Great Lakes Industries: The Business of Resilience

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Adaptation in the Great Lakes Region Conference
University of Michigan, Ann Arbor, MI (June 25, 2014)
Mission: To promote the economic growth and vitality of the region in harmony with its human and natural resources (sustainable development).
**Climate, Adaptation, and Resilience Initiative: Objectives**

- Comprehensive understanding of regional climate science
  - Multiple perspectives from experts
  - Focus on industry impacts
- Increased awareness of emerging adaptation policies, strategies, and information needs
- Opportunity to share and further develop best practices for climate risk management in the region.

(C) CGLI

*Council of GREAT LAKES INDUSTRIES*
Great Lakes Industries: The Business of Resilience

- The current state of resilience planning and initiatives among different industry sectors in the Great Lakes Region

- **William Landuyt**, Exxon Mobil (IPIECA’s perspective)
- **JulieBuffenbarger**, Lafarge (Hinckley, OH)
- **Bob Masterson**, Chemistry Industry Association of Canada (Toronto, ON)
- **Jim Byrum**, Michigan Agri-Business Association (East Lansing, MI)
- **Greg Ryan**, DTE Energy (Detroit, MI)
Addressing Adaptation in the Oil and Gas Industry: An IPIECA Workshop

William Landuyt

June 25, 2014
Outline

• IPIECA
• Introduction
• Adaptation planning
  • Risk identification
  • Risk assessment
  • Risk management
• Key Messages
IPIECA

- IPIECA helps oil and gas improve its environmental and social performance by:
  - Developing, sharing and promoting good practices
  - Enhancing and communicating knowledge and understanding
  - Engaging members and others in the industry
  - Working in partnership with key stakeholders

- IPIECA is industry’s principal channel of communication with the UN
Introduction

• Primary focus on mitigation strategies in climate risk management

• Growing perspective on role of adaptation

• Adaptation = climate risk management strategy

• Oil and gas companies have risk management implemented in business decisions
IPIECA Adaptation Workshop

- IPIECA convened a workshop of scientists, engineers, insurance industry, emissions disclosure organization, and O&G industry

- IPIECA Workshop Outline
  - Adaptation planning
  - Identify/assess risks and for the oil and gas sector
  - Risk management
  - Industry case studies

- Summary report published in 2013;
  SPE-HSE paper published in 2014
Adaptation Planning

Identification of risks and vulnerabilities

Revision of strategy and research; sharing lessons learned

Stakeholder engagement

Planning, assessment and selection of options

Monitoring and evaluation

Implementation

Revision of strategy and research; sharing lessons learned
Risk Identification

Changes in climate

- Changes in temperature
- Changes in precipitation
- Global and local sea level rise
- Regional changes in ice/snow/permafrost

Potential risks

- Exploration
  - Subsidence
  - Wave loading
  - Loss of surface water access
  - Delays due to species migration

- Production
  - Early season delays
  - Pad damage
  - Loss of surface water access
  - Production interruptions
  - Ice road—decreased tundra travel

- Transport and terminals
  - Ice-load variation
  - Damage to coastal facilities
  - Shipment interruptions
  - Improved or reduced shipping lanes or seasons

- Pipelines
  - Thaw subsidence and frost jacking
  - Wildfires

- Refining and processing
  - Loss of access to water
  - Flooding
  - Loss of peak cooling capacity

- Neighbouring communities
  - Loss of species and habitat
  - Water
  - Storm impacts on key infrastructure
Risk Assessment

- Risk = Hazard*Vulnerability
- Climate change may alter the hazard severity
- Challenges:
  - Assessing risk is complex and location specific (site design & lifetime, future projections)
  - Many future climate projections are low confidence at an appropriate local scale
Risk Management

• Response (adaptation) aims to either:
  • reduce vulnerability to a hazard/event and/or
  • reduce severity of resulting impacts

• “No-regrets” plans can define low cost actions to design resiliency into new and existing operations

• Flexible but robust designs, together with adaptive management practices will be critical

• Typical design factors are robust to extreme events across a broad range of conditions

• While project design is major response, the workshop highlighted opportunities a range of O&G may employ
Risk Management

Actions by industry to incorporate climate risk (responses to CDP survey)
Key Messages

