



Screening Level Risk Assessments

2013



Special Thanks To:





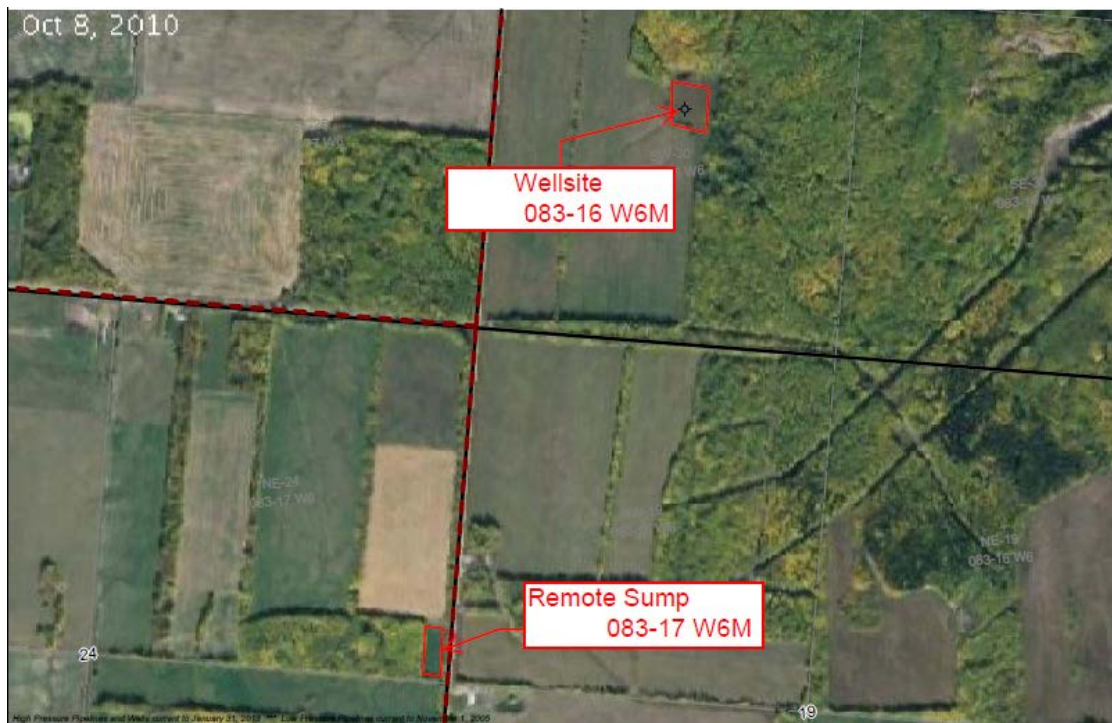
Presentation Outline

1. Site Background
2. Stage 2 Analytical Results
3. Risk Assessment Overview
4. Screening Level Risk Assessment for CoR Part 1
5. Questions and Discussion



