

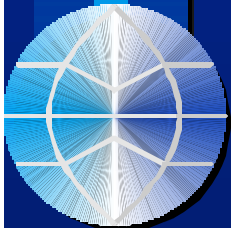
ALBERTA HYDROCARBON GUIDELINES

James H. Sevigny and Miles J. Tindal

Komex International Ltd.

As told by Ted Nason

Alberta Environment



Komex International Ltd.

Environmental and Engineering Consultants

PRESENTATIONS

- **Scientific Basis**

 - ◆ *How the Guidelines Were Calculated*

- **User Guide**

 - ◆ *Which Guidelines to Use*

- **Case Study 1**

 - ◆ *Flare Pit*

- **Case Study 2**

 - ◆ *Pipeline Break*

SCOPE OF WORK

- **Expand and Adapt PHC CWS for Alberta**
- **Expand PHC CWS**
 - ◆ *More Hydrocarbons*
 - ◆ *More Land Uses*
 - ◆ *Groundwater*
- **Adapt PHC CWS**
 - ◆ *Modify Rainfall and Recharge Rate*

ALBERTA UPSTREAM GUIDELINES

- **9 Chemicals of Concern**
- **5 Land Uses**
- **2 Soil Types**
- **2 Soil Depths**
- **8 Exposure Pathways**

SOIL GUIDELINE TABLES

- ***Tables 3-6 in User Guide***
 - ◆ **Table 3 - Fine Surface Soil**
 - ◆ **Table 4 - Coarse Surface Soil**
 - ◆ **Table 5 - Fine Subsoil**
 - ◆ **Table 6 - Coarse Subsoil**
- ***Each Table has 5 Land Use “Blocks”***
- ***Each Block has Multiple Pathways***

Groundwater Guidelines

FOUR WATER USES

- ***Human Drinking Water***
- ***Livestock Watering***
- ***Freshwater Aquatic Life***
- ***Wildlife Watering***

SUMMARY

- ***Scientific Basis for Alberta Upstream Hydrocarbon Guidelines***
- ***Tables 3-7 in User Guide***
 - ◆ **Table 3 - Fine Surface Soil**
 - ◆ **Table 4 - Coarse Surface Soil**
 - ◆ **Table 5 - Fine Subsoil**
 - ◆ **Table 6 - Coarse Subsoil**
 - ◆ **Table 7 - Groundwater**

USER GUIDE PRESENTATION

- ***Regulatory Framework***
- ***Using Tier 1 Guidelines***
- ***Tier 2 and 3 Guidelines***

CLOSURE TYPES

- ***Unconditional Closure***
 - ◆ **Types A and B Closure**
- ***Conditional Closure***
 - ◆ **Type C Closure**

GUIDELINE TIERS

- ***Tier 1 - Generic Guidelines***
- ***Tier 2 - Modified Generic Guidelines***
- ***Tier 3 - Site Specific Risk Assessment***

MANAGEMENT LEVELS

- ***Closure Type + Guideline Tier = Management Level***
- ***Tier 1***
- ***Tier 2A, 2B, 2C***
- ***Tier 3A, 3B, 3C***

USING TIER 1 GUIDELINES

- ***Most Sites Will Use Tier 1***
- ***Talk Focus is Tier 1***
 - ◆ **4 Tables**
 - ◆ **>1,000 Entries**
 - ◆ **How to Select Applicable Guidelines**
- ***Decision Tree***

Tier 1 Decision Process

Select Soil Depth



Select Soil Type



Select Land Use



Applicable Guideline Block



Exclude Inapplicable Pathways



Select Lowest Value for Each Substance

Polycyclic Aromatic Hydrocarbons

- **Carcinogenic PAH only -- 8 substances**
- **non-carcinogenic PAH covered by PHC CWS**
- **toxicity referenced to benzo(a)pyrene**
- **screen PAH out if light fuel or condensate release
-- otherwise characterize/analyze or pilot analyses
on worst case samples**

TIER 2 GUIDELINES

- ***Purpose - Allow Limited Flexibility***
- ***Same Protection Goals as Tier 1***
 - ◆ **Tier 2A - Customize Tier 1**
 - ◆ **(Tier 2B - Allow Passive On-Site Management)**
 - ◆ **(Tier 2C - Management of Off-Site Groundwater Plume)**

TIER 3 GUIDELINES

- ***Purpose - Allow Flexibility at Complex Sites***
- ***Same Protection Goals as Tier 1***
 - ◆ **Tier 3A - Site Specific Unconditional Guidelines**
 - ***May Include Site-Specific Toxicity***
 - ◆ **(Tier 3B - Allow Passive On-Site Management)**
 - ◆ **Tier 3C - Management Using Engineered/Institutional Controls**