CONVE & AVS, INC®

Servicing the Chlor Alkali Industry

Hazard Identification Process for a Chlor Alkali Operation

presented by

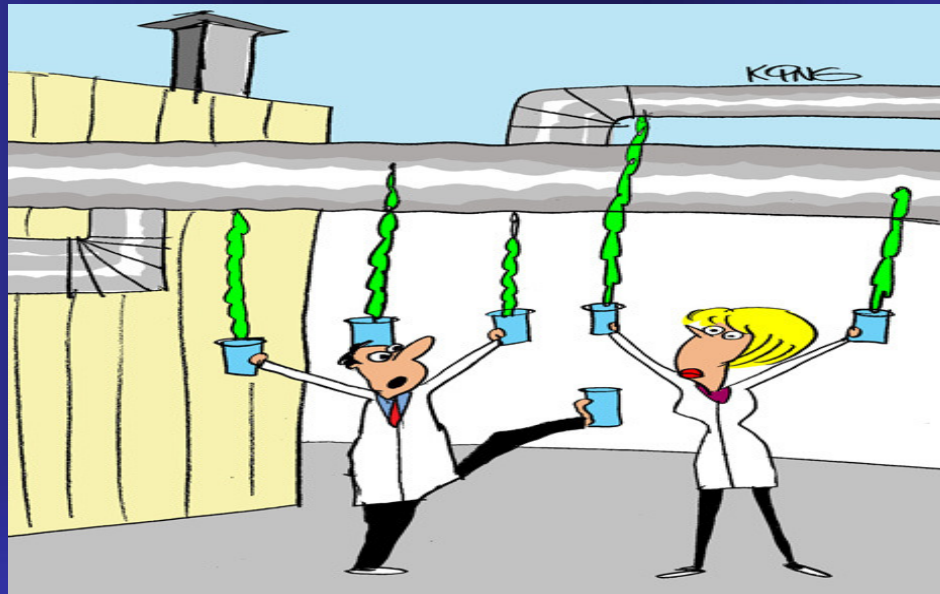# Alberto Gonzalez

Hazard Identification Process

FOUR main risk questions:

- ✓ Hazard Identiication- What can go wrong?
- ✓ Consequence Severity - How bad could it be?
- ✓ Likelihood- How often might it happen?
- ✓ Controls: What can be done to prevent or detect it ?

Overall hazard rating considers, both the severity and likelihood of each hazard.

Hazard Identification Process

Hazard Exposes:

❖ People

❖ Machinery, Equipment

❖ Environment

❖ Products

Design Deviation?

✓ A departure from a Chosen Path

Hazard Identification Process

Matrix Interaction

A	People	Equipment	Products	Environment
B	Equipment	People	Environment	Products
C	Products	Environment	People	Equipment
D	Environment	Products	Equipment	People

Disturbances?

✓ Interference with equipment or operation as a negative results from interactions

Hazard Identification Process

Deviation Management:

A deviation could be managed if we could identify it

Disturbance Management:

A disturbance could be managed if we could identify it

Hazard Identification as a Safety Tool

Deviation Identification:

Detailed and thorough identification is possible because the detailed plant design sets the path for through HAZOP analysis:

Images of the design deviation are generated by "guide words"

Guide Words are the essential part of a HAZOP as they provide the framework for thoroughly categorizing and capturing all possibilities.

Disturbance Identification:

This will work for basic Plant design because disturbances are originated by external and/or internal interactions.

Check Lists are the essential part of a HaZid.

Hazard Identification Process

Disturbances Identification Integrated to Conve Modular Design Concept by means of:

- ❖ Standardized design,
- ❖ 3-D Model Review by Design Engineers and Manufacturing Teams,
- ❖ Hazard Identification Analysis with customers participation,
- ❖ Feed Back of Analysis included in Detail Engineering

Hazard Identification Process

Results of Hazard Identification

$$R = P * C$$

❖ Potential Risks are identified at the very early stages of the Projects;

❖ Probability of major events taking place during plant operation is drastically reduced;

❖ 3-Zero SHE Goals: [Zero Accident; Zero Incident and Zero Release] have been achieved on all Conve & AVS Inc's plants pre-commissioning, start up and Operation

Hazard Identification Process

During the last 16 years of using the traditional HAZOP techniques, we have found that:

❖ There are no tailored Commercial HAZOP software packages for the Chlor Alkali industry;

❖ Those available don't have fields for assumptions or other notes that need to be recorded;

❖ The existing packages in general make finding entries a very slow process.

Hazard Identification Process

❖ When HAZOP techniques was first introduced in the early 60's, records were produced by pencil and paper; software packages are difficult to match this;

❖ A modern substitute for DATA ENTRY could be a word processing program or a simple spreadsheet

❖ Using a spreadsheet designed specifically for HAZOP in a Chlor Alkali plant is, by far, a more efficient method

Hazard Identification Process

…and that is why we would like to present to you a simple tool developed by CONVE which will facilitate the HAZOP Analysis and hopefully will make the exercise more productive:

CONVE HAZOP Matrix for Chlor Alkali Facilites

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…And that's why you need a relief valve!
THANK YOU!
GRACIAS!