Achieving Regulatory Closure

The process of discharging environmental liability in Alberta

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Topics to Cover

- **Common issues that arise and closure options that become available at each phase of assessment.**
- **Types of data to collect to achieve closure. Focus is the Tier 1 and 2/CCME guidelines.**
- **How to accurately and concisely communicate the information required to support closure.**

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Introduction

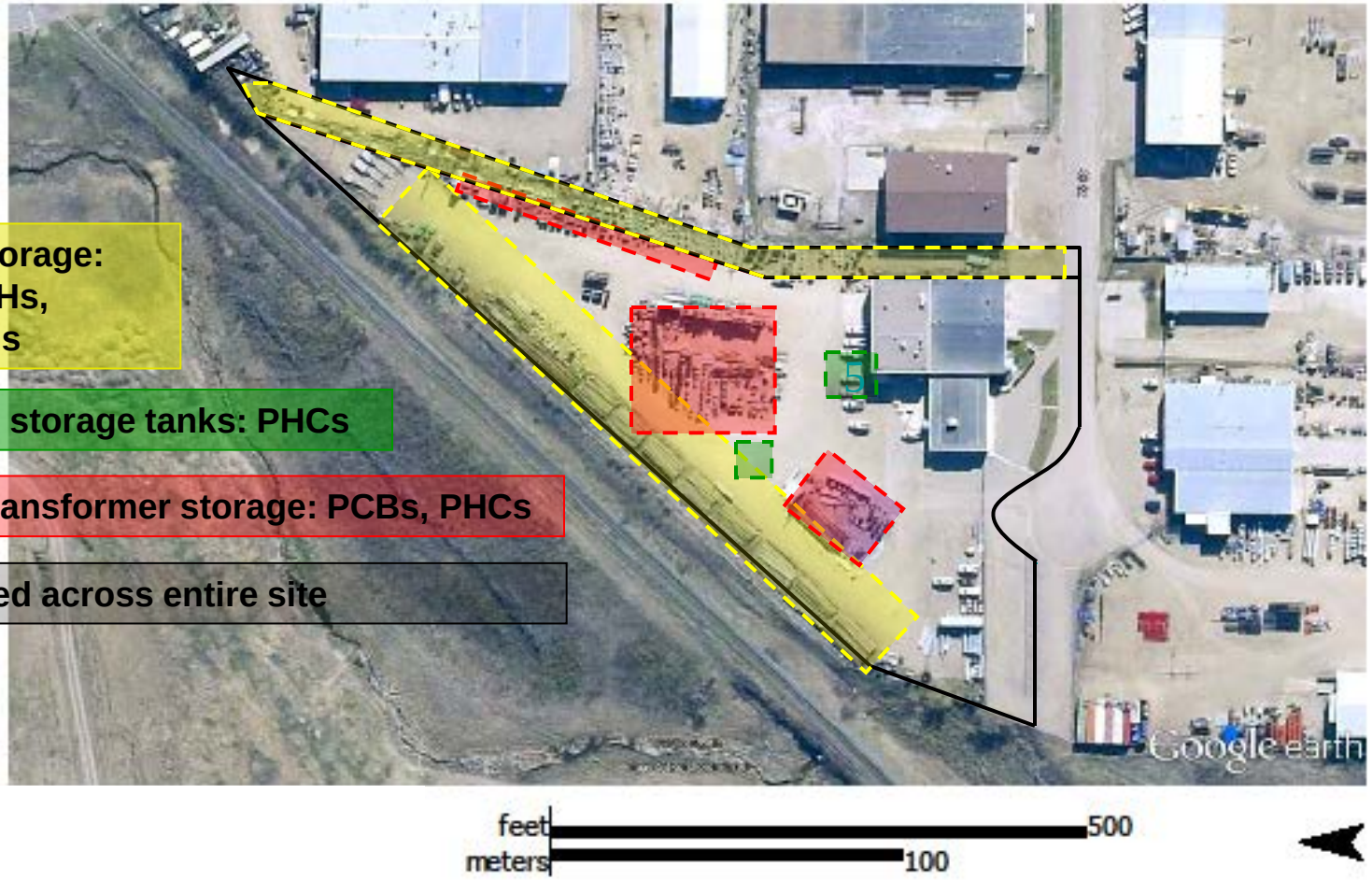
- **Often seemingly insignificant unanswered questions arise at each phase of work on a site.**
- **The root cause of this issue is nearsightedness and scope fixation.**
- **What is the end goal?**
  - **Put a price tag on risk/liability?**
  - **Discharge or otherwise eliminate risk/liability?**
- **Our goal should be to catalogue all issues and incorporate them into an overall closure plan for the site.**

