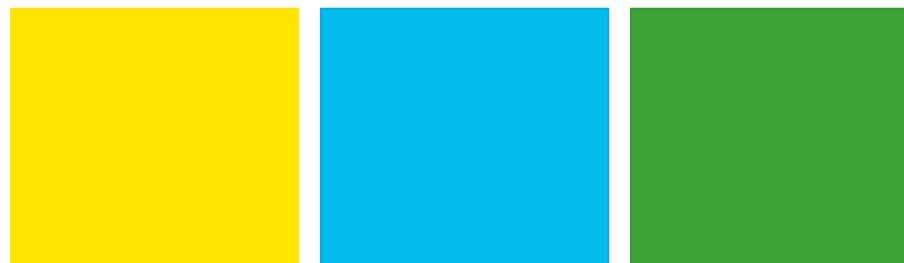




Incident Sharing Practices

Fritz Näumann | Euro Chlor

WCC GST Safety Workshop
Sao Paulo November 14, 2014





WCC Incident Reporting „Theory“

Objective: Learn from experience
=> “near misses” should reported

Scope: Incidents associated with chlorine production,
distribution or use

WCC incident reporting is coordinated with the regional
chlorine producers associations e.g. ABICLOR, CI, JSIA ...
to produce WCC database.



WCC Incident Reporting Criteria

- technical interest : learning form experience
- serious injury: lost time (employee or contractor)
- property damage in excess of EUR 100,000
- media response
- authorities involved
- leak > 5 kg chlorine



WCC Incident Reporting Format

EXCEL sheet available on the EuroChlor website

Key elements to be included:

- description,
- consequences
- preventative measures, important for the learning process!
- Pictures or drawings to better illustrate the event.

WCC Incident Sharing Form

Type of Activity	Event related activity		Quantity released	Equipment	
Bleach maker	Bulk storage	Bulk storage	Unknown	Cylinder	Cylinder / bottle (50-100 kg)
Chemical Industry Cl2 consumer	Cl2 absorp.	Chlorine Absorption - Hypo Production	0	Drum	Drum (500 - 1000 kg) / ton container
Chlorine producer	(Off)Loading	Loading off-loading	<= 1 kg	Hose	Hose / Flexible
Other	Other	Other	<= 5 kg	Other	Other
Packager	Pack	Packaging Operation	<= 10 kg	Pipe	Pipework
Swimming pool	Pr gas	Production Chlorine gas	<= 100 kg	Prod. vessel	Production (process) vessels
Water treatment	PrLq L	Production Liquid Chlorine Liquefaction	<= 500 kg	Pump	Pump / compressor
	PrLq V	Production Liquid Chlorine Vaporisation	<= 1 t	Storage vessel	Storage tank
	Transport	Transport	<= 5 t	Transp. vessel	Rail or road tanker or ISO container
	Unknown	Unknown	<= 10 t	Unknown	Unknown
	User	Chlorine consumer	>10 t	Valve	Valve

Primary Cause		Transport activity	Mode of shipment	Product
Electrical	Electrical outage	Collision with other vehicle	Water	Chlorine
Mixing	Erroneous mixing	Equipment leak	Pipeline	HCl
Training	Human error: Lack of Training	Loosing movement control	Rail	Hydrogen
Procedure	Human error: Procedure Not Applied	Shunting yard incident (rail)	Road	Hypo
Design	Initial Process Design Error			Other
Instrument	Instrumentation failure			
Explosion	Loss of Mechanical Integrity due to violent chemical reaction / explosion			
Corrosion	Loss of Mechanical Integrity due to corrosion/erosion			
Force	Loss of Mechanical Integrity due to external forces (collision, ill will, weather ...)			
Maintenance	Loss of Mechanical Integrity due to maintenance procedure error			
Machine	Machinery failure			
Gasket Mat.	Material Gasket Failure			
Gasket Mech.	Mechanical Gasket Failure			
Modif	Modified Process Design Error			
Not ident	No Identified Primary Cause			
Other	Other			
Heating	Overheating			
Pressure	Overpressurisation			
Structure	Structural support failure			
Constr Mat	Unsuitable Material of Construction			

Media Response
No
Local
National
International



WCC Incident Sharing Form (2)

Type of Activity
Bleach maker
Chemical Industry Cl ₂ consumer
Chlorine producer
Other
Packager
Swimming pool
Water treatment

