Summary

- The Air Liquide Group
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- IMS Group Procedures
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- Selection and Qualification of auditors
- Audit levels
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- Challenges
- Contribution of the Audit Function to the Reduction of the Risk Level
- Conclusion
The Air Liquide Group

- Founded in 1902
- Headquarter in Paris
- Hubs in Houston, Shanghai, Frankfurt and Dubai
- 68,000 employees in more than 80 countries
  - Over 250 different subsidiaries
- Quoted on the Paris Stock Exchange (CAC40)
  - 400,000 individual shareholders
  - Revenue of approximately 20 Billion Euros

Four major business lines
- Large Industries
- Industrial Merchant
- Healthcare (including fine chemicals)
- Electronics

Other activities
- Welding
- Diving
- Engineering
- Aerospace
Genesis of IMS – The Industrial Management System

2003-2004
- Incidents around the world showed that procedures and processes varied significantly between subsidiaries
- Lessons learned were not always communicated between countries
- Unacceptable in a world scale organization: increased liability
- International IMS Project Development team assembled
  - Tasked with developing a system applicable to all subsidiaries and activities

2005-2006
- IMS deployed around the world
  - IMS states what are the mandatory minimum requirements to be met by all subsidiaries
  - Subsidiaries develop their local system by determining how to apply IMS, taking into account their regulatory environment, organization, and local certification requirements (ISO-9001, FSSC 22000, GMP, etc.)

2007
- Audits started
IMS – Group Procedures

GP 00 - IMS principles
GP 01 - Industrial regulatory compliance
GP 02 - Documentation implementation & control
GP 04 - Industrial Risk Management
GP 05 - Industrial Emergency Management
GP 06 - Occupational HSE Management
GP 12 - Procurement
GP 13 - Management of Change (MOC)
GP 07 - Training
GP 08 - Qualification
GP 03 - Development, design, manufacturing & Installation
GP 09 - Ready for Start-up Review (RFSR)
GP 10 - Production Management
GP 11 - Maintenance Management
GP 14 - Accident & Incident Reporting and Analysis
GP 15 - Industrial Reporting
GP 16 - Industrial Audit
GP 17 - Management Review
Organization of the Audit Function

■ At Group Level
  ■ Group Chief Industrial Auditor
    ■ Reports to the Group Vice President, Safety & Industrial Systems
    ■ Manages a small team of Group Lead Industrial Auditors
    ■ Relies on a network of experienced lead auditors located around the world auditing “on his behalf”
    ■ Sets the annual Group audit schedule

■ At Subsidiary Level
  ■ Subsidiary Chief Industrial Auditor (CIA)
    ■ Appointed by and reports directly to the Subsidiary Managing Director
    ■ Reports functionally to the Zone VP, Industrial Management Systems
    ■ Must be totally independent from the audited activities
      - May not have any other functions related to operations in the subsidiary
    ■ May act as CIA for more than one subsidiary
      - But always reports to the Managing Director of the subsidiary being audited
    ■ Relies on a network of lead and HSEQ/Technical auditors supplied by various departments
    ■ Sets the annual Subsidiary audit schedule
    ■ Must be available 20% of his/her time to assist the Group audit function
Organization of the Audit Function (Americas)
Selection and Qualification of Auditors (Subsidiary)

- **Chief Industrial Auditor (CIA)**
  - Engineering or other technical university level degree
  - 10+ years of relevant experience in engineering, process safety management, industrial operations, HSE, etc.
  - Formal CIA training by the Group Safety & Industrial System department
  - Formal training in auditing techniques
  - Thorough knowledge of the subsidiary IMS
  - Good understanding of the technologies being audited
  - Knowledgeable in process safety management and HSE

- **Lead Auditors and HSEQ/Technical Auditors**
  - Associate Technology or Technologist degree. Bachelor degree preferred
  - 7+ years of relevant experience in engineering, process safety management, industrial operations, HSE, etc.
  - Formal training in auditing techniques
  - Familiar with the subsidiary’s industrial operations and the main risks
  - Intimate knowledge of the technologies being audited
  - Understand internal requirements pertaining to HSE and reliability
Audit Level 1 – Facility Self Audits

- Purpose is to make the site manager aware of deficiencies early, reducing the number of Corrective Action Reports officially reported by higher level audits.
- Performed at facility level by the facility manager, peer manager or local supervisory staff.
- Based on self audit checklists
  - Technical and procedural
  - Topics chosen based on experience, suspected deficiencies or specific requests from CIA or management.
Audit Level 2 – Subsidiary Audits

- Purpose is to check that all plants and sites conform to the subsidiary IMS
- Typically performed by a team of 3 (depending on plant size):
  - CIA or other lead auditor
  - HSEQ auditor
  - Technical auditor
- Based on audit protocols prepared by the CIA, taking into account
  - Magnitude of risk
  - Accident/Incident history
- Critical facilities (determined by risk assessments) audited every 2 years
- All facilities audited at intervals no greater than 5 years
Audit Level 3 – Group Audits