• Risk management is integral to oil and gas decision-making frameworks

• Adaptation in climate risk management involves:
  • Identify/evaluate risk; develop strategy; implement & manage

• O&G companies currently assess a range of climate-related risks

• Many impacts are local, therefore adaptation plans need to be local to enable appropriate design and operational actions

• Uncertainty in climate variability/future scenarios suggests focus on:
  • Flexible & robust engineering designs
  • Adaptive management systems

• Both the private sector and government will play key roles
The Current State of Resilience Planning and Initiatives in the Great Lakes Region: Cement and Concrete Sectors

Julie Buffenbarger, FACI, LEED AP
Lafarge North America
Climate Change and Resilience

- **Measurable Impacts**
  - Loss of Lives,
  - Damage to Infrastructure
  - Economic Costs

- **Implications beyond Measurable Impacts**
  - Loss of Elements of Social Capital
    - Identity
    - Culture
    - Historical
    - Community
Infrastructure resilience is the ability to reduce the effects of the magnitude and duration of disruptive events on the physical environment.

The effectiveness of a resilient enterprise depends upon its ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.

Resilience is the ability to anticipate risk, limit impact, and bounce back rapidly through **survival, adaptability, evolution, and growth** in the face of turbulent change.

**Resilient communities**
- Minimize damage and losses of property, environment and lives
- Quickly return citizens to work, reopen businesses, and restore other essential services

**Functional Resilience**
- A structure's **durability and competence to maintain its integrity and its function restored.**
Infrastructure resilience can be characterized by the three R’s:

- Robustness, resourcefulness and recovery.

Secure, Durable and Resilient Design includes:

- Energy Conservation, Environmental, Safety, Security, Durability, Sustainability and Operational Efficiency

After Hurricane Sandy, the ICF home was structurally intact, with only a section of exterior siding missing.

Another home, just three lots down, looked like this following the super storm.
Multi-pronged approach:

• Continued efforts to achieve the adoption of more robust building code requirements through advocacy, education efforts and proposals within the codes. Educational opportunities with community leaders, city planners, building code officials, design community and post-secondary education arenas.

• Support of governmental legislature for the adoption of resilient construction.

• Continued research into resilient and innovative construction techniques.

• Comprehensive promotion strategy with partners to raise the awareness of the social, economic, and environmental benefits of resilience.
Code Changes

Update building codes, standards, practices and zoning plans.

- Support the development and adoption of meaningful, effective, robust performance-based building codes.
  - IBC and IgCC
- Require resiliency to hazards beyond minimum code.

Community-wide or even regional climate adaptation and resilience plans.

Re-establishment of Green Space and Barriers
USGBC and Resilience

There are no specific credits in LEED v4 that discuss the issue of resiliency.

Resiliency is considered as part of the equation we use to assess value (assign points) to credits. There are seven different impacts that we consider, which includes everything from climate change to human health, biodiversity protection, water preservation, and enhancement of the economy and improving community quality of life.

Resiliency falls under community quality of life. Essentially, it gives additional points to credits related to issues that would allow for resiliency through a significantly altered state (whether from climate change, an environmental disaster, etc). Examples of this concept include (but are not limited to) Demand Response, Renewable Energy Production, and Green Power and Carbon Offsets.
NRMCA – Resilience Pilot Credit

LEED Pilot Credit based on 3 option pathways:

1. Reduced lifetime material replacement from probability of hazard events

2. FORTIFIED designation

3. Durability Characteristics (per Canadian LEED)

Submitted October. Waiting for response from USGBC. Recently (11/7) requested status update.
• **Practical design**, so that decision makers can not only see clearly what problems they face, but also find the solutions they need, in order to respond to power and water supply needs in a changing climate.