Quantity released
Unknown
0
<= 1 kg
<= 5 kg
<= 10 kg
<= 100 kg
<= 500 kg
<= 1 t
<= 5 t
<= 10 t
>10 t

Product
Chlorine
HCl
Hydrogen
Hypo
Other



WCC Incident Sharing Form (3)

Primary Cause	
Electrical	Electrical outage
Mixing	Erroneous mixing
Training	Human error: Lack of Training
Procedure	Human error: Procedure Not Applied
Design	Initial Process Design Error
Instrument	Instrumentation failure
Explosion	Loss of Mechanical Integrity due to violent chemical reaction / explosion
Corrosion	Loss of Mechanical Integrity due to corrosion/erosion
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Not ident	No Identified Primary Cause
Other	Other
Heating	Overheating
Pressure	Overpressurisation
Structure	Structural support failure
Constr Mat	Unsuitable Material of Construction



Incident Sharing – The Practice



ABICLOR INCIDENT REPORTING

(1) EVENT DATE: ___ / ___ / ___ (2) CITY _____ (3) STATE: _____

(4) PLACE OF ACCIDENT: _____ TIME: _____

(5) PRODUCER: _____ (6) CARRIER: _____ (7) COSTUMER: _____

(8) PRODUCT: _____

(9) AMOUNT INVOLVED: _____ (10) AMOUNT RELEASED: _____

(11) DESCRIPTION OF EVENT:

(12) DAMAGE/CONSEQUENCE:

- MATERIALS/EQUIPMENT:
- PERSONAL:
- ENVIRONMENTAL:

(13) CAUSE OF EVENT:

(14) IMMEDIATE ACTIONS TAKEN:

(15) PROPOSALS TO AVOID REOCURRENCE:

Date: ___ / ___ / ___

ABICLOR Incident Sharing

Year		Chlorine	Caustic soda	Sodium hypochlorite	Hydrochloric acid	Total
2012	Transport	-	3	2	1	6
	at Plant (*)	8	-	-	-	8
	Total	8	3	2	1	14
2013	Transport	-	5	2	0	7
	at Plant	5	-	-	-	5
	Total	5	-	-	-	12
2014 ytd	Transport	1	1	1	4	7
	at Plant	3	-	-	-	3
	Total	4	1	1	4	10

(*) Water treatment station/Costumer facility/Producer plant



Incident Sharing in USA / CI

Example of Intelex Form and Information

Question 4, Incident Classification:

Modified to
include
chemical
burns in the
“on-site” and
“off-site”
injury
counts.

Safety and Incident Reporting: Form IR

S Form IR CHLOREP Form List of Form S Reports List of Form IR Reports List of CHLOREP Reports

e. Resulted in an emergency Response

f. Resulted in an ON-site OSHA recordable injury.

i. # of total OSHA recordable injuries

ii. # of OSHA recordable injuries that were classified as a chlorine gas inhalation

iii. # of recordable injuries classified as restricted work or day away from work (DAWAC) case

