Environmental Effects Monitoring (EEM) under Proposed CMER
Federal EEM

› Created to verify effectiveness of new PPER (1992)
  › “Assess the overall adequacy” of effluent limits
    (are they protective?)

› Also applied to metal mines under MMER (2002)

› Objectives of program:
  › National consistency;
  › Site-specificity;
  › Scientific defensibility; and,
  › Cost-effectiveness.

› Supported by extensive, prescriptive Technical Guidance

› Many coal mines already do EEM-style monitoring, under site-specific provincial permit requirements
Federal EEM Components

› EEM is an effects-based program, focused on operating pulp mills and mines
› **Site Characterization** ➔ **Design** ➔ **Implementation** ➔ **Reporting**
› **Laboratory component:**
  › Sublethal effects of effluent on fish, invertebrates, algae.
› **Field components:**
  › Effects on fish health (reproduction and condition);
  › Effects on use of fish tissues (bioaccumulative contaminants);
  › Effects on fish habitat (benthic invertebrate surveys)
  › Monitoring of potential stressors (WQ, SQ) provides *supporting data* for effects assessment.
› EEM progresses through an step-wise framework…
EEM Investigative Framework

EFFECT?

Initial investigation → Confirmation of effect(s) → Investigation of Cause (IOC) → Investigation of Solution (IOS)

Yes → Yes → Yes

No → No → Repeat at reduced frequency

Implementation of Solutions → Assess effectiveness
Proposed **CMER EEM Components**

- **Effluent characterization** (quarterly: metals, nutrients);
- **Water quality monitoring** (quarterly & during EEM field studies);
- **Sublethal (chronic) toxicity testing** of effluent:
  - On Final Discharge Point with “most potential environmental adverse impact”
  - Fish, invertebrate, algae, plus aquatic plant for freshwater discharges
  - 2x annually for first 3 years, then quarterly only for most sensitive test
- **Biological monitoring studies**, to determine any effect on:
  - Fish populations;
  - Fish habitat (benthic invertebrate communities); and
  - Fish tissue quality, specifically for mercury.
- Applies to mines with point-source and those with non-point-source (seepage) discharges
Proposed CMER EEM Components

› 3-year EEM cycles proposed under proposed CMER, extending to 6-year cycles with demonstrated proof of no effects
› Some exemptions from required biological monitoring for point-source discharges with rapid dilution in receiving environment
› Fish tissue monitoring can stop after 2 cycles of “no effect” on Se or Hg concentrations
› “Coal mines [must] consider all relevant data, analysis, scientific information, as well as Indigenous Knowledge for the purpose of meeting the EEM requirements.”