2011 Remediation Technologies Symposium

MARKET ADOPTION OF SUSTAINABLE PRACTICES IN THE CONTAMINATED SITES FIELD IN WESTERN CANADA

Workshop Agenda

- Panel goals and outcomes; challenges and issues in the Western Canadian context .
- Introduction of panelists
- Individual panelist presentation on how SR has been adopted/implemented in their organization
- Challenges or barriers that panel representatives have faced.
  - We hope this will provide the basis or direction for next steps of the SRF group or subcommittees).
  - May be an opportunity to look at a couple of unique issues for a specific/sets of organization and get some discussion on how to move forward.
- Questions to the panelists.
- Wrap up outcomes.
  - Highlights of major issues,
  - Direction for SRF group subcommittees.

Our Panelists

- Clayton Truax, PWGSC
- Joanne West, DOW Chemical Canada
- Lenz Haderlein, Golder & Associates
- Mike Mellross, City of Edmonton
- Paul Fuellbrandt , Alberta Environment

Innovative/Green/Sustainable Remediation in the Federal Contaminated Sites Action Plan

Clayton Truax, PWGSC FCSAP Expert Support

- October 19, 2011 -

FCSAP Phase I and II

- FCSAP Phase I Approaches and Outcomes
  - Defining Innovative Technology
  - Initial Uptake
  - Innovative Remediation Activities: Innovative Remediation Solutions Workshops and Tool Development
  - Identifying Challenges and Opportunities

- FCSAP Phase II Path Forward
  - Defining Green and Sustainable Remediation
  - Promoting Innovative Technology including Green and Sustainable Remediation

Étape I et II du PASCF

- Étape 1 du PASCF: Approches et résultats

  - Définir le terme: Technologie novatrice

  - Évaluation initiale

  - Activités d'assainissement novatrices: Développement d'ateliers et d'un outil sur les Solutions novatrices d'assainissement

  - Identifier les défis et les opportunités

- Étape II du PASCF: Prochaines étapes
  - Définir le terme: Assainissement vert et durable
  - Faire la promotion des technologies novatrices incluant l'assainissement vert et durable

Approaches in FCSAP Phase I

- Innovative Solutions Workshops
- Innovative technology profiles
- Technology Advancement Working Group
- Development of tools (GOST and SD tool)
- Innovative technology promotion, presentations, and displays at National and Regional Workshops, networking events, and through trade publications (e.g., ReNew)

Les approches de l'étape I du PASCF

- Ateliers sur les solutions novatrices
- Description des technologies novatrices
- Groupe de travail sur l'avancement technologique
- Développement d'outils (GOST et outil DD)
- Faire la promotion, des exposés et des présentations aux ateliers nationaux et régionaux, aux évènements de réseautage, et à travers les publications professionnelles (par exemple: ReNew)

Alberta

Freedom To Create. Spirit To Achieve.

