OGP Safety Reporting and Statistics

Kirsty Walker, Schlumberger
Chair - OGP Safety Data Sub-Committee

12th December 2011
• What is OGP and how does it work?
• Safety Data
• Process Safety Data
• Health Leading Performance Indicators
What is OGP?

The International Association of Oil & Gas producers (OGP):

- OGP members produce more than half the world’s oil and about one third of its gas.
  - most of the world’s leading publicly-traded, private and state-owned oil & gas companies,
  - oil & gas associations
  - major upstream service companies.

- OGP aims to help members achieve continuous improvements in safety, health and environmental performance and in the engineering and operation of upstream ventures.
How does OGP work?

- OGP work is primarily done by staff of the member organisations with support from the secretariat.
- A Management Committee oversee a dynamic network of committees, subcommittees, task forces and work groups.
- OGP work is primarily done by staff of the member organisations with support from the secretariat.
OGP Safety Committee

OGP's Safety Committee aims to:

• Promote the integration of safety into the everyday business of OGP member companies and other E&P companies and contractors
• Provide safety leadership with cost effectiveness
• Promote a level playing field for safety that is recognised by the E&P industry and administered by national and global regulatory authorities

The Safety Committee achieves this through:

• Providing practical tools and guidelines to advance safety performance
• Providing information to, and entering into dialogue with, those intergovernmental authorities that regulate the industry
• Promoting best practices and the sharing of ‘lessons learned’
• Providing a common, simplified, and effective approach to internal and external issues by working closely with other OGP committees and industry trade associations
Safety Data Sub-Committee

- **Identify learning**
  - Identify learning and areas for improvement by analysing safety information

- **Data consistency**
  - Improve consistency in data definition and analysis to facilitate benchmarking

- **New indicators**
  - Provide advice and guidance to other sub-committees and task forces on developing and prioritising indicators
OGP Safety Data

- OGP has been publishing safety data since 1985
- Largest database of safety performance metrics in the E&P Industry

**Metrics**
- Fatal incident and accident rates
- Total recordable injury rate
- Lost time injury frequency
- Severity of lost work day cases and restricted work day cases
- Fatality and lost work day cases by category and activity

**Results**
- Overall
- By region
- By function
- By company
2012 timeline and process
Safety Performance Indicators Report 2011 Data

1 March
Deadline for submission of data

12 March
company results circulated to contributors
for comment - allow 1 week
19 Mar

23 March
Draft report [in Word format] circulated to SDSC by email

27-29 Mar
SDSC meets to review draft report [in Word format]

10 April
Revised draft [in Word format] circulated to Safety Committee, SDSC and contributors for comment - allow 2 weeks
24 Apr

1 May
final draft goes to Tom Pearce for format and layout
- allow 2½ weeks

18 May
Formatted report circulated to Chairs only of Safety Committee and SDSC
- allow 1 week
25 May

31 May
Final changes incorporated and report published electronically
2010 safety data - scope

- 3411 million work hours (reduction of 5% compared to 2009)
- 1 new reporting company, 2 that submitted data in 2009 did not submit data for 2010 (one is no longer a member)
- 42 of the 53 OGP member companies reported
- All reported contractor data
- Operations in 102 countries

Fatal accident rate per 100 million hours worked

<table>
<thead>
<tr>
<th>Year</th>
<th>Company</th>
<th>Contractor</th>
<th>Overall</th>
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</thead>
<tbody>
<tr>
<td>2006</td>
<td>2.0</td>
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</tr>
<tr>
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</tr>
<tr>
<td>2010</td>
<td>3.2</td>
<td>2.8</td>
<td>3.2</td>
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</table>
Safety Data Trends 2010

