



Update on *Directive 050:* *Drilling Waste Management*

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Purpose of Today's Discussion

- ◆ Provide an overview of the draft revision of *Directive 050*
 - ◆ History on the management of drilling waste
 - ◆ Need for the review
 - ◆ Review process
 - ◆ Overview of draft revision of *Directive 050*
 - ◆ Next steps

History of Drilling Waste Management

- ◆ Drilling waste disposal has been regulated in Alberta since 1975
 - ◆ Energy Resources Conservation Board (now the EUB)
Interim Directive ID-OG 75-2 Sump Fluid Disposal Requirements
- ◆ In 1993, *ID-OG 75-2* was superseded with *Interim Directive (ID) 93-1* and *Guide 50: Drilling Waste Management*
 - ◆ *GB 95-04* introduced *Interim Working Document for Drilling Waste Management*
 - Data from 4200 wells used to update sampling, analytical, & data requirements, and criteria for disposal options
- ◆ Then in 1996 the EUB issued a revision to *Guide 50 (now Directive 050)*, which was introduced with *Information Letter (IL) 96-13: Revision of Guide 50 Drilling Waste Management*.

Directive 050 – Need for Review

- ◆ Advances in soil quality guidelines since 1996
 - ◆ *Canadian Soil Quality Guidelines for Protection of Environmental and Human Health* (CCME 1999 as updated)
 - ◆ *Alberta Soil and Water Quality Guidelines for Hydrocarbons at Upstream Oil and Gas Sites* (AENV 2001)
 - ◆ *Salt Contamination Assessment & Remediation Guidelines* (AENV 2001)
 - ◆ *Soil Quality Guidelines for Barite* (AENV 2004)
 - ◆ *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (AENV 2007)



Directive 050 – Need for Review

- ◆ Late 1990s – early 2000s, the EUB worked with Alberta Environment (AENV) and Alberta Sustainable Resource Development (SRD) to
 - ◆ Harmonize our approaches to waste management, and
 - ◆ Clarify regulatory roles & responsibilities in this area
 - IL 98-2: Suspension, Abandonment, Decontamination, and Surface Land Reclamation of Upstream Oil and Gas Facilities (MOU)
 - ID 99-4: Deposition of Oilfield Waste into Landfills (MOU)
 - ID 2000-3: Harmonization of Waste Management (MOU)
 - ID 2000-4: an Update to the Requirements for the Appropriate Management of Oilfield Wastes

Directive 050 – Need for Review (Regulatory)

- ◆ EUB, pursuant to the Oil and Gas Conservation Act & Regulations, authorizes methods for storage, treatment, processing, or disposal of oilfield waste, including drilling waste
- ◆ AENV, pursuant to the Environmental Protection and Enhancement Act & its regulations, establishes environmental quality and land reclamation guidelines
 - ◆ issues reclamation certificates for private lands designated as “specified lands”
- ◆ SRD, pursuant to the Public Lands Act, manages Public Lands
 - ◆ the disposal of drilling waste on Public Lands requires consent from SRD
 - ◆ delegated authority to issue reclamation certificates on Public lands

Definition of Specified Lands

- ◆ Section 1(w) of the Conservation and Reclamation Regulation (EPEA)
 - ◆ Specified lands means land that is being or has been used or held for or in connection with
 - (i) the construction, operation or reclamation of a well
 - Includes sites remote to the well site used to manage drilling waste (storage / sumps, land treatment / biodegradation)



Directive 050 – Need for Review

- ◆ The need to harmonize drilling waste management requirements with other waste management requirements and to clarify regulatory roles and responsibilities, combined with advancements in environmental quality and reclamation guidelines, resulted in:
 - ◆ The EUB-chaired multi-stakeholder review of the 1996 edition of *Directive 050*

Directive 050 Review - Process

- ◆ EUB-chaired review of *Directive 050* commenced in 2002
- ◆ Committee membership:
 - ◆ EUB, AENV, SRD, CAPP, SEPAC, PSAC, ESAA, CLRA, Farmers Advocate, CAODC, CEPA
- ◆ Observers:
 - ◆ NEB, BC Environment, BC Oil and Gas Commission, Saskatchewan Industry and Resources

Directive 050 Review - Process

- ◆ Multi-stakeholder process
 - ◆ Review Committee oversaw 5 working groups
 - Sump Guidelines & Pipeline Entry-Exit Pits
 - Salinity and Nitrogen Loading
 - Hydrocarbon & BTEX
 - Metals, Drilling Fluids, & Toxicity Testing
 - Disposal on Forested Public Lands
 - ◆ Last Committee meeting was December 2003
 - ◆ Final submissions from working groups received in 2004
- ◆ The EUB considered all of the information generated through the review committee, as well as current regulatory documents, in developing the draft revision of *Directive 050*