The ideal world

- **Phase 1 ESA**
  - Historical land use clearly defined.
  - Areas of potential environmental concern (APECs) and their associated contaminants of potential concern (COPCs) are well known, clearly listed and supported by documentation.

- **Preliminary Phase 2 Environmental Site Assessment (ESA)**
  - Boreholes are drilled in all identified APECs and samples are analyzed for all appropriate COPCs.
  - Any contaminants present are located and characterized.

Example Site



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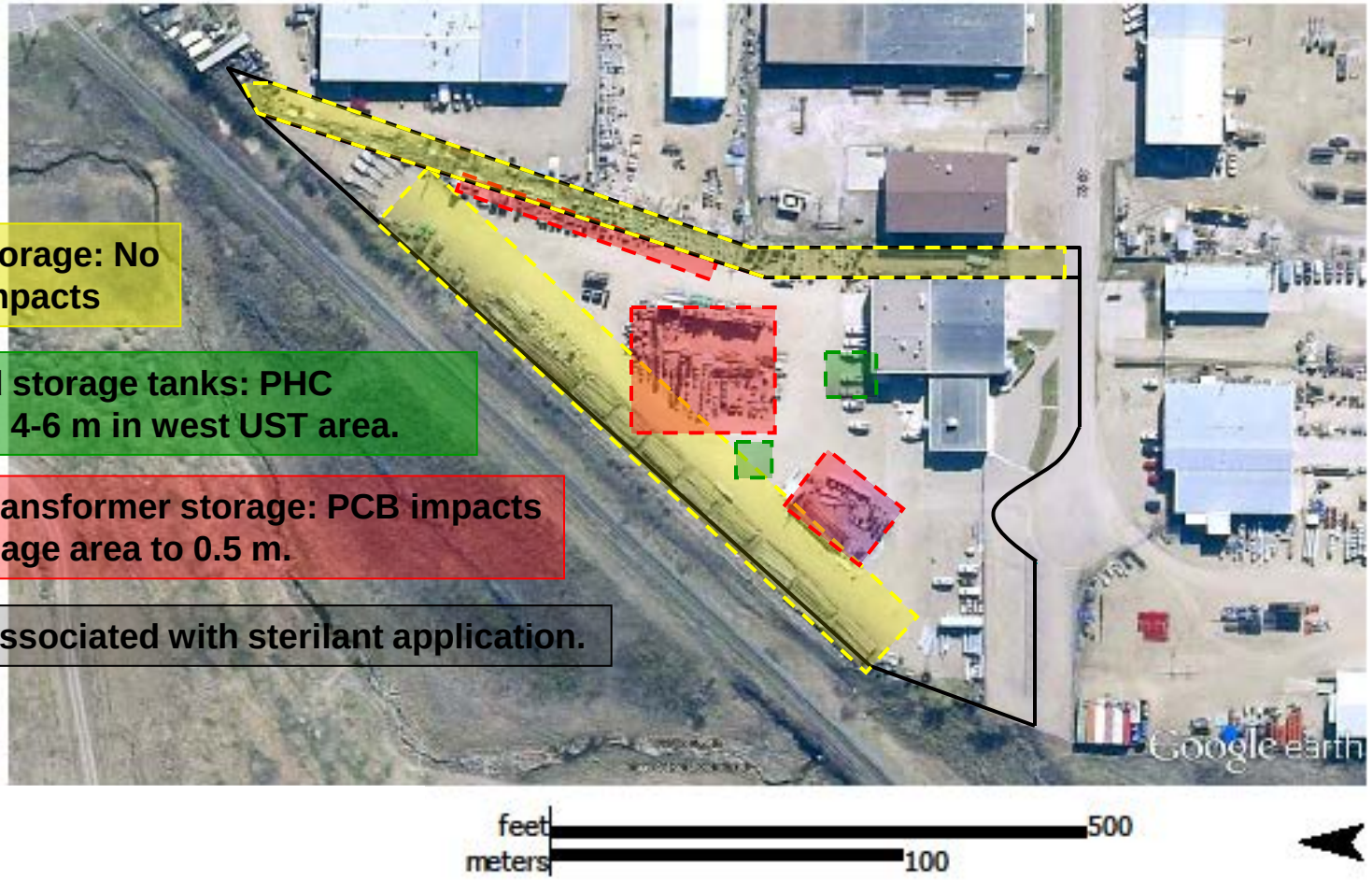
The ideal world continued