Reduction in all injury KPIs

FIR

LTIF

TRIR
<table>
<thead>
<tr>
<th>Incident/Event Category</th>
<th>Type of activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assault and Violent act</td>
<td>• Construction, commissioning, decommissioning</td>
</tr>
<tr>
<td>• Caught In, Under or Between</td>
<td>• Diving, Subsea, ROV</td>
</tr>
<tr>
<td>• Confined space</td>
<td>• Drilling / Workover / Well services</td>
</tr>
<tr>
<td>• Water related including drowning</td>
<td>• Lifting, crane, rigging, deck operations</td>
</tr>
<tr>
<td>• Cut, Puncture, Scrape</td>
<td>• Maintenance, Inspection, Testing</td>
</tr>
<tr>
<td>• Explosion/burn</td>
<td>• Office, Warehouse, Accommodation, Catering</td>
</tr>
<tr>
<td>• Exposure Electrical</td>
<td>• Production Operations</td>
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<tr>
<td>• Exposure Noise, Chemical, Biological, Vibration</td>
<td>• Seismic/survey operations</td>
</tr>
<tr>
<td>• Pressure release</td>
<td>• Transport - Air</td>
</tr>
<tr>
<td>• Falls from Height</td>
<td>• Transport - Land</td>
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<tr>
<td>• Overexertion/strain</td>
<td>• Transport - Sea, incl. Marine activity</td>
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<tr>
<td>• Slips and Trips (at same height)</td>
<td>• Unspecified - Other</td>
</tr>
<tr>
<td>• Struck by</td>
<td></td>
</tr>
<tr>
<td>• Other</td>
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</table>
2010 reported fatalities

- 94 fatalities reported in 2010 (93 in 2009, 103 in 2008)
- 23 Company and 71 Contractor fatalities
- 22 related to air transport in 2 incidents
- 34% (32 fatalities) were attributable to 2 incidents (aviation and explosion/burn)
- 9% land transport in 2010 (10% in 2009, 25% in 2008)
Improved incident information

Fatality descriptions 2000

| Offshore |
|------------------|------------------|------------------|
| Norway, Drilling, 24/12/2000 | Number of deaths: 1 | Type of incident: Struck by |
| Age: 32 | Occupation: Drilling/Well Servicing Operator |
| Employer: Contractor |
| A roughneck was struck by a hoist of drillpipe during crane operation on the pipedeck. |

| Norway, Production, 09/09/2000 |
| Age: unknown | Number of deaths: 1 | Type of incident: Struck by |
| Employer: Contractor |
| Crewmember on board anchor handling vessel was hit by anchor chain in his head. |

| UK, Drilling, 18/05/2000 |
| Age: 41 | Number of deaths: 1 | Type of incident: Struck by |
| Employer: Contractor |
| Contract worker was fatally injured when crushed by 3.5-inch drill pipe. |

| UK, Drilling, 09/10/2000 |
| Age: 30 | Number of deaths: 1 | Type of incident: Struck by |
| Employer: Contractor |
| Man pulled into mouse-hole while riding on a man-riding winch under the drill floor. |

| UK, Drilling, 04/01/2000 |
| Age: 32 | Number of deaths: 1 | Type of incident: Struck by |
| Employer: Contractor |
| A contractor roustabout was struck in the back by a casing joint during a lifting operation. |

Fatality descriptions 2010

Romania, Production, Mar 25 2010
Number of deaths: 2
Incident Category: Explosions or Burns
Activity: Maintenance, Inspection, Testing

Age: 41
Employer: Company

Age: 49
Employer: Company

Narratives:
- Maintenance crew from E&P Services, was involved in repairing the oil pipeline (5.5 inch) from Park to Tank Farm. Because of a local explosion followed by fire, two employees (mechanic and welder) got burnt and died on the spot, being in the position hole (1.5 m deep). Another injured person from this incident was the Chief Deputy of EP Sector who was burnt on the face and hands, trying to help his two colleagues. The fire was extinguished by the Military Fire Brigade.