iv. # of recordable injuries resulting in hospitalization

v. # of fatalities

vi. # of OSHA recordable injuries that were classified as a CHEMICAL BURN

g. Resulted in an OFF-site injury

i. # of total injuries

ii. # of injuries that were considered a chlorine gas inhalation

iii. # of hospitalizations

iv. # of fatalities

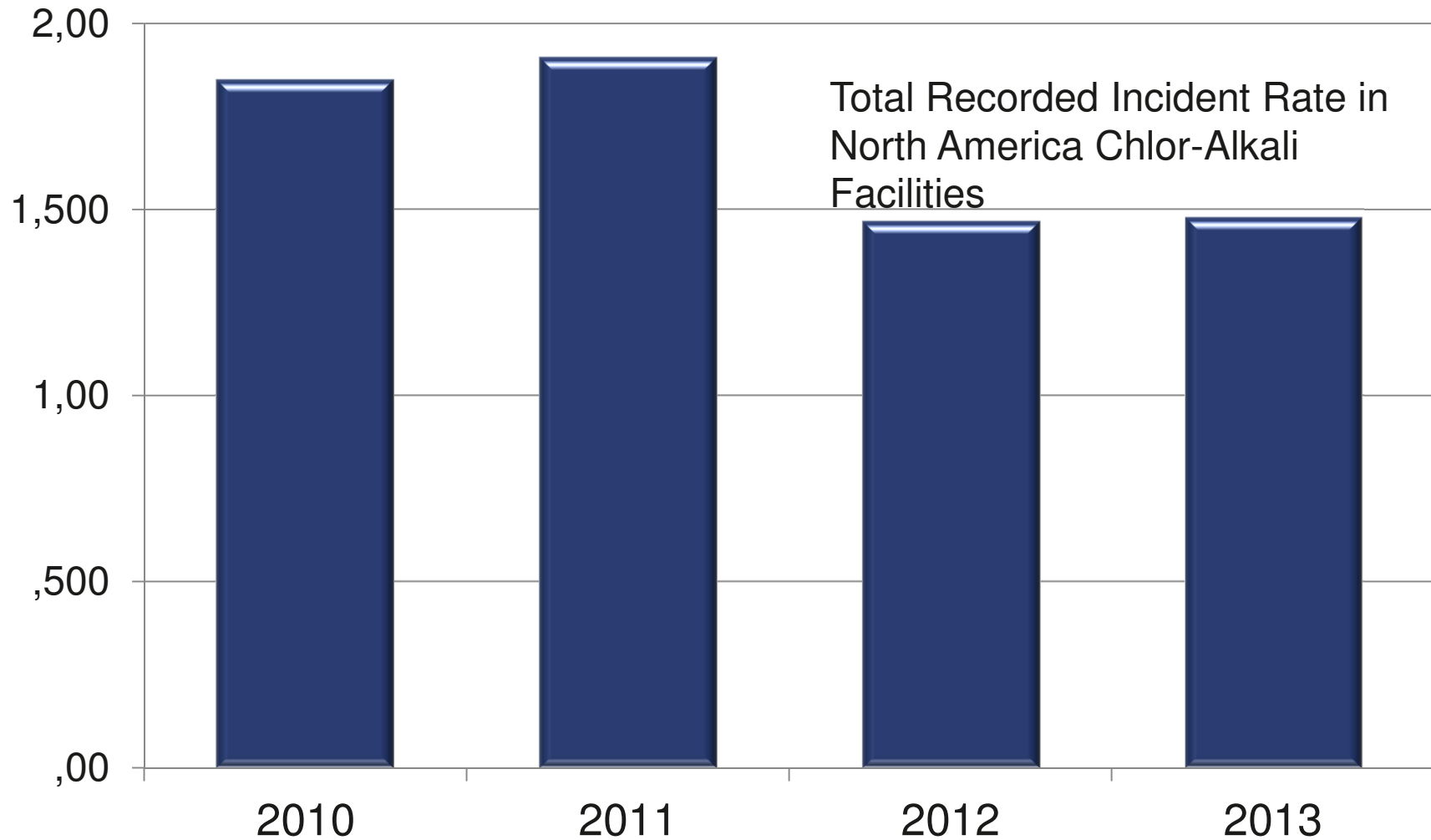
v. # of injuries that were classified as a CHEMICAL BURN

Incident Reporting

- However- incident reporting has basically stopped since 2004
- Not really sure why – when in doubt blame the lawyers
- Along with process safety the goal of the GST over the next few years will be to improve incident reporting
- Simplify format and provide a clear definition of what should be reported
- Get commitment from GST associations to provide information

Injury Statistics- North America

number of incidents per 200,000 work hours





Incident Sharing EUROCHLOR

Year	2011				2012				2013				2014		ytd	
	Transport	at Plant	Total		Transport	at Plant	Total		Transport	at Plant	Total		Transport	at Plant	Total	
	-	1	1		-	3	3		1	-	1		-	1	1	



Incident Sharing - Conclusions & Questions

Sound safety and environmental practices
are the basis of our
LICENSE TO OPERATE

Are we really performing that good in some regions ??

How can we revitalize incident sharing ?