- **Supplemental Phase 2 ESA**
  - The contaminants identified in the preliminary Phase 2 ESA are delineated vertically and horizontally.
  - Only parameters identified as part of the source material in the initial Phase 2 are analyzed for.

- **Remediation/mitigation**
  - Any parameters that exceed the applicable guidelines are remediated or mitigated via other means (Tier 2 options).

Example site



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The ideal world continued

- **Closure Plan**
  - PHCs from UST
    - Contamination is below 3 m and meets subsoil criteria once eco-direct contact pathway is removed.
  - PCBs from Transformer storage
    - Top 0.5 m of soil in former Transformer storage area are stripped and disposed of.
  - No impacts remain and remediation certificate application is application is submitted.
  - Site is sold with no remaining liability.

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A more realistic scenario

- **Phase 1**
  - Multiple stakeholders both on and off-site. Source of COPC's overlap between stakeholders.
  - Unclear land use leading to poorly defined APECs and COPCs.

- **Preliminary Phase 2**
  - Uncertainty about COPCs leads to analytical for the full spectrum of parameters.
  - Background and/or off-site conditions not properly captured.
  - Groundwater flow not determined.
  - Exceedances with no attributable source documented as "thought to be naturally occurring."

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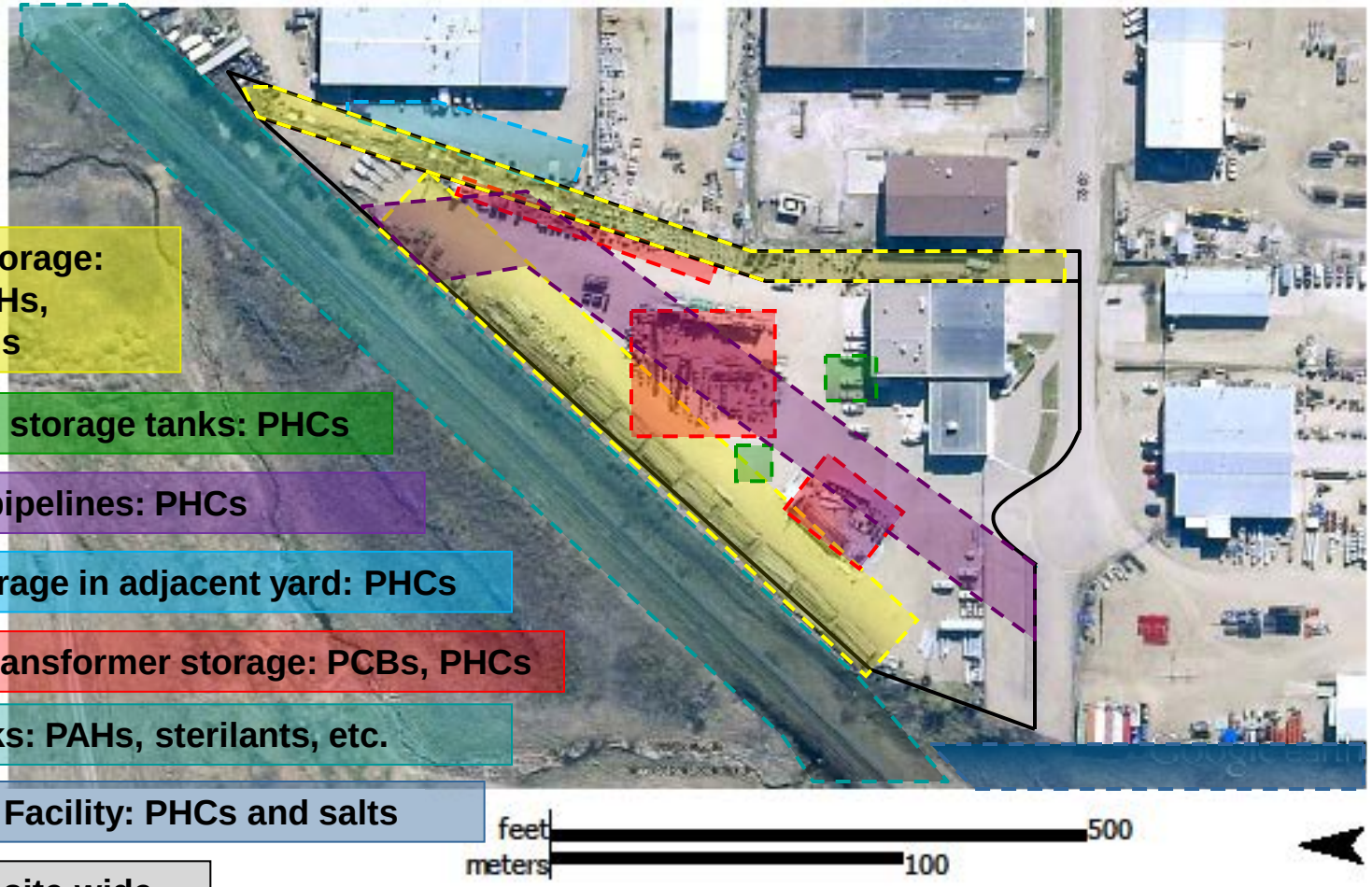
Example site



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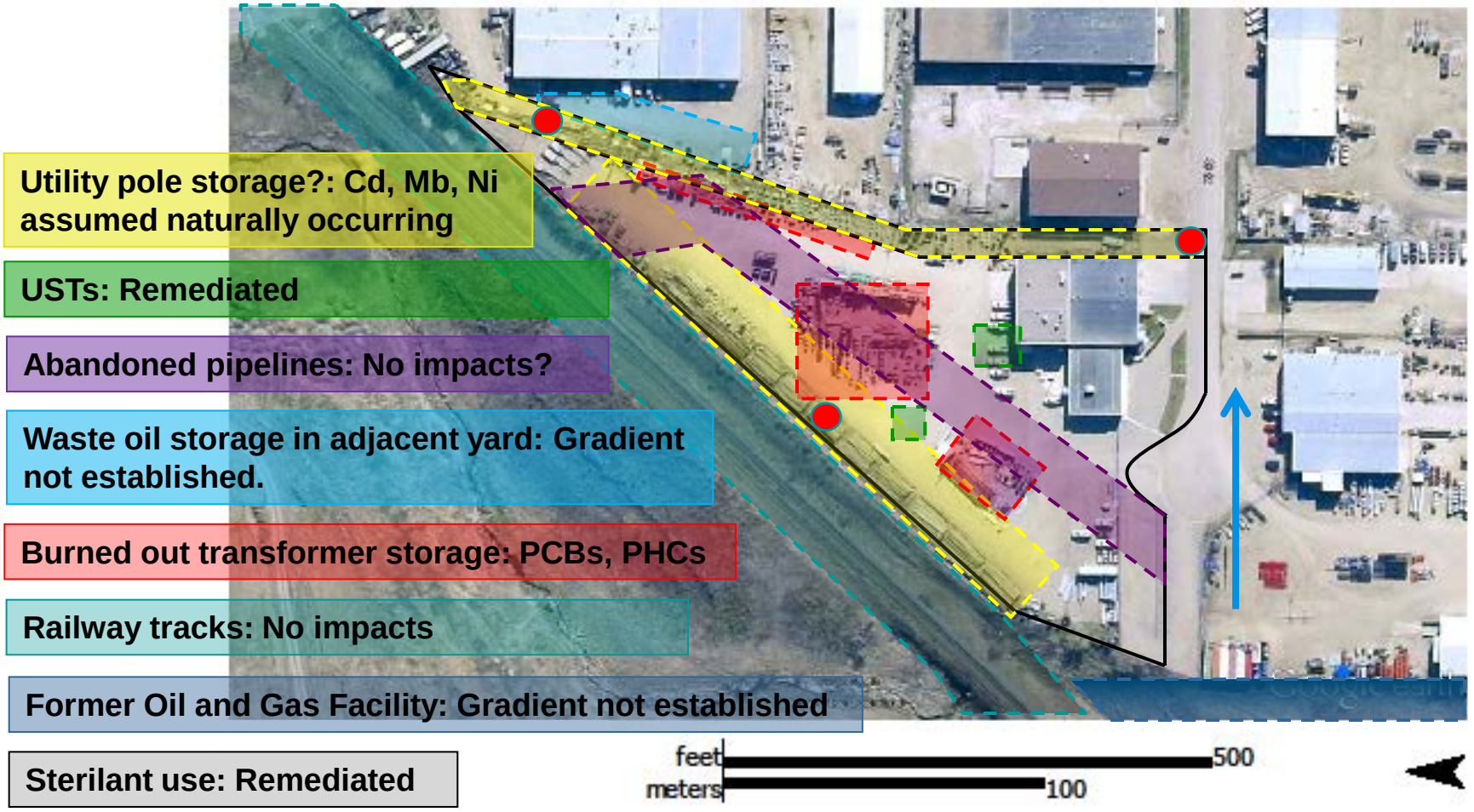
A more realistic scenario cont'd