What went wrong:
- Immediate Cause Root: Servicing Equipment in Operation - Error Enforcing Conditions:
  - Over-energetic attention was being paid to the work in hand.
  - Decision to work in unacceptable environment taken for financial/production reasons supervisor tried to do job quickly to get back on line
- Root/Underlying Cause HSE Management System
  - Decision to work in unacceptable environment taken for financial/production reasons
- Management Commitment: To challenge or stop any activity that conflicts with the HSEQ policies.
- Comments: no one had highlighted the sub standard asset integrity or repair practices in operation

Corrective actions and recommendations:
- The non-recognition and lack of risk control measures
- Failure to follow procedures
- Unused opportunities to intervene
- Making risks, deliberately or unconsciously
- Recommendations: Emphasis should be put on quality of the safety observations/findings, the willingness to intervene and visible participation in operations of the management.

Caused factors:
- People (acts): Following Procedures: Violation intentional (by individual or group)
- People (acts): Following Procedures: Improper position (in the line of fire)
- People (acts): Following Procedures: Overexertion or improper position/posture for task
- People (acts): Use of Tools, Equipment, Materials and Products: Improper use/position of tools/equipment/materials/products
- People (acts): Use of Protective Methods: Failure to warn of hazard
- People (acts): Use of Protective Methods: Inadequate use of safety systems
- People (acts): Use of Protective Methods: Disabled or removed guards, warning systems or safety devices
Lost Work Day Cases

- 26% ‘Struck by’ falling or moving objects (22% in 2009)
- 17% ‘Caught in, under or between’ (18% in 2009)
- 17% ‘Slips, trips and falls at the same height’ (18% in 2009)
- LWDC results by activity are very similar to 2009
• January 2010 - 38 participants representing 26 OGP member and associate member companies and 3 industry trade associations

• Two SDSC task forces were formed to work on two key deliverables:
  • Definition, analyse and reporting on “causal factors” for fatal incidents and high potential events.
  • Development of an appropriate set of recommended Life-Saving Rules.
Life-Saving Rules

- 8 core rules
- 10 additional rules
- Comprehensive package of support materials
Causal Factors

The main change to the 2010 report is the addition of ‘causal factors’ for fatal incidents and high potential events. The causal factors are as follows:

**PEOPLE (ACTS)**

Following Procedures:
- Violation intentional (by individual or group)
- Violation unintentional (by individual or group)
- Improper position (in the line of fire)
- Overexertion or improper position/posture for task
- Work or motion at improper speed
- Improper lifting or loading

Use of Tools, Equipment, Materials and Products:
- Improper use/position of tools/equipment/materials/products
- Servicing of energized equipment/inadequate energy isolation

Use of Protective Methods:
- Failure to warn of hazard
- Inadequate use of safety systems
- Personal Protective Equipment not used or used improperly
- Equipment or materials not secured
- Disabled or remove guards, warning systems or safety devices

Inattention/Lack of Awareness:
- Improper decision making or lack of judgment
- Lack of attention/distracted by other concerns/stress
- Acts of violence
- Use of drugs or alcohol
- Fatigue

**PROCESS (CONDITIONS)**

Protective Systems:
- Inadequate/defective guards or protective barriers
- Inadequate/defective Personal Protective Equipment
- Inadequate/defective warning systems/safety devices
- Inadequate security provisions or systems

Tools, Equipment, Materials, Products:
- Inadequate design/specification or management of change
- Inadequate/defective tools/equipment/materials/products
- Inadequate maintenance/inspection/testing

Work Place Hazards:
- Congestion, clutter or restricted motion
- Inadequate surfaces, floors, walkways or roads
- Hazardous atmosphere (explosive/toxic/asphyxiant)
- Storms or acts of nature

Organisational:
- Inadequate training/competence
- Inadequate work standards/procedures
- Inadequate hazard identification or risk assessment
- Inadequate communication
- Inadequate supervision
- Poor leadership/organisational culture
- Failure to report/learn from incidents
Fatality Causal Factors

- 51 of 58 fatal incidents were assigned causal factors
- 242 causal factors were assigned for the 51 fatal incidents
  - 109 were People (Acts)
  - 133 were Process (Conditions)
- Top 10