Incident Sharing Practices

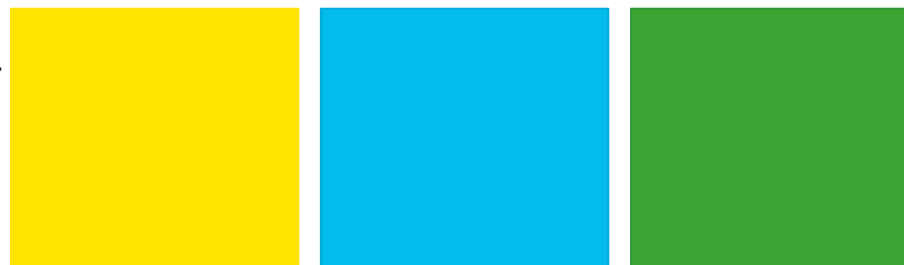
BACK-up slides



Euro Chlor Safety Initiative

Fritz Näumann | Euro Chlor

GAM Edinburgh, September 12, 2014





Euro Chlor Safety Initiative

Sound safety and environmental practices
are the basis of our
LICENSE TO OPERATE

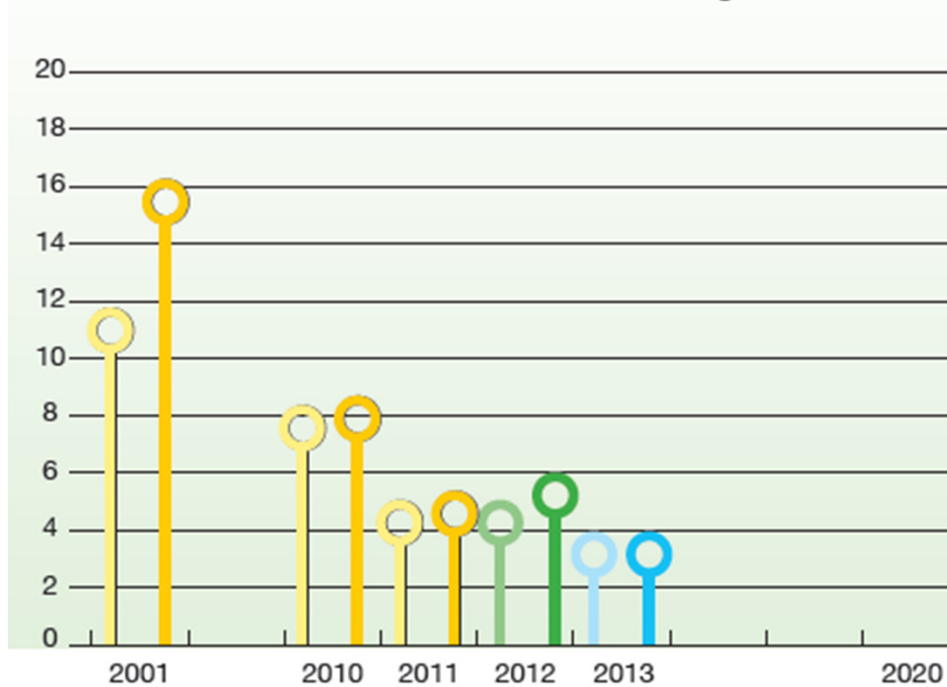
Proactive approach of Euro Chlor towards SAFETY

May 2013 Euro Chlor Safety Commitment

Euro Chlor Safety Initiative 2014

European Chlorine Industry Safety Performance

Chlor-alkali Lost-time Injuries frequency rate
(number of LTI incidents per million working hours)



Companies

Contractors

- improvement trend reconfirmed in 2013
 - big spread of performance
- => further improvement potential



Euro Chlor Safety Initiative - Elements

- Enhance self-commitment of members
- Offer 3rd party training for leaders
- Improve reporting & sharing of safety information
- Establish a self-audit tool
- Offer enhanced networking & experience exchange
- Encourage sharing of best practices & safety rules
- Offer support visits by Euro Chlor
- Build on existing industry and member programmes

Dutch industry programme Safety First – Veiligheid Voorop



- Safety Leadership Culture
- Safety Management System
- Agree & report safety KPIs
- Emphasize workers' training
- Networking, Communication (IT assisted)
- Sharing of Safety Information & Practices
- Responsibility for Value Chain

AkzoNobel Life-Saving Rules

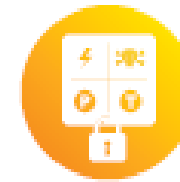
Golden Principle:
Stop work if conditions
or behaviour are unsafe

TakeCare

Life-Saving Rules:



Work with a valid work permit when required



Check equipment is isolated before work begins



Use fall protection when working at height



Obtain authorization before disabling safety equipment



Obtain a permit for entry into a confined space



Wear a seatbelt in motor vehicles when provided



Make sure moving machinery is guarded



Do not use alcohol or drugs at work

Lead on – Geh voran

BASF Safety Awareness Cards

- What do I want to Improve under my responsibility this year to prevent accidents, incidents and near-misses?
- How and when do I reward good safety work?
- Where in my area might the next accident happen?
- How do I react appropriately when someone doesn't behave safety/respect our Safety Rules?
- What percentage of my resources do I spend on safety in my area?





