

# Oil Sands Remediation What's the (end) Point?

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# The Fine Print

- The comments made today are my own
- They do not reflect the views of my current, past or future employers or the CLRA
- They are derived from almost 30 years in the business
- They are shaped by my roles in research, regulation, policy development as well as my roles as chronicler of things reclamation for the CLRA

# I Know It Is Rude But ...

- ▣ Getting back to the basics



All Clip Art from MS Word

# Mineable Oil Sands Focus



<http://environment.alberta.ca/apps/osip/>

# Why the Concern?

- ▣ Considerable effort and money being spent on developing solutions to a problem that has not been clearly articulated
  - Process-affected water treatment
  - Mine Financial Security Program calculations
- ▣ Implications
  - Revise conclusions and recommendations based on new guidelines
  - Worst case is need to redo work

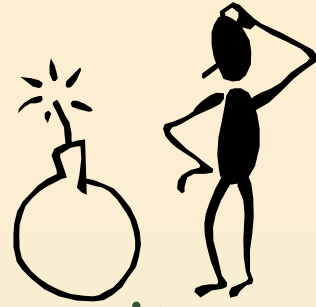


# Remediation Plan Requirements

- ▣ Current and proposed land use
- ▣ Compounds of potential concern (COPCs)
- ▣ Natural levels and variability of COPCs in the environment
- ▣ The guidelines (endpoints) to be applied



# Is There a Remediation Problem?



- ▣ Given negative press, especially for tailings, it seems obvious but ...
- ▣ Look to the definition of remediation for an answer
  - The removal, reduction, or neutralization of substances, wastes or hazardous material from a site so as to **prevent or minimize any adverse effects** on the environment now or in the future
- ▣ Treatment vs. remediation
  - The power of words

# Land Use



- ▣ Reclamation objective
  - The approval holder shall reclaim the land so that the reclaimed soils and landforms are capable of supporting self-sustaining, locally common **boreal forest** ecosystems, **regardless of the end land use.**
- ▣ Forest = *natural areas* guidelines
- ▣ But
  - Recreation is possible – residential/parkland
  - Commercial or industrial use is possible
- ▣ But **regardless of the end land use** so ...
- ▣ Aboriginal traditional use must be considered





# COPCs



- ▣ Salts
- ▣ Metals
- ▣ Hydrocarbons
  - Naphthenic acids
  - But, not just classical NAs so ... oil sands tailings water acid-extractable organics
  - Which one or subset to regulate and how to measure?

# COPCs in the Environment

- ▣ Option to modify Tier I Guidelines based on natural COPC levels
- ▣ Research and characterization work has been done on hydrocarbons, salts and metals
  - Sets stage for developing guidelines

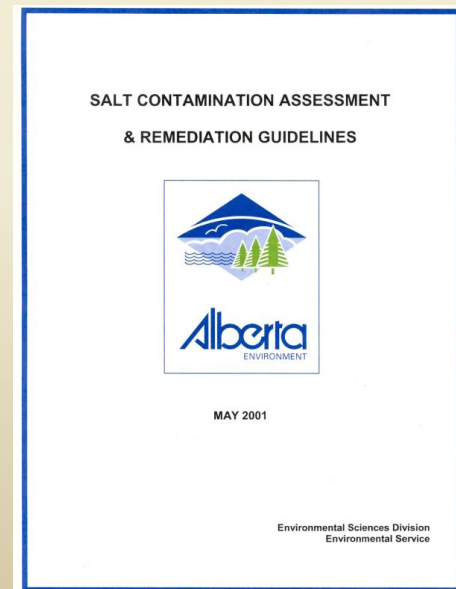
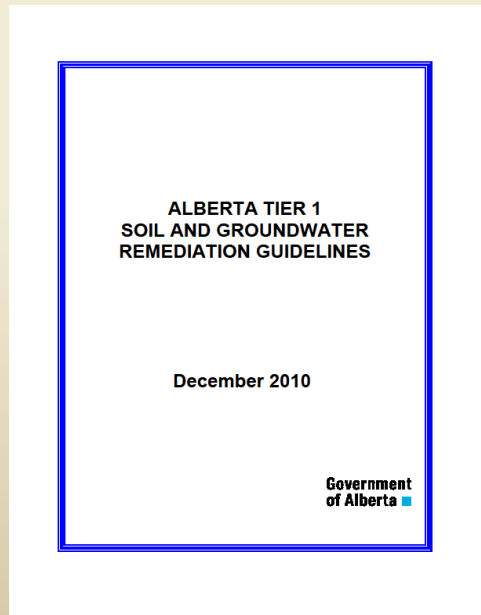
Table 3. Results for Hydrocarbons in Trace, Medium and Strong Samples.

Site	Visual Rating	Depth (cm)	F2	F3	F4	F4+	Petro-flag Reading
			Observed	Observed	Observed	Observed	
8	Trace	50-100	<10	<10	<10	<10	179
10	Trace	150-200	<10	<10	<10	<10	239
35	Trace	50-100	<10	21	14	14	25
5	Medium	50-100	16	83	168	554	691
7	Medium	150-200	<10	76	80	115	612
7	Medium	250-300	<10	125	162	504	783
3	Strong	50-100	<10	13900	19200	55000	>2000
15	Strong	50-100	<10	11000	11300	39400	>2000
10	Strong	80-90	<10	82000	13700	44500	251 @ (50-100 cm)
CCME Coarse Soils Limits							
Surface			150	300	2800	-	
Sub-surface			440	2500	10000	-	

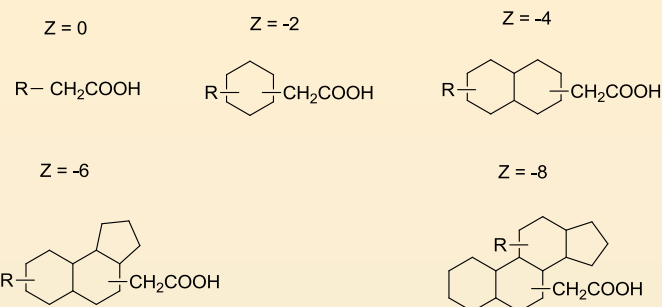
Source: Leskiw, L.A., 2005.  
Hydrocarbons in natural soils: Literature review. Cumulative Environmental Management Association, Fort McMurray, Alberta. CEMA Contract No. 2005-0046 RWG. 27 pp.