  • Energy Efficiency
  
  • Water Efficiency
Climate Adaptation/Mitigation Design

- **Cooler Communities**
  - Pavements
  - Building Facades

- **Energy Efficient Design**
  - Building Envelope Design

- **Water Efficiency**
  - Permeable Concretes
    - Water Storage
    - Return Water to Aquifer
Climate Resilient Buildings

Protection of buildings, cities, infrastructure and lifestyles against risks associated with extreme weather and related social, economic and energy events require

• Durability

• Resilience
Enhanced Resilience

90 West St.
Built in 1907

Damaged by WTC collapse, uncontrolled fire for 5 days, and reopened as apartment building in 2005

Winecoff Hotel.
Built in 1913

Completely gutted by fire in 1946, hotel in 1951, housing for elderly, vacant for 20 years, and became the Ellis Hotel in 2007
Resilient Iconic Infrastructure

The L.A. Metro Blue Line Bridge was designed to sustain no functional damage from the worst earthquake expected in the next 75 years.

Celebrated as an engineering marvel when it was completed in 1932, today it remains one of the world's highest single-span bridges and is memorialized in countless car commercials.

Built in the 2nd century A.D., Rome’s Pantheon is still the largest unreinforced concrete dome in the world.

Hoover Dam: Built in 1935, there are 4,360,000 cubic yards of concrete in the dam, power plant and appurtenant works.
Federal Resilience Legislation

HR 1878, Safe Building Code Incentive Act of 2013
Increased contribution for a major disaster by an amount equal to 4% of estimated grant at time of disaster declaration if state has adopted most recent version of building code and uses it as a minimum standard.

HR 2241, The Disaster Savings and Resilient Construction Act of 2014
Offers tax credit of $3,000 and $25,000 per structure, for building owners who use life-and-property saving techniques in residential and commercial construction respectively. Received designation from the Insurance Institute for Business and Home Safety of FORTIFIED for Safer Living/Business

http://www.nrmcavoice.com/resilient-construction
Federal Resilience Legislation

SB 601, Amendment – Water Resources Reform & Development Act

(1) Encouraging Army Corps of Engineers to use resilient construction:

(A) to resist hazards due to a major disaster; and

(B) to continue to serve the primary function of the water resources infrastructure project following a major disaster;

• reduce the magnitude or duration of a disruptive event to a water resources infrastructure project; and

• have the absorptive capacity, adaptive capacity, and recoverability to withstand a potentially disruptive event.

(2) Use of innovative materials which is now defined as, “methods, or materials, including roller compacted concrete, geosynthetic materials, and advanced composites which the Secretary determines are appropriate to carry out this section”

(3) Asks National Academy of Sciences to consider the reduction in long-term costs and vulnerability to infrastructure through the use of resilient construction techniques

http://goo.gl/oRGa1F

http://www.nrmcavoice.com/resilient-construction
Resilience Research Strategy

- The strength of concrete systems offer unmatched resistance to major devastation
  - Strong wind resistance
  - Greater stiffness than ordinary frame construction
  - Heavier
  - Reduced uplift
  - Reduced overturn
- Better wind driven debris protection
- Unequaled passive fire resistance

Hearst Castle: Reinforced Concrete
Built from 1919-1947; Suffered no damage in 2003 from four earthquakes.
Understanding Hazard Mitigation

MIT Concrete Sustainability HUB

FLASH

American Concrete Institute

Universities
Educational Partnership Strategy

• **Internal Collaboration**
  • Concrete Joint Sustainability Initiative
  • World-wide collaboration between cement and concrete industries on sustainability & resilience

• **External Collaboration**
  • FLASH – Federal Alliance for Safe Homes
  • CARRI – Community and Regional Resilience Institute
  • ReScU - Resilient Scoring Utility for Homes by Homeland Security
  • IBHS – Institute for Business and Home Safety
  • NIBS – National Institute of Building Sciences
  • Mitigation Movement
Insurance Institute for Business and Home Safety (IBHS) criteria that greatly increase a new commercial building’s durability and resilience to natural and manmade hazards.

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**IBHS FORTIFIED for Safer Business Designation (3 points)**

Achieve the Insurance Institute for Business and Home Safety’s (IBHS) FORTIFIED for Safer Business (FFSB) designation. To qualify for this credit option the building must meet all design, construction and inspection criteria such that the building receives the IBHS FORTIFIED for Safer Business designation.
Think Harder: Concrete Solutions for a Stronger Joplin

• Exhibits of Engaged Local Organizations
What is on the Industry Horizon?

Increased Focus:

• General Awareness
  • Media Campaigns
  • Social Networking Outlets
  • Partnerships with Credible Third Parties

• Continued Federal Advocacy

• Concrete Promotion
  • Local and National Disaster Prevention/Resilience Seminars to building codes officials, city planners, etc.