<table>
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<th>Causal Factors 2010 data</th>
<th>Fatal Incidents</th>
<th>Fatalities</th>
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<td>17</td>
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<td>15</td>
</tr>
<tr>
<td>PEOPLE (ACTS) : Following Procedures : Violation unintentional (by individual or group)</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Organisational : Inadequate communication</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Organisational : Inadequate work standards/procedures</td>
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<td>11</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Tools, Equipment, Materials &amp; Products : Inadequate design/specification/management of change</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>
High Potential Incident Causal Factors

- 98 of 99 high potential incidents were assigned causal factors
- 400 causal factors were assigned for the 98 HiPo incidents
  - 134 were People (Acts)
  - 266 were Process (Conditions)
- Top 11

<table>
<thead>
<tr>
<th>Causal Factors 2010 data</th>
<th>High Potential Events</th>
</tr>
</thead>
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<td>PROCESS (CONDITIONS) : Organisational : Inadequate hazard identification or risk assessment</td>
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<tr>
<td>PROCESS (CONDITIONS) : Organisational : Inadequate work standards/procedures</td>
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</tr>
<tr>
<td>PROCESS (CONDITIONS) : Organisational : Inadequate supervision</td>
<td>31</td>
</tr>
<tr>
<td>PEOPLE (ACTS) : Following Procedures : Violation unintentional (by individual or group)</td>
<td>27</td>
</tr>
<tr>
<td>PEOPLE (ACTS) : Inattention/Lack of Awareness : Improper decision making or lack of judgment</td>
<td>23</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Organisational : Inadequate training/competence</td>
<td>22</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Tools, Equipment, Materials &amp; Products : Inadequate maintenance/inspection/testing</td>
<td>21</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Tools, Equipment, Materials &amp; Products : Inadequate/defective tools/equipment/materials/products</td>
<td>16</td>
</tr>
<tr>
<td>PEOPLE (ACTS) : Inattention/Lack of Awareness : Lack of attention/distracted by other concerns/stress</td>
<td>15</td>
</tr>
<tr>
<td>PROCESS (CONDITIONS) : Organisational : Poor leadership/organisational culture</td>
<td>15</td>
</tr>
</tbody>
</table>
Welcome to the OGP Safety Zone

This website has been provided by members of OGP to allow their own personnel, contractors and other organisations to have ready access to operations in the upstream oil and gas industry. Its primary aim is to improve the global dissemination of safety related information - it is up to individual regions (where available, appropriate regional information should be consulted).

Within the Safety Zone you will find:

- **New** - [Causal factors](#) for fatal incidents and high potential events.
- A safety alert system which allows registered users (register [here](#)) to receive emails on the latest alerts and information on incidents relating to specific areas of interest.
- The [fatal incident](#) and [high potential event](#) databases. These incident reports were submitted by participating OGP members as part of the annual safety data collection exercise, and were published in the Safety Performance Indicators reports.
- [Links](#) to health & safety related website, including OGP maintained areas such as:
  - Geophysical Operations
  - Human Factors
  - Land Transport
  - Lifting & Hoisting
  - Risk Management
- [Easy access](#) to reports and other information produced by OGP, its members, international regulators and other bodies, in particular the latest OGP [Safety Performance](#) reports.
OGP Process Safety Task Force:

- Adapt ‘PSE’ and ‘LOPC’ KPIs for industry reporting (terminology, language and thresholds for upstream to be aligned with CCPS OECD, API, ANSI work etc.)

- Request data aligned to both these KPIs for previous years (2009, 2008 etc.) by end of Q1 2010

- Publish specific upstream guidance on Tier 1 to Tier 4 KPIs
Framework for PSE KPIs

- Tier 1 and 2 KPIs primarily for corporate-level reporting and industry benchmarking
  - Process Safety Events recorded when Loss Of Primary Containment (LOPCs) meet or exceed defined criteria (based on API RP754 ANSI standard)

- Tier 3 and 4 KPIs primarily for facility-level reporting
  - Based on 6 step process to identify critical barriers and assign leading and lagging KPIs to assess barrier strength / weakness (based on UK HSE guidance)