Euro Chlor Safety Initiative - How

- Focus on leaders: company executives, site/plant managers, EHS function
- Safety culture
- Offer support
- Encourage sharing information / best practices
- Peers assisting each other but also peer pressure
- Expect industry leaders to actively assist
- Build on existing programmes



Implementation Steps

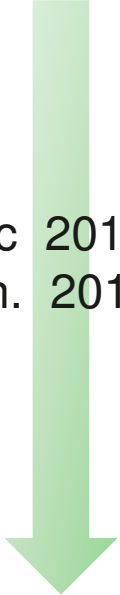
- Communicate basic safety rules
- Check / adapt LTI data
- Select 3rd party leadership seminar
- Design & roll-out self-audit tool
- Offer support visits to members sites
- Organize 1st leadership seminar

- Progress report at AGM 2015

Sept 2014

Dec 2014
Jan. 2015

Mid 2015





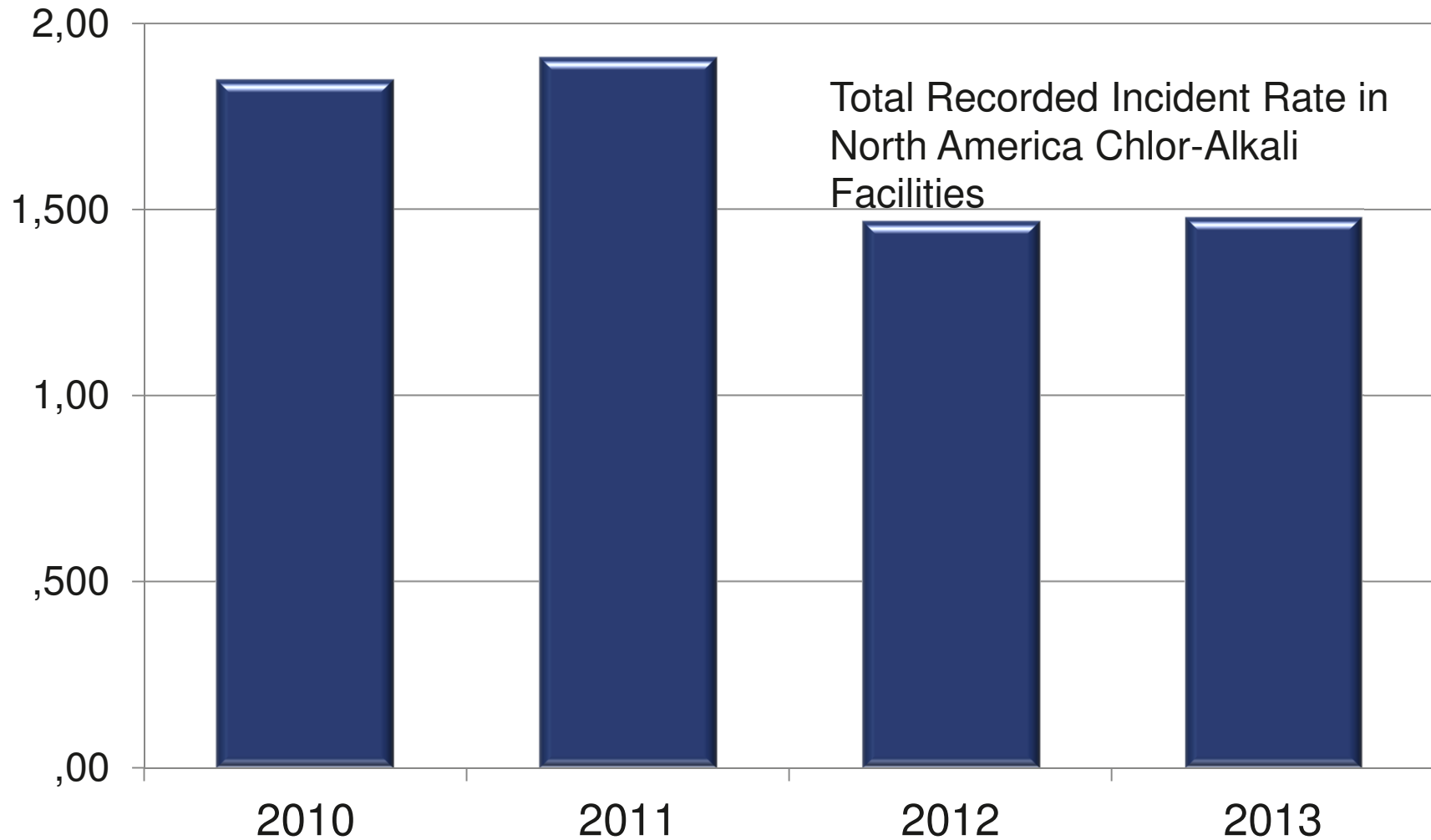
BACK-UP Incident Sharing in USA / CI

US Incident Reporting

US Government Requirements

- The US government agency for personnel safety is OSHA
- The US government agency for releases of chlorine or other hazardous chemicals is EPA
- In the US personnel records of accidents are maintained but are not required to be submitted to the OSHA.
- Releases of chlorine or other regulated hazardous chemicals that are of a certain quantity or which may leave the facility property must be reported.

Injury Statistics- North America



US Incident Reporting

Chlor-Alkali Industry Reporting

- Members of the Chlorine Institute report both personnel and chemical release incidents to CI staff via an online reporting system called Intalex
- All injuries reported except first aid cases (personnel injuries)
- Releases of chlorine or other CI mission chemicals reported (process incidents)
- The Performance Indicator Report and CI Safety and Environmental Awards based on this reporting