- Purpose is to verify how the subsidiary IMS works and if it meets the Group’s IMS requirements
  - Evaluation of the quality, quantity and qualifications of technical personnel
  - Timeliness and completeness of the incorporation of Group Standards into subsidiary procedures
- Performed by a team led by the Group CIA or designee
- Typically performed every 5 years, but spot audits may take place if deficiencies are suspected
  - Follow up done one year after audit
## Audit Findings: Terms & Definitions

<table>
<thead>
<tr>
<th>Finding</th>
<th>Symbol</th>
<th>Description of Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Practice</td>
<td>⬤</td>
<td>The facility/department has implemented a process, practice, or methodology that should be shared and put into use across similar facilities.</td>
</tr>
<tr>
<td>Comment</td>
<td>⬤</td>
<td>Compliant with IMS requirements, but the suggested action would improve or strengthen the existing system. Corrective and preventive actions are Optional.</td>
</tr>
<tr>
<td>Remark</td>
<td>⬤</td>
<td>The system/process/procedure in place is generally IMS compliant but a few evidences of non-compliance in field application have been noted. The system/process/procedure in place is partially or generally IMS compliant but safety/reliability risks remain. Corrective and Preventive actions required.</td>
</tr>
<tr>
<td>Gap</td>
<td>⬤</td>
<td>Non-compliance and/or safety/reliability risk identified; IMS process partially compliant - Corrective and Preventive actions required.</td>
</tr>
<tr>
<td>Critical Gap</td>
<td>⬤</td>
<td>Major non-compliance and/or major safety/reliability risk identified; Urgent Corrective and Preventive actions required.</td>
</tr>
</tbody>
</table>
Evolution of the Audit Approach

For the first 4-5 years audits tended to be confrontational
- Progress in the subsidiaries was slow at start
- Subsidiary audits identified hundreds of findings
  - Plants were audited on requirements they had not implemented yet
  - Initial auditors had a “bad cop” confrontational attitude
    - Playing “good cop” to help the subsidiary develop the system was not in their job description…
    - They were instructed to identify all possible deficiencies: be careful what you wish for!
  - Led to a lot of backlash coming from the subsidiaries and slowed down IMS implementation in some countries

A more collaborative approach is now in place
- The auditor is still looking for compliance but the role has evolved towards coaching and problem resolution by
  - Providing explanations as to why things must be done in a certain way
  - Identifying and spreading best practices between subsidiaries and facilities
  - Helping the sites and facilities identify priorities by better categorizing the findings
Challenges

- Availability of resources
  - Due to work load, subsidiary CIAs are unable to make 20% of their time available to support the Group audit function
    - Group audit plans must be adapted carefully
  - A lead auditor can make a maximum of 12 audits per year
  - Difficulty to identify auditors in sufficient number and with appropriate technical knowledge who are independent from the audited operation
    - Continuously looking for auditors due to departures, internal moves, changes in responsibilities, etc.
  - Availability of auditees in a reduced staffing context
    - Importance to build system around processes rather than people

- Growing number and complexity of sites
  - Audits last from 1 to 7 days depending on complexity, excluding pre-audit preparation and writing report (up to 3 weeks)
Challenges

- Pressure to maintain the prescribed 2 years/5 years frequency
  - Disconnect between frequency and auditor availability
  - Under review based on experience and industry trends
  - Considering a merit approach as opposed to a time-based approach

- Multiplication of audits: IMS, ISO-9001, GMP, Food Safety, customers, government agencies
  - Attempting to combine audits but objectives/approach/requirements are sometime diverging
  - IMS audits are evolving towards assessment of effectiveness rather than strictly compliance

- Cost constraints
  - Audit costs highly dependent on location and travel required
IMS was implemented as a means to reduce the level of risk within the operations

Competent engineers design all types of safety mitigation systems to keep our processes and people safe, and our plants running

But are you sure that these systems

- Were designed based on the proper conditions, and that these conditions are still valid?
- Are installed properly?
- Are maintained properly?
- Are calibrated properly?
- Are operated properly?
- Are not by-passed?

This is the contribution of audits to risk reduction: to provide an independent, unbiased measure of the true condition of the plants at a given point in time

Remember: You can’t improve what you don’t measure!
**Conclusion**

- A successful industrial audit program requires
  - A high level of focus by dedicated resources
  - Commitment from leaders who
    - Understand that auditors are their eyes in the field and realize that audits are one of the few methods they have to know what is really happening in the operations
    - Believe that audits can help reduce the risk exposure for the corporation
    - Participate actively in the resolution of issues uncovered during audits as opposed to relying only on the auditees to fix everything
End of presentation
Thank you for your attention