SUSTAINABLE REMEDIATION FROM A PROVINCAL REGULATORY PERSPECTIVE

Paul Fuellbrandt Alberta Environment

Government of Alberta

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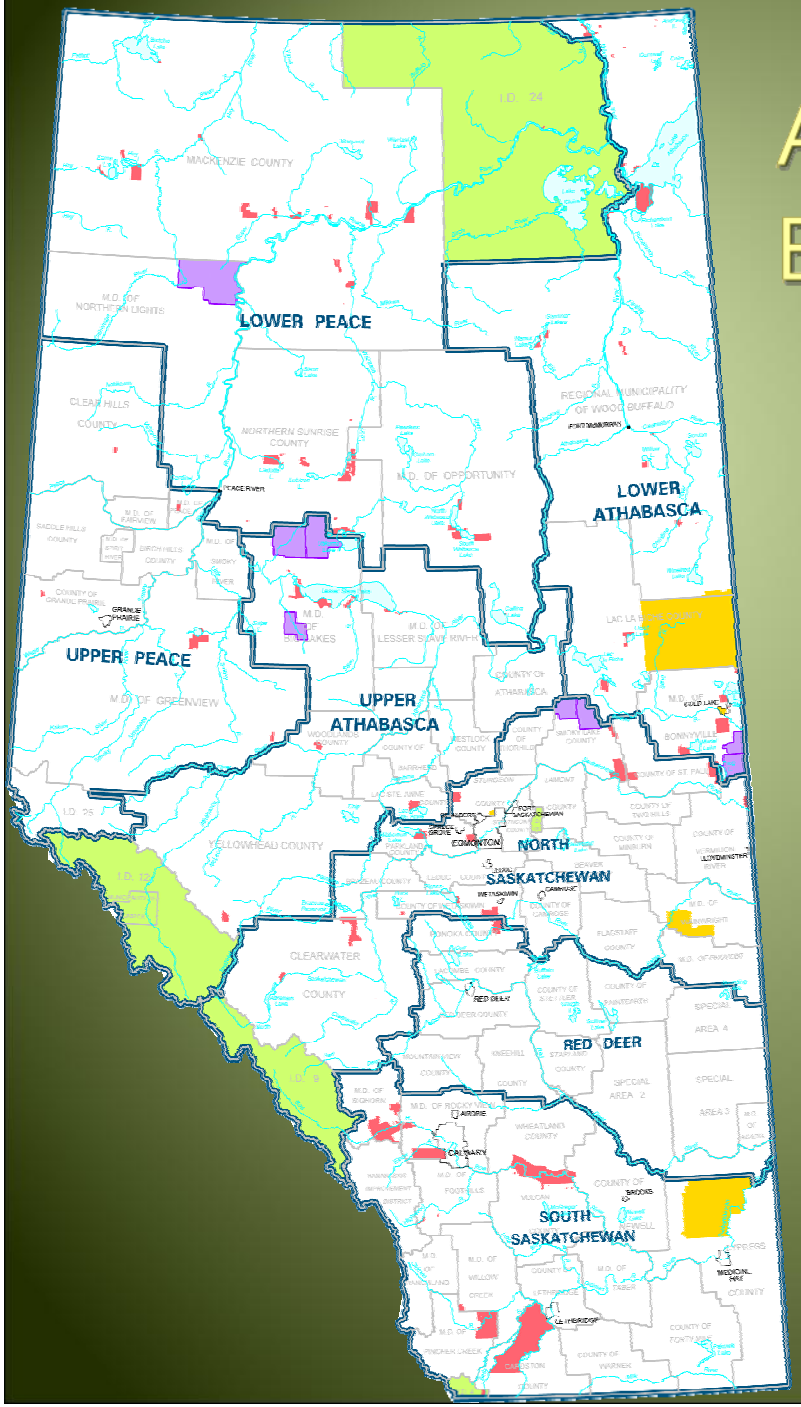
Today's Paradigm

- Current system is Tier 1, Tier 2 and Exposure Control
- Tier 2 Site-Specific Risk Assessment (SSRA) and Exposure Control both allow for some in-situ and risk management options.

Note: Tier 2 SSRA allows for regulatory closure while Exposure Control does not

- Brownfield initiative is currently being discussed with municipalities
- This will address sites that have implications for the broader community



A Shift Towards Cumulative Effects Management (CEM)

- Cumulative Effects Management (CEM) will be used to manage implications of development to air, land, water and biodiversity
- Environmental assessment will need to shift to a regional focus from a project-specific focus to support CEM.
- The current implementation vehicle for CEM is the Land-Use Framework system
- Regional plans will guide future development decisions

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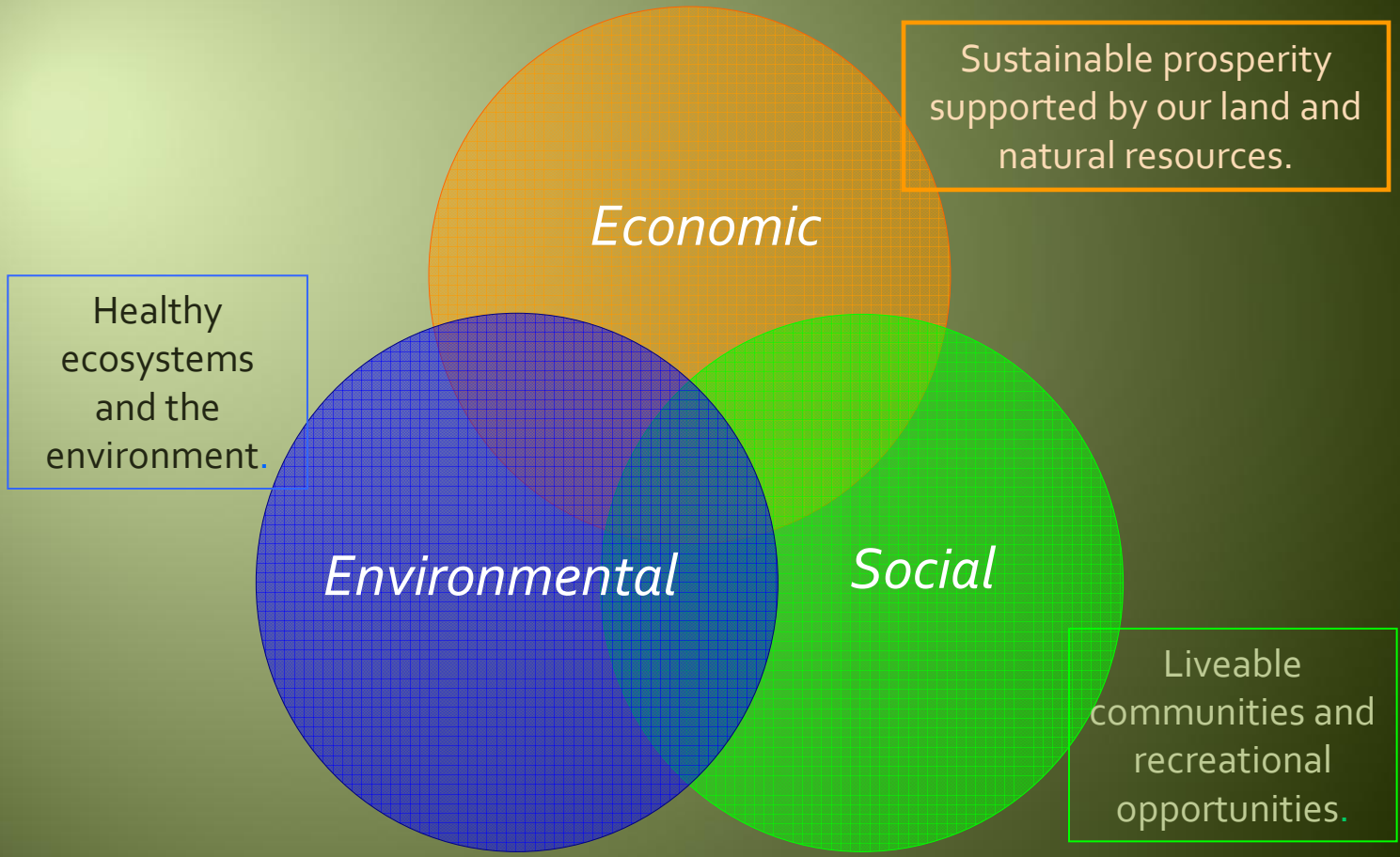
Land-use Framework