Directive 050 Review - Process

- ◆ *Bulletin 2007-31: Invitation for Comment-Draft Revision of Directive 050:Drilling Waste Management* (September 10, 2007)
 - ◆ Draft revision available
 - electronic version on the EUB Web site (www.eub.ca)
 - paper copies from EUB Information Services
 - ◆ Comments to identify section of issue, possible solutions, and rationale to support solutions
 - ◆ Draft revision will be available until October 31, 2007
 - ◆ Comments will be accepted until October 31, 2007

Draft *Directive 050* - Overview

- ◆ Draft revision is written and formatted in current EUB style for a directive
 - ◆ Looks very different than, and is more comprehensive than the 1996 edition of *Directive 050*
- ◆ It requires disclosure of
 - ◆ Biodegradation activities for which approval was not received or those that have been on-going for longer than five years
 - ◆ Remote sumps that have been open longer than one year or have been used more than once, or any site that has been used repeatedly to accommodate remote sumps and has not been totally reclaimed
 - ◆ Cement return pits on a stand-alone site or remote sump site for which reclamation certification has not been obtained

Draft *Directive 050* - Overview

- ◆ Retains the land application methods set out in the 1996 edition to apply drilling waste to land
 - ◆ landspray, landspray-while-drilling, pump-off, mix-bury-cover, landspreading
- ◆ Adds two more land application methods
 - ◆ disposal onto forested Public Lands, biodegradation (land treatment or in a contained system)
- ◆ Methods are now based on preventing the build-up of contaminants in soil to concentrations that exceed Alberta Tier 1 Soil Remediation Guidelines
 - Change from load rate (kg/ha) or total load (kg) of a parameter in the drilling waste to resulting concentration (mg/kg) of a parameter in the soil/waste mix
- ◆ Drilling waste characteristics trigger the need to post sample the soil/waste mix to verify that guideline values for salts, hydrocarbons, and metals have not been exceeded

Landspray / Landspray-While-Drilling



Landspray / Landspray-While-Drilling



Landspreading Drilling Waste



Mix-Bury-Cover Operations



Mix-Bury-Cover Operations



Completed Mix-Bury-Cover



01/06/2003

Draft *Directive 050* – Overview

Landowner/Department/Agency Consent

- ◆ Private land – landowner
- ◆ Public Lands – SRD (disposition under the Public Lands Act)
- ◆ First Nation Lands – Indian Oil and Gas Canada (if drilling waste was generated on Reserve Lands), Indian and Northern Affairs Canada (if drilling waste was not generated on Reserve Lands)
- ◆ Métis Settlement Lands – Métis Settlement General Council
- ◆ Canadian Forces Base – Department of National Defence and SRD if the Base is on leased provincial lands

Draft *Directive 050* – Overview

Consent Cont'd

- ◆ Additional consent is not required to manage drilling waste on the well site on which it was generated
 - ◆ Must follow *Directive 050* or site-specific approval
- ◆ Landspray, landspray-while-drilling, pump-off disposals occurring off the well site requires landowner/department/agency consent prior to activity occurring
- ◆ Storage or mix-bury-cover, landspread, or biodegradation disposals on a site remote to the well site, requires a written agreement with the owner of the land or the department/agency managing the land on behalf of the provincial or federal Crown

Draft *Directive 050* – Overview

Reclamation Obligations for Sites Used to Manage Drilling Wastes

- ◆ All drilling waste land application methods must meet the identified soil endpoints at the time the disposal is complete
 - ◆ Therefore, methods should not interfere with the final reclamation process and objective to restore the site to equivalent land capability
- ◆ For drilling waste activities occurring on the well site, reclamation typically occurs when the well site is undergoing reclamation
- ◆ Methods used to store, mix-bury-cover, landspread, or biodegrade drilling waste on sites remote to the well site must be reclaimed to equivalent land capacity
 - Specified lands are subject to reclamation certification process under EPEA
 - For other lands the reclamation process is through the department/agency that provides consent/agreement

