,071	0,007

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 formula from the data in tables 9.1 and 9.4. For example, suppose company "A" reported 10,000 total worked hours (which are added in column 3 of tables 9.1 and 0.4), 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

Formulas to calculate incidence rates

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

1. Total incidents' rate

$$= \frac{Columna4(d) * 200}{Columna3}$$

Where:
Column 4(d) = Total recordable cases
Column 3 = Worked hours (in thousands)

2. Incidents' gravity rate

$$= \frac{Columna5(h) * 200}{Columna3}$$

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

$$= \frac{Columna5(f) * 200}{Columna3}$$

Where:
Column 5(h) = Cases of lost workdays.
Column 3 = Worked hours (in thousands)

4. Fatal incidents' rate

$$= \frac{Columna4(c) * 200}{Columna3}$$

Where:
Column 4(c) = number of fatalities
Column 3 = Worked hours (in thousands)

5. Tasks planned observations' rate

$$= \frac{Columna2(a)}{Columna2(b)}$$

Where:
Column 2(a) = tasks planned observations' number (cumulative)
Column 2 (b) = average number of workers

6. Safety training intensity rate

$$= \left[\frac{Columna3(d)}{Columna3(e) * 1000} \right] * 100$$

Where:
Column 3(d) = safety training hours (cumulative)
Column 3(e) = Worked hours (in thousands)