- Guidance is detailed to enable implementation by technical specialists

- Separate appendix of 65 examples provides important “case-law” and can be updated (print / web)
Process Safety Triangle – API 754

Events of Greatest Consequence
- LTIs & Fatalities
- Restricted Work & Medical Treat
- First Aid Cases & Events without Consequence

Events of Less Consequence
- Behaviors & Conditions

Events with Least or No Consequence

Process Safety

Reportable PSIs
- Tier 1 Events

LOPC Events of Greater Consequence

LOPC Events of Lesser Consequence

Challenges to Safety Systems

Operating Discipline & Management System Performance Indicators

Tier 2 Events

Tier 3 Events

Tier 4 Performance

Lagging Indicators

Leading Indicators
Tier 1 – Process Safety Incidents

Loss of primary containment (LOPC) with the greatest consequence

- an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials from a process that results in one or more of the consequences:
  - employee, contractor or subcontractor “Lost Workday Case” injury and/or fatality; or
  - A hospital admission and/or fatality of a third-party; or
  - An officially declared community evacuation or community shelter-in-place; or
  - A fire or explosion resulting in greater than or equal to $25,000 of direct cost to the Company; or
  - A pressure relief device (PRD) discharge to atmosphere or to a downstream destructive device that results in one or more of four consequences; or
  - A release of material greater than certain threshold quantities in any one-hour period
Tier 2 – Process Safety Incidents

LOPC approximately an order of magnitude less than Tier 1

- an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials from a process that results in one or more of the consequences:
  - An employee, contractor or subcontractor occupational injury; or
  - fire or explosion resulting in greater than or equal to $2,500 of direct cost to the Company; or
  - A pressure relief device (PRD) discharge to atmosphere or to a downstream destructive device that results in one or more of four consequences; or
  - A release of material greater than certain threshold quantities in any one-hour period (1/10 of those for Tier 1)
Challenges to Safety Systems

- LOPC Events that do not meet Tier 2 criteria
- Other Process Unit Fires
- Safe Operating Limit Exceedence
- Demands on Safety Systems
- More predictive or ‘leading’ indicators
- Considered a Process Safety Near Miss
Tier 4 – Process Safety Incidents

Risk Control Barriers

- Also called Operating Discipline metrics
- KPIs typically based on Management System
- Site-specific
- Primarily predictive or ‘leading’ indicators
- Currently no intention for collection and benchmarking
OGP PSE data collection

• Pilot in 2008 and 2009 - not strictly comparable with 2010+
• 2010 data should be treated with some caution as even the API standard was not finally issued until April 2010
• Many companies are not yet fully confident in their data because they have had to do quite a lot of retrospective manual analysis for 2010
  • 52% of 19 reporting companies surveyed stated their PSE data is fully aligned with the OGP definitions (others partly); and
  • only 36% fully aligned on definition of work hours for PSE
• Interpretation by the Process Safety SC will be carried out
• Further work required on how to validate the data to assess reliability
Excellent start!

- **24 companies have submitted 2010 Tier 1 PSE data**
  - 17 companies have submitted Tier 2 PSE data
  - compares to 11 companies submitting pilot 08/09 data
  - compares to 42 companies in total submitting 2010 personal safety data
  - number already provides an encouraging basis for statistical interpretation
  - At least 4 more companies state they will report next year

- **Companies were also asked to provide additional information – however just over half could already provide this in the first year of collection**
  - Consequence (LOPC, fire damage, injury)
  - Material released by category
  - Activity (e.g. normal, start-up, shutdown)
Initial Data Return

- Note differences but difficult to draw conclusions without further years of data for trend analysis and without benchmark (e.g. versus downstream)
  - Offshore vs onshore
  - Drilling vs production
  - Regional
- Recognise that hours worked is not an “ideal” normalisation factor for asset integrity / process safety
- Averages provide a simple benchmark
- Tier 2 may be underestimated
Major AI/PS incidents