Site Background

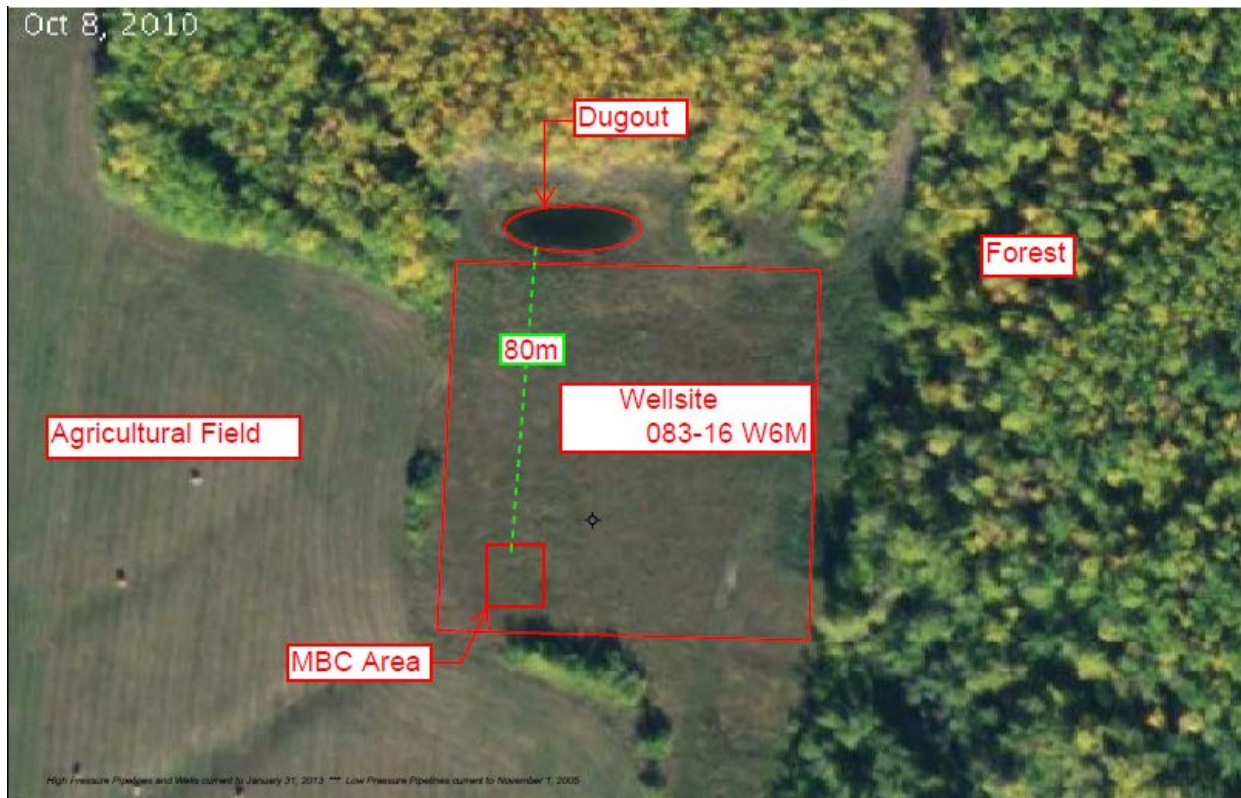
- Drilled in 1990 to 2400 m
- Produced oil, gas, water
- Abandoned in 1996
- Stage 1 in 2011
- Stage 2 in 2011 – sumps, flare pit, tank farm, well center





Stage 2 Analytical Results

- SAR impacts in the on-site sump (SAR is poor) – 500 m³
- Sodium concentrations significantly higher than in background





Stage 2 Analytical Results

- SAR impacts in the remote sump (SAR is poor / unsuitable) – 2000 m³
- Sodium concentrations significantly higher than in background