City of Edmonton

Mike Mellross Sr. Environmental Project Manager
City of Edmonton's Urban Planning & Environment Branch

Tools for Integrating Sustainability into Contaminated Sites Management

Community Brownfield Redevelopment

- Exposure Control and In Situ Management
- Interim Land Use
- Stackable Incentives and Programs
- Education

City Contaminated Sites Management

- The Way We Green Sustainability Lens
- Full Cost Accounting
- Capacity Building

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Golder and Associates

Lenz Haderlein - October 19, 2011 -

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Sustainable Remediation in Conventional Upstream Oil and Gas in Western Canada

- Decommissioned or end-of-life upstream oil and gas sites represent a significant proportion of the contaminated sites in Western Canada
- Many oil and gas operators have begun to adopt corporate sustainability strategies in aspects of their business
- Site remediation of typical decommissioned upstream oil and gas sites today often consists of excavation and on-site treatment or landfill disposal of impacted soil.
- An operator dealing with end-of-life issues is often dealing with a portfolio of sites (tens to thousands). Prioritization and risk ranking of sites provides an opportunity to look at the "bigger picture" There can be benefit to introducing sustainable remediation concepts at this stage.

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Sustainable remediation components that can be successfully integrated into site prioritization:

- Environmental Indicators
  - Environmental Quality Guidelines (Water, Soil, Sediment)
  - Energy consumption and GHG emissions
  - Quantity of Waste Generated
  - Effects on Flora and Fauna
- Societal Indicators
  - Health and Safety (workers and community
  - Opportunites for local business
  - Cultural Heritage
  - Public disruption
- Economic Indicators
  - Direct costs
  - Liability reduction
  - Corporate image

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Dow Chemical Canada

Joanne West - October 19, 2011 -

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Translating sustainable principles into effective remediation projects

- **Sustainability** requires making every decision with the future in mind.

- Seven areas of focus in Dow's Corporate sustainability goals:
  - Sustainable Chemistry
  - Breakthroughs to World Challenges
  - **Addressing Climate Change**
  - **Energy Efficiency & Conservation**
  - Product Safety Leadership
  - **Contributing to Community Success**
  - **Local Protection of Human Health & the Environment**

Remediation Metrics

	Climate Change	Energy Conservation	Community Success	Human Heath & Environment
Energy use	√	√		
Greenhouse gases	√			
Air quality				√
Land reuse			√	
Renewable fuels	√			
Waste minimization		√	√	
Ecosystems – biodiversity, habitat			√	
Minimize injury illness potential				√
Life cycle costs			√	
Water use		√	√	
Long term liability			√	√
Confidence remedy will meet goals			√	√
Stakeholder acceptance			√	
Coordination with other property owners			√	

Sustainable remediation projects at Fort Saskatchewan, AB

DOW

Groundwater - avoid conventional pump & treat systems

- using trees for hydraulic control instead of mechanical pumping
- using permeable reactive barriers to treat contaminated groundwater in utility corridors

Soil – avoid excavation with landfill/incineration

- extensive use of bioremediation with construction of soil treatment areas and ex-situ biocells to treat chlorinated organics

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