Groundwater Investigation for CoR applications

Dec 2, 2010

Devin Scheck
Director, Waste Management and Reclamation
Engineering Division

BC Oil & Gas COMMISSION

Overview

- Why investigate groundwater?
- When is investigation required?
- Water Quality standards
- Acceptable Methods to determine K
- Remediation, risk assessment, monitoring

BC Oil & Gas COMMISSION

Current Status

- Current Decisions based on TG 6
- Expectations for investigation are to developed over the coming months
- Impacts of new TG 6 & 8
- Where do we differ & why?

BC Oil & Gas COMMISSION

Why investigate GW

- Requirement of EMA to investigate relevant environmental media at each APEC
- Provides a broader capture area than soil sampling alone
- Not just trying to obtain samples and compare with numerical standards
- Evaluate potential impacts (i.e. future concentrations at off-site locations)

BC Oil & Gas COMMISSION

Information Requirements

- Magnitude of contamination
  - wells should be located to intercept the highest concentrations of contaminants
- Must have information on potential contaminant travel.
  - Contaminant characteristics
  - Stratigraphy and conductivity
- Groundwater flow direction

BC Oil & Gas COMMISSION

Investigate GW at every site?

- Yes…. If reasonable
- Where can exceptions be made?
  - remote, winter access locations
  - D&A wells
    - Where site information supports the low risk of contamination

BC Oil & Gas COMMISSION

Address GW at every site?

- Yes…. Always
- Supporting site information
  - lack of a significant source
  - Proximity to receptors
  - Soil characteristics/stratigraphy
  - Temporal considerations

BC Oil & Gas COMMISSION

Conceptual site model

- Physical setting in relation to local/regional flows
- Site stratigraphy - aquifers/aquitards
- Location and character of potential contamination sources
- Temporal considerations
- Proximity to receptors
- Conditions that may affect contaminant transport

Determining water use

- Technical Guidance 6
- DW – disprove current (proximity) and future use
  - Confining layer > 5m thick
  - Muskeg
- AL – 500m or > 50 yrs travel time or demonstrate per SLRA that receptor wont be impacted
- IW and LW – ALR lands strata with K > 10-6
  - Or existing wells/intakes w/i 500 m

Determining K

- Field testing preferred
  - Slug tests, pump tests
- Lab permeameter tests

- All methods have uncertainties

- Least preferred – empirical calculations

BC Oil & Gas COMMISSION

If GW Standards are exceeded?

- Remove source and re-evaluate
- Follow SLRA type approach
  - Determine leachate concentrations
  - Predict groundwater concentrations
  - Predict GW concentrations at receptor
- Remediation – extraction, oxidation, etc.
- MNA

Contacts

Devin Scheck, Director
(250) 261-2059 devin.scheck@gov.bc.ca

Taher Morsi, Waste Management Officer
(250) 261-5710 taher.morsi@gov.bc.ca

Akbar Khan, Waste Management Officer
(250) 261-5736 akbar.khan@gov.bc.ca