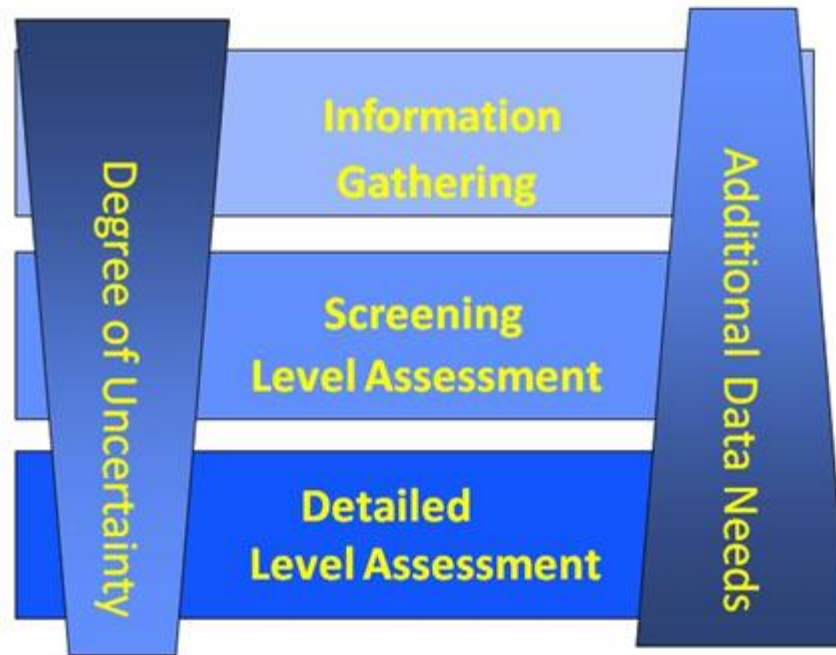
Risk Assessment Overview

ANSWER DESK RATE SCHEDULE

ANSWER	\$1.00
ANSWER WITH THOUGHT	\$2.00
CORRECT ANSWER	\$4.00
DUMB LOOK	NO CHARGE



Risk Assessment Overview





Protocol 13 - SLRA

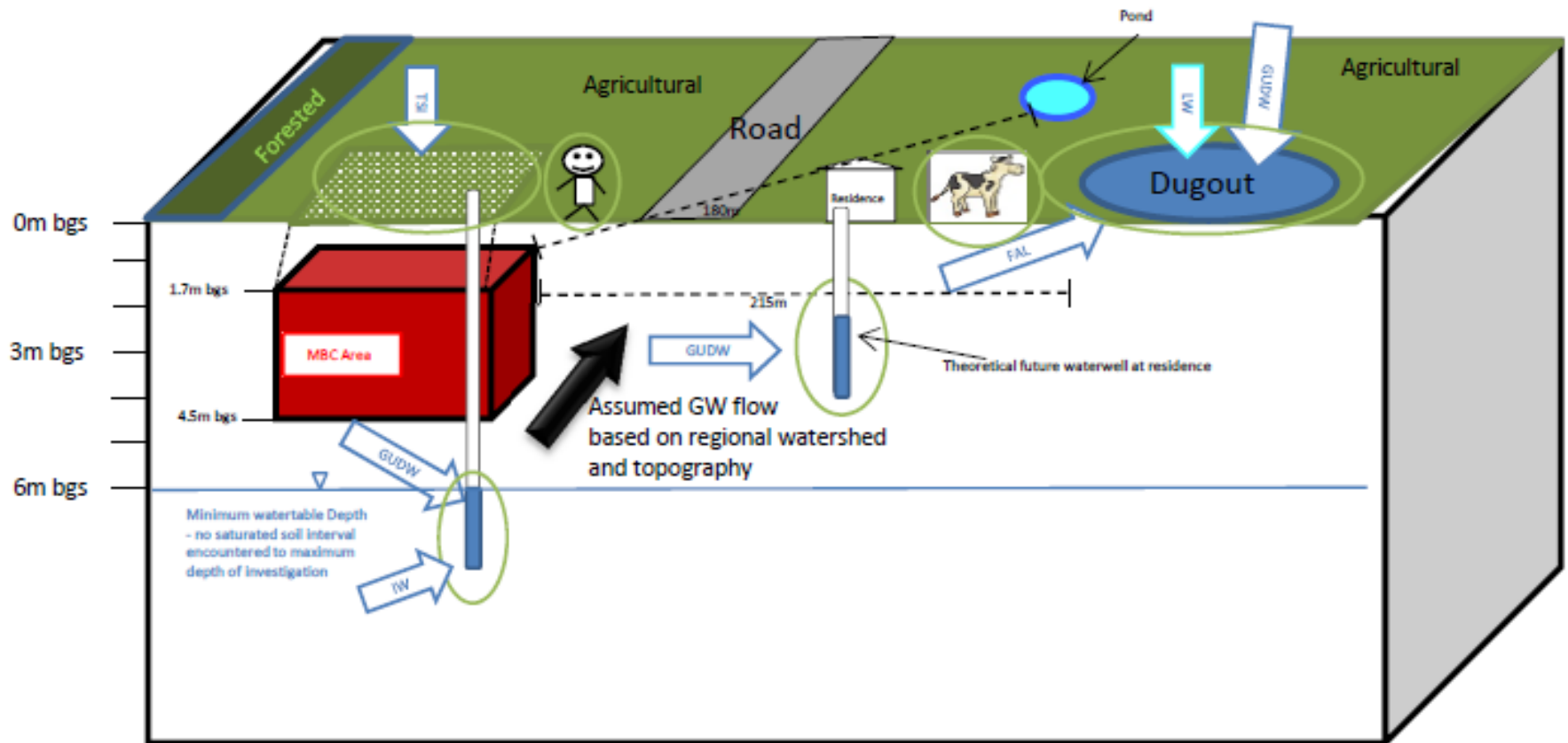
Precluding Conditions

- *Is the site agricultural?*
- *Is the site classified as high risk?*
- Is contaminant an ionizing organic substance?
- Is contaminant inorganic in soil with pH < 5?
- Are bioaccumulative substances within top 1 m of soil?
- Are LNAPL or DNAPL present?
- Are soil vapours present?
- Are there very high permeability soil or complex hydrogeological units present?
- Is there contaminated sediment or surface water?
- Are there deep-rooting plants or trees in areas of contamination?
- Are there preferential flow pathways to a receiving environment?
- Are drinking water standards exceeded in off-site groundwater?



You need a conceptual model

- Understand pathways and receptors





Protocol 13 – Determination of Risk

- Human Exposure Scenarios

Exposure to Contaminated Soils or Dust (Human Soils - 1 to 3)		Yes	No
HS-1	Do substance concentrations in soil exceed the applicable standards?	Yes	
HS-2	Are contaminated soils located within 1m of ground or an excavation surface?		No
HS-3	Is the ground surface above contaminated soils uncovered?	█	█