- 4 out of 58 fatal incidents were also identified as Tier 1 PSEs
  - GOM Fire/explosion
  - Contractor struck by ball valve unscrewed under pressure
  - 2 employees burnt in pipeline repair explosion
  - Contract driller struck by ice plug during work-over
  - Following procedures and hazard ID were common causes

- Other Fatal incidents and High Potential Events may be process safety related
- Important to learn from all of these – will pay particular attention to available causal factors
- Plan to identify High Potential PSEs in future data requests
Health Performance Indicators (HPI)

• 2007 OIHC published HPI document
  • Management system framework of 8 elements

• 3 Tier approach to HPIS:
  • Tier 1 - Implement a Health Management System
  • Tier 2 - Leading indicators to support Tier
  • Tier 3 - Lagging indicator on work-related illness
Health risk assessment and planning

Health risk assessment is generally understood to relate to ‘within the fence’ activities. Workplace, product and environmental health hazards are identified, their risks assessed and a health plan produced for all current activities, operations and products. This takes place during the development stage of all new projects and products, prior to modifications to plant or process, and before the acquisition or divestiture of sites’ leases, plant or other processes or materials, to address changing public and environmental health conditions. The health plan addresses any risks identified, is reviewed regularly and is progressed against internally set targets.

| Level 4 | System to capture and report data is in place and implemented. System sustained and supported by an ongoing improvement process. | no |
| Level 3 | System to capture and report data is in place and implemented. System functioning, system procedures documented and results being measured. | no |
| Level 2 | System to capture and report data is in place but not fully implemented and embedded. | yes |
| Level 1 | System to capture data is under development. | no |

Figure 1 OIHC Gap Analysis Tool 2008, Element 1 Health Risk Assessment and Planning
HPI Results - Company B
### Key to Ratings used:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Process under development.</td>
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<tr>
<td>2</td>
<td>Process in place but not fully implemented and embedded.</td>
</tr>
<tr>
<td>3</td>
<td>Process in place and implemented. System functioning. System procedures documented and results being measured.</td>
</tr>
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<td>4</td>
<td>Process in place and implemented. System sustained and supported by an on-going improvement process.</td>
</tr>
<tr>
<td>5</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

### 1 HEALTH RISK ASSESSMENT AND PLANNING (generally understood to relate to 'within the fence' activities)

**Workplace health hazards** are identified, their risks assessed and a health plan addressing any risks is implemented for the following:

- A 1: all current activities and operations.
- B 2: during the development stage of all new projects.
- C 4: prior to modifications to plant and equipment.
- D 5: prior to acquisition or divestiture of sites, leases, plant or other processes or materials.
- E 5: to address changing public and environmental health conditions or new scientific information.

**Internal targets** are set for the workplace health plans.

- F 4: The workplace health plans are reviewed regularly and progressed against the internally set targets.

**Product health hazards** are identified, their risks assessed and a product health plan produced for the following:

- H 2: for all current products.
- I 1: during the development stage of all new products.
- J 5: prior to acquisitions.
- K 4: to address changing public and environmental health conditions or new scientific information.

**Internal targets** are set for the product health plans.

- L 3: The product health plans are reviewed regularly and progressed against the internally set targets.
<table>
<thead>
<tr>
<th>Health Impact Assessment (6)</th>
<th>Health Risk Assessment (1)</th>
<th>Public Health / Promotion (8)</th>
<th>Fitness for Task / Surveillance (5)</th>
<th>Health Reporting (7)</th>
<th>Management of Ill-health (4)</th>
<th>Medical Emergency Management (3)</th>
<th>Industrial Hygiene (2)</th>
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HPI Conclusions

- Tool communicates WHAT needs to be done
- Leaves companies to decide HOW and WHO
- Enables identification and prioritization of gaps
- Tracks leading indicators of performance
- Facilitates benchmarking
- Visual ranking and presentation of data is helpful
- Makes HEALTH concepts broadly accessible
Conclusions

OGP collect a lot of data, the aim is:

• to ensure the data is accurate and verifiable
• to turn the data into information
• to encourage organisations to use the data and information to learn and improve
Thank you for your attention, questions?