Draft *Directive 050* – Overview

Soil Quality & Assessment for Sites Used to Manage Drilling Wastes

- ◆ Soil Salinity Endpoints
 - ◆ Adopted from AENV *Salt Contamination Assessment and Remediation Guidelines* (2001)
 - ◆ Each land application method has initial soil salinity criteria and then maximum allowable changes to the EC and SAR of the soil
 - ◆ Triggers for post disposal sampling of the soil/waste mix are based on the EC of the drilling waste
 - EC trigger is dependant upon the land application (disposal) method used

Draft *Directive 050* – Overview

Soil Quality & Assessment for Sites Used to Manage Drilling Wastes

- ◆ Soil Hydrocarbon Endpoints
 - ◆ Adopted from AENV *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2007)
 - ◆ Drilling waste must be tested for hydrocarbons when
 - a hydrocarbon based drilling mud is used; use results to select a management method
 - a water-based drilling mud is used and a hydrocarbon flag is encountered; use results to determine appropriate spread rates for land application methods
 - ◆ Post disposal sampling of the soil/waste mix is required when the concentration of any of the hydrocarbon components in the drilling waste exceed two-times the soil endpoints

Draft *Directive 050* – Overview

Soil Quality & Assessment for Sites Used to Manage Drilling Wastes

- ◆ Soil Trace Element Endpoints
 - ◆ Adopted from AENV *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2007)
 - ◆ Drilling waste must be tested for trace elements when
 - The cumulative concentration for any trace element (contributed by all mud additives/products) exceeds the soil endpoint concentrations
 - There is a lack of mud additive/product information to determine the concentrations of trace elements in the drilling waste
 - ◆ Post disposal sampling of the soil/waste mix is required when the concentration of any of the trace elements in the drilling waste exceed the soil endpoints

Draft *Directive 050* – Overview

Drilling Waste Toxicity Assessment

- ◆ Luminescent bacteria toxicity test remains the industry standard to evaluate drilling waste toxicity
 - ◆ Pass threshold: 75 % for an EC50(15)
 - The aqueous concentration of drilling waste that halves the initial light output of luminescent bacteria after 15 minutes must be 75 % or greater
 - ◆ Petroleum Services Association of Canada (PSAC) maintains a list of toxicity assessment data for fluid additives/mud products
 - Drilling wastes containing additives/products in concentrations below the threshold level listed are unlikely to be toxic
 - cannot account for synergistic effects

Draft *Directive 050* – Overview

Drilling Waste Storage



Draft *Directive 050* – Overview

Drilling Waste Storage

- ◆ Drilling waste must not be stored longer than one year
- ◆ Sumps
 - ◆ Earthen excavations on the well site or a remote site
 - Limited to nonhydrocarbon-based drilling wastes
 - ◆ Sump construction requirements (appropriate clayey soils)
 - ◆ Reuse of a sump requires notification to the EUB
 - Verify sump integrity
 - Agreement from landowner/department/agency
 - ◆ Sumps in use longer than five years require approval as an oilfield waste management facility (subject to *Directive 058*)
- ◆ Alternative storage systems
 - ◆ Tanks, lined sumps, or other methods approved by the EUB
- ◆ Earthen-bermed Storage Systems
 - ◆ Storage of nonhydrocarbon-based drilling waste solids on clayey subsoil surrounded by earthen berms
 - ◆ Limited to the well site that generated the drilling waste solids

Drilling Waste Sump



Drilling Waste Sumps



Drilling Waste Sumps



Draft *Directive 050* - Overview

- ◆ The draft revision also:
 - ◆ Summarizes non-land application options
 - Sending drilling waste to approved waste management facilities
 - Using a mobile thermal treatment unit (on-site)
 - ◆ Outlines the application process for approval to:
 - Dispose drilling waste from a previously drilled well down the wellbore of a subsequently drilled well
 - Use an alternative management method
 - ◆ Updates the record keeping and notification requirements
 - Incorporates the direction set out in *Directive 045: Digital Data Submission of Drilling Waste Disposal Notification*

Next Steps

- ◆ Consider the comments received through the public review and finalize the revision
 - ◆ Comments will be accepted until October 31, 2007
 - ◆ Anticipate release of the new revision to *Directive 050* in the first quarter of 2008
- ◆ Investigate and develop a system to permanently house key pieces of drilling waste management information and have this information linked to the licence of the well that generated the drilling waste
- ◆ Investigate the feasibility of using terrestrial toxicity tests to set toxicity threshold levels for drilling fluid additives/mud products and to identify environmentally toxic drilling wastes



The End

- ◆ Questions?

- ◆ Note:

- ◆ Future EUB/ESAA partnership to roll-out the new revision to *Directive 050: Drilling Waste Management*