Protocol 13 – Determination of Risk

- Human Exposure Scenarios

Exposure to Contaminant Vapours (Human Vapour - 1 to 2)		Yes	No
HV-1	Do substance concentrations in soil vapour exceed the applicable criteria (for wildlands land use only)?		No
HV-2	Are humans present on the site for greater than 2 hours per day, 1 day per week?	█	█



Protocol 13 – Determination of Risk

- Human Exposure Scenarios

Exposure to Contaminated Groundwater (Human Water - 1 to 3)		Yes	No
HW-1	Does drinking water use apply at the site?	Yes	
HW-2	Do substance concentrations in soil or groundwater exceed the standards for the protection of drinking water?		No
HW-3	Is there the potential for soil leachate or contaminated groundwater to migrate to an onsite well used for drinking water or beyond the property line, at concentrations greater than the drinking water standards?	█	█



Protocol 13 – Determination of Risk

- Ecological Exposure Scenarios

Terrestrial Exposure to Contaminated Soils (TS - 1 to 5)		Yes	No
TS-1	Do substance concentrations in soil exceed the applicable standards?	Yes	
TS-2	Are contaminated soils located within 1m of ground surface?		No
TS-3	Is the ground surface above contaminated soils uncovered?	█	█
TS-4	Is there potential terrestrial habitat present?		
TS-5	Does the site contain suitable habitat for specific local species?		



