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# SLP TECHNICAL TALK

## Lessons Learned from an Accident Investigation

Mr. Kenneth Harrington, Senior Process Safety Adviser, Chevron Phillips Chemicals Company (CPCChem) presented a talk on "Lessons learned from an accident investigation" to about 30 SLP members and guests on March 23, 2005 at the Jurong Country Club.

A contributory cause was the inadequate oversight (inspection/monitoring) of the plant by the regulatory body.

The full investigation report is available on the Chemical Safety Board (CSB) USA website.

As for the lessons learned from this accident, Ken stressed that effective operator training and technical management of process safety are critical to prevent catastrophic events such as the Sierra Chemical Company explosion. These root causes were serious system problems and pointed to management failures within the organization.

In his presentation, Ken also elaborated on the requirements for effective accident investigation. He highlighted the following key points:

**Preparation – have everything ready well ahead of time**

- "Go bag" – investigation supplies
- Trained personnel
- Investigation technique
- Interviewing skills
- List of specialists and specialty laboratories

**Competing Objectives** – bias of investigation body will skew the results. For this accident, there were several investigations going on.

- Sierra Chemicals
- Local police
- Occupational Safety and Health Administration (OSHA)
- Bureau of Alcohol, Tobacco, and Firearms (ATF)

**Analysis Method** – choose an analysis method appropriate to the complexity of the accident.

- US Department of Energy Accident Investigation Procedure
- MORT (Management Oversight Risk Tree)
- TapRoot®
- Why-Tree
- Checklist

**Prioritize Investigation** – Choose analysis detail based on risk assuming failure of the most critical safeguard is credible or probable.



*Ken Harrington illustrating his talk with an overview of the Kean Canyon Facility*

The primary purpose of accident investigation and analysis is to determine the root cause of the accident so that a repeat of the accident can be avoided. As such, the accident investigation must produce factual information leading to the basic/root causes that can reasonably be identified. These basic/root causes ideally should also be in areas that a manager/owner has control over and can put right.

Mr Harrington cited the Sierra Chemical's Kean Canyon Explosive Manufacturing Plant accident investigation, with which he was personally involved in. Ken shared the lessons learned from this investigation. He presented the following root causes, mostly process safety system issues, established by the investigation team on the Sierra explosion:

- **Process hazard analysis was inadequate**
- **Training programs were inadequate**
- **MOC (management of change) of personnel was inadequate**
- **Written operating procedures were not available**
- **The facility was built with insufficient separation distances**
- **There was no systematic safety inspection or audit program**
- **Employee participation was inadequate**

**Protect evidence** – rescue and emergency responders have different concerns from accident investigation

- Take pictures – early and often
- Look at the crowd
- Cover evidence
- Limit access until investigation complete
- Look in fire water run-off

**Stay the Course** – don't jump to conclusions

- Examine evidence, interview people, review records
- Conflicting goals
- Look for possible management system failures
- Don't stop at "the" root cause
- Analyst integrity

Ken concluded the talk by quoting the Columbia Accident Investigation Finding 3

*“Organizations must learn from “small” incident (weak signals) and not wait until a major catastrophe occurs to deal with operational or safety issues”*

*The main lesson from the Columbia Accident Investigation -- The power of a company's culture to influence behavior for good or ill*



The talk was followed by a very interesting discussion between Ken and members of the audience.

Our President, Richard Gillis, ended the proceedings by thanking Kenneth Harrington for his interesting presentation and presented him with an SLP memento.



*It's not all serious business -- Ken Harrington with Richard Gillis and SLP members enjoying dinner after the talk*

*By Tay Cheng Pheng*

Note : SLP members who like to have a soft copy of Ken's presentation may obtain one by contacting Ms Lylia Law at the SLP Secretariat.