# Applicable Guidelines

- ❑ Tier 1 and II (hydrocarbons and metals)?
- ❑ Salt Contamination Assessment & Remediation Guidelines?
- ❑ Seems reasonable but requires dialog



# Research



- ▣ Considerable research and demonstration work done to date even though there is uncertainty about end points
  - Process-affected water treatment options
  - Analytical methods – especially for oil sands tailings water acid-extractable organics
  - Monitoring and modelling fate and behaviour
  - Environmental effects and toxicity
- ▣ This work will help in guidelines development

# What is Holding us Back?



- ▣ Far future problem
  - Won't happen for years so focus on more important issues
  - But
    - ▣ 1968 GCOS request to discharge tailings pond water
    - ▣ 1996 Oil Sands Water Release Technical Working Group

# What is Holding us Back?

- ▣ Far future problem
- ▣ No one wants to be first



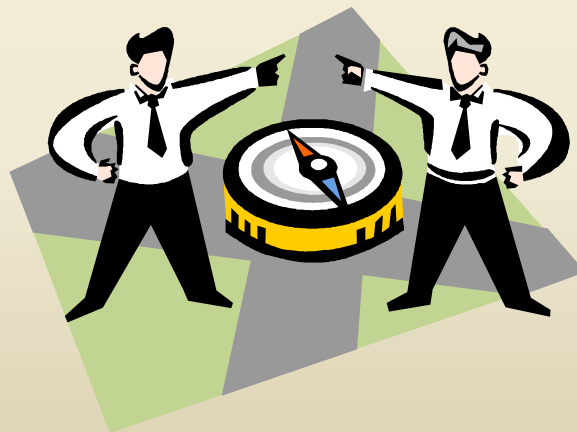
# What is Holding us Back?

- ▣ Far future problem
- ▣ Don't want to be first
- ▣ Zero discharge policy
  - Hinders consideration of options
  - Don't believe it exists



# What is Holding us Back?

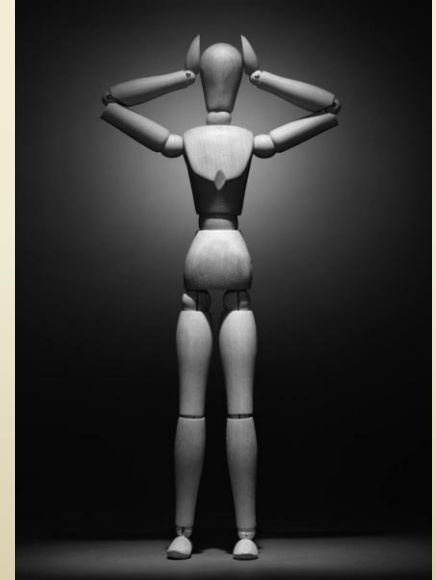
- ▣ Far future problem
- ▣ Don't want to be first
- ▣ Zero discharge policy
- ▣ Guidelines known – No they aren't
  - Province-wide standards
  - Oil sands a special case





# What is Holding us Back?

- ▣ Far future problem
- ▣ Don't want to be first
- ▣ Zero discharge policy
- ▣ Guidelines known – No they aren't
- ▣ Don't want to know the answer
  - Confirm contamination exists
  - Narrows remediation options
  - Better delineation of financial liabilities



# What is Holding us Back?

- ▣ Far future problem
- ▣ Don't want to be first
- ▣ Zero discharge policy
- ▣ Guidelines known – No they aren't
- ▣ Don't want to know the answer
- ▣ Natural remediation
  - Remediation occurs on its own so we don't need rules



# What is Holding us Back?

- ▣ Far future problem
- ▣ Don't want to be first
- ▣ Zero discharge policy
- ▣ Guidelines known – No they aren't
- ▣ Don't want to know the answer
- ▣ Natural remediation
- ▣ Remediation plans provided by regulator
  - EPEA approval says cover specific materials with 1.0 m clean soil
  - Materials likely to have the COPCs of interest

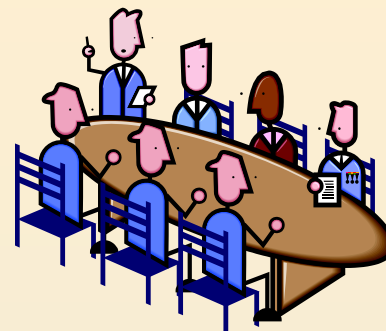


# Conclusions



- ▣ Current lack of clarity on the remediation guidelines that should be applied
- ▣ Deferring discussion is simply postponing the inevitable
- ▣ Seems likely at least one new guideline for oil sands tailings water acid-extractable organics will be required
  
- ▣ Worst thing that could happen is scramble to set guidelines due to an application

# Path Forward



- ▣ Start the discussion now
- ▣ Establish a government/industry Steering Committee
- ▣ Establish government/industry/academia/stakeholder Technical Committees to support Steering Committee
- ▣ Workshop to surface issues, knowledge, gaps and recommendations
- ▣ Communicate results broadly

# Questions?