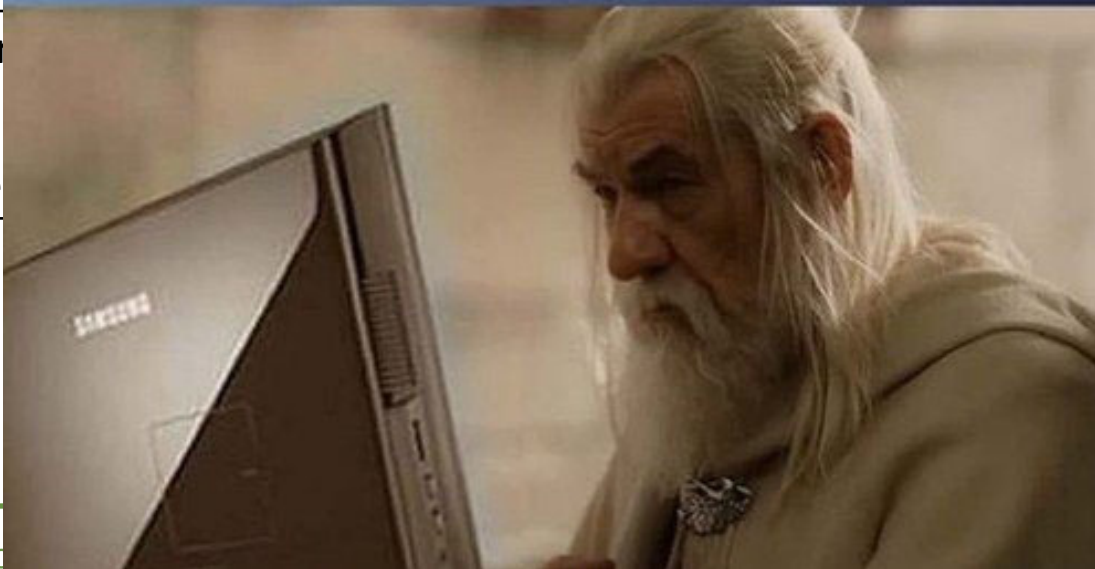
Protocol 13 – Determination of Risk

- Ecological

Exposure of A	
AW-1	Does a
AW-2	Do su standa
AW-3	Is ther ground conce



	Yes	No
)	Yes	
e		No
, at	█	█





Protocol 13 – Determination of Risk

- Ecological Exposure Scenarios

Exposure of crops to contaminated groundwater (IW - 1 to 3)		Yes	No
IW-1	Does irrigation water use apply at the site?	Yes	
IW-2	Do substance concentrations in soil or groundwater exceed the standards for the protection of irrigation watering?		No
IW-3	Is there the potential for soil leachate or contaminated groundwater to migrate to a well used for irrigation watering, at concentrations greater than the irrigation water standards?	█	█



Protocol 13 – Determination of Risk

- Ecological Exposure Scenarios

Exposure of livestock to contaminated groundwater (LW - 1 to 3)		Yes	No
LW-1	Does livestock water use apply at the site?	Yes	
LW-2	Do substance concentrations in soil or groundwater exceed the standards for the protection of livestock watering?		No
LW-3	Is there the potential for soil leachate or contaminated groundwater to migrate to a well used for livestock watering, at concentrations greater than the livestock water standards?	█	█



Protocol 13 – Determination of Risk

- Default Standards

DEFAULT STANDARDS		Yes	No
DF-1	Do substance concentrations in groundwater exceed the default generic numerical water standards for Volatile Hydrocarbons (VH_{w6-10}) or Extractable Petroleum Hydrocarbons (EPH_{w10-19}) water standards?		No
DF-2	Is there the potential for soil leachate or contaminated groundwater to migrate offsite, at concentrations greater than the VH_{w6-10} or EPH_{w10-19} water standards?		



Summary

- Wellsite sump and remote sump had elevated SAR compared to controls.
- All human health and ecological exposure scenarios were evaluated using the SLRA.
- All exposure scenarios and pathways were deemed either inactive, or posed no risk to human health or the environment.
- SLRA Determination of Risk: Acceptable.
- No remedial work is required at wellsite or remote sump.



Conclusions

Site received a Certificate of Restoration Part 1 (April, 2013)





Questions and Discussion

