Assessing Drilling Waste Disposal Areas
Discussion Summary

1. Assessing Drilling Waste Disposal Areas – Compliance Options

2. Feedback and Guideline Review
Assessing Drilling Waste Disposal Areas – Compliance Options
Phase 1 and/or Phase 2 environmental site assessments required at all sites
- Sites must meet Alberta Environment’s remediation requirements

Phase I ESA must include drilling waste disposal areas
- Mix-bury-cover, landspreading, land treatment and alternative methods
- On-site or remote
Guiding Principles

- Soil quality must be consistent with “Equivalent Land Capability” and “no adverse effect”
- Reclamation Certificate can be obtained with sufficient Phase I information
- Phase II ESA required if Phase I ESA finds insufficient information or identifies specific concerns
Compliance Options

Three options for drilling waste site compliance

1. Detailed and accurate disposal records, including *Guide 50 Drilling Waste Notification Form* (1996 or equivalent)
2. Records review demonstrating low likelihood of site problems
3. Phase II ESA – assessment, sampling, and analytical confirmation of soil:waste mix
Soil Quality
Objectives

◆ **Guide 50 Equivalent Salinity Requirements**
  - Optional alternative to AENV Salt Contamination Assessment and Remediation Guidelines

◆ **AENV and CCME soil quality guidelines for metals and hydrocarbons**
  - CCME Canadian Environmental Quality Guidelines
  - Alberta Soil and Water Quality Guidelines for Hydrocarbons at Upstream O&G Facilities
  - Soil Quality Guidelines for Barite
  - Alberta Tier I Criteria
Compliance Option 1

- Records available and comply with 1996 G-50
  - G-50 Notification form or equivalent must be submitted
- Mud additives are recorded and known
- Barite, zinc carbonate and chrome thinners require additional review
- Chloride limit for mix-bury-cover is 800mg/kg
- Not suitable for advanced systems such as $K_2SO_4$, Pot. Formate, Pot. Silicate, Sodium Silicate… unless specific EUB approval was issued
Compliance Option 2

- **Used if G-50 records incomplete or unavailable**

- **Review of drilling records to confirm the following:**
  - Freshwater gel/chem, salt load consistent with post-disposal salinity targets
  - Records indicate no issues with salt formations, hydrocarbon contamination, DST fluids.
  - No metals issues
Compliance Option 2

- Fill-in calculation tables are provided for salinity, barite, zinc carbonate, and chrome thinners
  - If calculated value exceeds target, a Phase II ESA is required.

- Salinity and hydrocarbons from the formation are assessed by specific questions
Compliance Option 3

This compliance option is used when:

- No information or insufficient information is available to allow completion of either a Option 1 or Option 2 checklist,
- The disposal fails to meet Guide 50 disposal requirements or those requirements as outlined in the Option 1 or Option 2 checklists

In either case a Phase 2 ESA environmental site assessment (ESA) must be completed
Compliance Option 3

- **Sampling requirements for disposal area**
  - Number of samples based on well depth
  - Samples from different locations may not be combined
  - Sample must be representative of waste or soil-waste mix (e.g. not mixed with cap or base material)
What have we heard!?
Drill Stem Test Returns

Definition
- Brines and hydrocarbons released to surface from the formation during a drill stem test

Guide 50 does not allow disposal of DST returns with drilling waste
- Typically disposed of off-site or in drilling flare pit

Before Guide 50, disposal with drilling waste was common
Chemistry and volume data is frequently available, disposal location often unknown
- Developing calculations to allow assessment of DST returns (pre-G50) in drilling waste

Phase II ESA for post-G50 DST returns should focus on drilling flare pit
Lime and gypsum have limited solubility

Current salt calculation addresses this by capping the number of bags included in the calculation

CAPP is funding an assessment of lime and gyp muds that will help refine how these materials are addressed
Some assessors are finding that barium concentrations found during Phase II ESAs are consistently lower than predicted by the barite calculation.

CAPP is funding a study of barite-soil blends to evaluate whether revisions to the calculation are needed.
Mix Ratio
Assumptions

- Calculations assume a mix ratio of 3:1 for post-1996 and 1:1 for pre-1996
- If actual mix ratio is available, will provide a more accurate estimate
- Evaluating ways to incorporate actual mix ratio into the calculations
  - Need to strike a balance between need for simplicity and ability to use all available information
Drill Cuttings

- Drill cuttings are often disposed on-site during LWD programs.
- If more than 50 m$^3$ of cuttings disposed on-site without G50 Notification Form, need a Phase II ESA.
- Volume of cuttings disposed on-site is calculated by subtracting volume of cuttings (not total waste) disposed off-site from total volume of cuttings.
Phase II ESA Sampling

Cap

Soil:Waste Mix Sample

Soil

Do not composite

Do not composite

Do not composite
Drilling Fluid Additives

- Drilling fluid additives must be identified
- Many changes to products and trade names over time
- PSAC historic additive list available at: [http://www.psac.ca/](http://www.psac.ca/)
- Requests to identify unknown additives can be made at same website
Assessing Drilling Waste Disposal Areas provides a defined process for conducting Phase I and II ESAs.

Since its release in February 2005, users have identified some aspects that need more definition and clarification.

Work is proceeding on revisions to address these areas.
Thank You