Example of Intelex Form and Information

Question 4, Incident Classification:

Modified to include chemical burns in the “on-site” and “off-site” injury counts.

Safety and Incident Reporting: Form IR

S Form IR CHLOREP Form List of Form S Reports List of Form IR Reports List of CHLOREP Reports

e. Resulted in an emergency Response

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iv. # of recordable injuries resulting in hospitalization

v. # of fatalities

vi. # of OSHA recordable injuries that were classified as a CHEMICAL BURN

g. Resulted in an OFF-site injury

i. # of total injuries

ii. # of injuries that were considered a chlorine gas inhalation

iii. # of hospitalizations

iv. # of fatalities

v. # of injuries that were classified as a CHEMICAL BURN

Example of Intelex Form and Information

Part IV: Incident Information

5. Date Incident Began (MM/DD/YYYY)

6. Time of day when incident began

6a. For each on-site injury, list the number of years of Chlor-Alkali experience of the injured person.

Question 6, Incident Information:

Modified to add a text box to indicate the number of years of experience of each injured person involved in the incident.

Example of Intelex Form and Information

10a. Mode of operation when the incident occurred

Question 10, Incident Information:

Modified to add a dropdown list for Mode of Operation

- Normal Operations
- Troubleshooting
- Routine Maintenance
- Reactive Maintenance
- Startup
- Shutdown

Safety Data Use

Performance Indicator Report

- For Chlorine Institute Members Only
- Published in late spring
- Purpose:

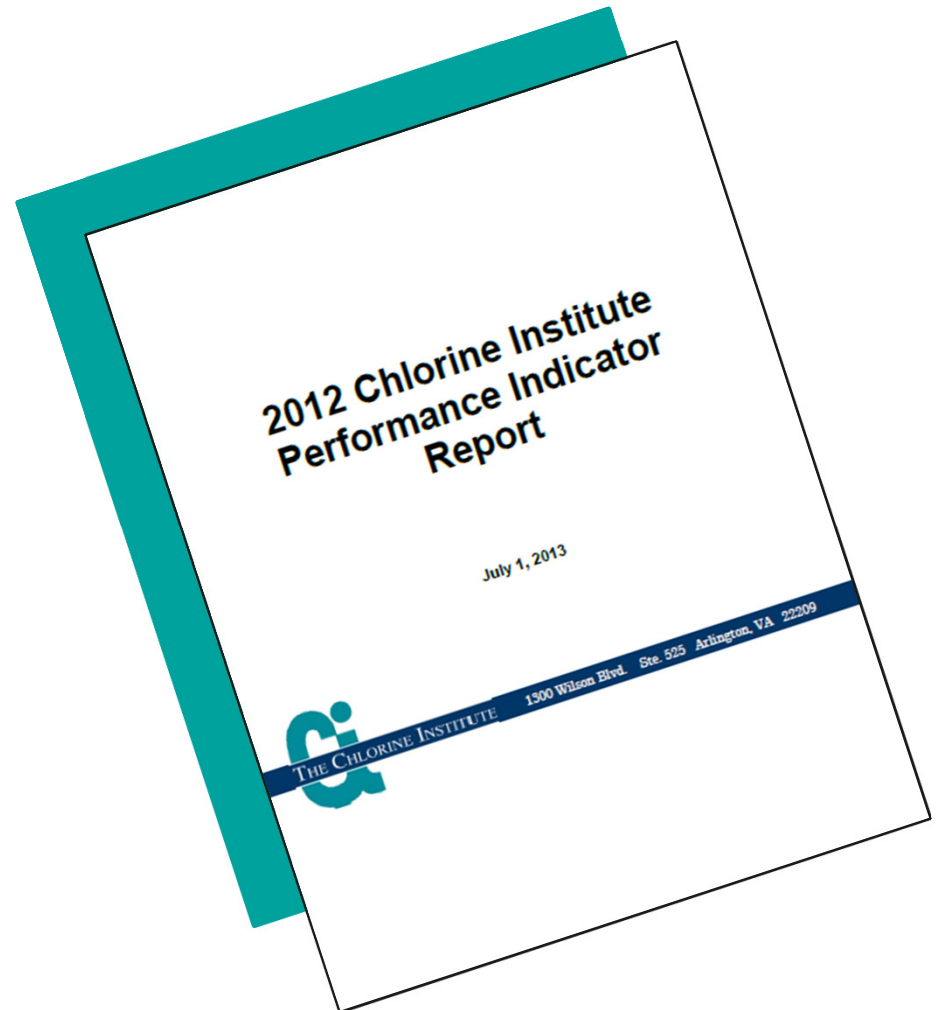
Sharing information regarding chlorine incidents is critical to each member's overall success in reducing the frequency and severity of such incidents. ...A report on chlorine safety performance of the Institute membership shall be prepared and presented annually. Chlorine safety performance measurements include chlorine incident and related injury performance.”

-Policy on Chlorine Safety and Security Stewardship

Contents of Report

Annual compilation of CI member safety performance:

- Comparison of actual performance with annual goals
- Listing of incident descriptions with CI severity ratings
- Historical trends in safety of CI members



Safety Alerts/Lessons Learned

- Safety Alerts based on information reported to CI Staff
- Member Exchanges

WCC GST Incident Reporting

WCC Global Safety Team (GST) Incident Tracking Program

- The GST seeks to learn about chlorine incidents and report about them in the GST newsletter so we can all learn from these experiences and minimize the risk of such incidents being repeated.
- The GST believes that the reporting of such incidents can also improve the technical recommendations published by WCC member associations.

Incident Reporting

- However- incident reporting has basically stopped since 2004
- Not really sure why – when in doubt blame the lawyers
- Along with process safety the goal of the GST over the next few years will be to improve incident reporting
- Simplify format and provide a clear definition of what should be reported
- Get commitment from GST associations to provide information



Chlorine events reporting – General guidance

The events reporting is coordinated with the other chlorine producers associations (like the Chlorine Institute) to produce the World Chlorine Council (WCC) database. All events to be reported would be associated with chlorine production, distribution, or use. The objective is not to build an exhaustive database, but to allow chlorine producers and users to learn from experience of these events; in consequence, the “near misses” having also a “high learning potential” should be included.

The event report form (EXCEL sheet available on the CVn) should preferably be used and sent as soon as possible to the Euro Chlor secretariat. The key elements to be included are:

- description,
- consequences,
- preventative measures (most important part in the frame of the learning process).

Pictures or drawings are also very useful to better illustrate the event.

Criteria for reporting

The most important criterion triggering the reporting is the technical interest (learning form experience), but other criteria, like the ones used in the “process incident” reporting of the Sustainable Development questionnaire, must also be taken into account:

- serious injury (lost time) to one or more employee or contractor
- property damage in excess of EUR 100,000
- media response
- authorities involved
- leak > 5 kg chlorine