• Local Advocacy/Promotion after Disasters
Responsible Care®

Created in Canada in 1985.

- Condition of membership in CIAC
- Now in 62 countries worldwide
- 180 CEO signatories to Responsible Care Global Charter.

“An inspiring model of self-regulation (which) other industries should consider following.”

– KOFI ANNAN, Former U.N. Secretary General
Why Worry About Resiliency?

“....insurance company statistics show that how companies respond in the first four hours of a disaster is make-or-break.

90% of companies that fail to resume operations within 5 days are out of business in one year.

78% of the companies who suffer a disaster without a business continuity plan are out of business in two years.”

- American Management Association
Some Statistics

43% of U.S. companies never reopen after a disaster, and 29% more close within 3 years (NFPA)

60% of businesses in the World Trade Centre were out of business within 2 years of the terrorist bombing (Canadian Insurance Company)

93% of companies that suffer a significant data loss are out of business within 5 years (U.S. Bureau of Labor)

The 2003 North American grid failure resulted in $6 billion in losses... Over 30 chemical facilities in Southwestern Ontario suffered outages of a week or longer, with several having to declare force majeure on product deliveries. (US FEMA Report)
“... have a process to identify the goods and services it depends on others to provide and those which it may be called upon to provide to others in the event of a larger-scale emergency. The process should consider:

a) ability to operate under different scenarios;
b) ability to cover gaps in resources while maintaining sufficient control
c) knowledge, relationships and accessibility of key data
d) communications
e) staff implications, including cross-training and the potential for operation at lower skill levels
f) staff family support; and
g) policy and decision-making and how the system defaults, both inside the company and in external organizations providing essential services or supplies.
Five Key Questions for Business Continuity Planning

What could go wrong? (The Risk Assessment)

If something went wrong, how would it affect business? (The Business Impact Analysis)

How will the critical services / processes be sustained / resumed in the event of a disruption? (maintaining control through a Business Continuity Plan)

Have the resources been deployed as planned? (Implementing the Plan)

Is the Plan Working? (regular testing and comprehensive post incident reviews)
A wide-range of possible disruptions need to be considered:

1. Hazards caused by nature

2. Hazards caused by technology failures

3. Hazards caused by humans actions, accidental & intentional
Benefits of Resiliency Planning

- Confidence in ability to survive an unexpected catastrophe
- Demonstration of concern to employees, families and communities;
- Ability to meet customers’ expectations
- Demonstration of due diligence to stakeholders;
- Robust and resilient managements systems
- Safeguarding of company reputation;
- Competitive advantage gained due to a swift and effective response;
- Decreased weaknesses and vulnerabilities in business operations; and
- Improvements in insurance costs and coverage.
Verification of Results

All CIAC member companies subjected to triennial external verification process.

Current verification cycle includes an emphasis on expectations for business continuity planning.

Several best practices and gaps identified.

All reports publicly available on CIAC website.
Responsible Care Contacts

www.canadianchemistry.ca

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James E. Byrum
Great Lakes Industries: The Business of Resilience
CLIMATE CHANGE

• Water
  ➢ Access
  ➢ Quality

• Cropping Systems

• Risk Management

• Energy
WATER ACCESS
FUTURE

» RIGHT Fertilizer Source, at the

» RIGHT Rate, at the

» RIGHT Time and in the

» RIGHT Place
CROPPING SYSTEMS

• DRY BEANS
• CORN
• SOYBEANS
• POTATOES
ISSUES

• Pests
• Extreme Weather
• Heat / Cold
• Cropping Systems
RISK MANAGEMENT

• Crop Decisions

• Irrigation

• Drainage
ENERGY

• Access

• Renewables

• Sustainability
FUTURE - SUSTAINABILITY

REDUCED CARBON FOOTPRINT

» Fertilizer
» Fuel
» Irrigation

ENVIRONMENTAL IMPACT

CORPORATE RESPONSE
“STRIVE TO BE WHERE THE PUCK IS GOING TO BE, NOT WHERE IT HAS BEEN!”

Wayne Gretzky

THANK YOU

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