- **Supplemental Phase 2 ESA**
  - A number of years have passed. Guidelines have changed. Consultant has changed…multiple times.
  - New consultant re-characterizes the site (all parameters).
  - Full vertical and horizontal delineation is not achieved.
  - Background and/or off-site conditions still not captured.

- **Remediation**
  - The primary COPCs that have attributable sources are dealt with via remediation.
  - Secondary COPCs and those without attributable sources are listed and explained but not scientifically mitigated.

Example site: Remaining Issues



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A more realistic scenario cont'd

- **The End Result**
  - **A site that has had between 80% and 99% of the issues associated with historical operations remediated or mitigated.**
  - **All reports are put into a box and stored. The future you will be much better at dealing with the remaining issues.**

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Closure Routes

- ***Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification***

- ***Tier 1 Soil and Groundwater Remediation Guidelines***
  - **Coarse grained**
  - **Fine grained**

- ***Tier 2 Soil and Groundwater Remediation Guidelines***
  - **Pathway exclusion**
  - **Guideline adjustment**
  - **Site specific remediation objectives**

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Closure Routes

- **Phase 1**
  - ***Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification*** **(AENV, 2007)**
- **Preliminary/Supplemental Phase 2**
  - **Reclamation certificate for specified lands**
  - **Tier 2 pathway elimination adjustment**
  - **Tier 2 site specific remediation objectives**
- **Remediation/Reclamation/Mitigation**
  - **Tier 2 Closure**
  - **Remediation Certificate for specified lands**
  - **Reclamation Certificate**

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Achieving closure options

- **Each step is a part of the larger closure plan**
  - With each new phase of information collection, ask what it will take to close the site given what you know now.
  - Plan next work phase based on most probable closure route.
  - Plan how each issue discovered during the previous phase(s) will be addressed in the next phase of work.
- **A word about novel remedial techniques**
  - These often produce some amazing results under laboratory conditions.
  - They may not scale well or they are applicable to a narrow range of real world conditions.

The most common solution

- **Suite Solution Risk Mitigation**
  - **The most common solution is not a single solution at all but a suite of solutions.**

- **Three elements usually required to reach closure:**
  - **Source removal.**
  - **Background or off-site conditions.**
  - **Tier 2.**

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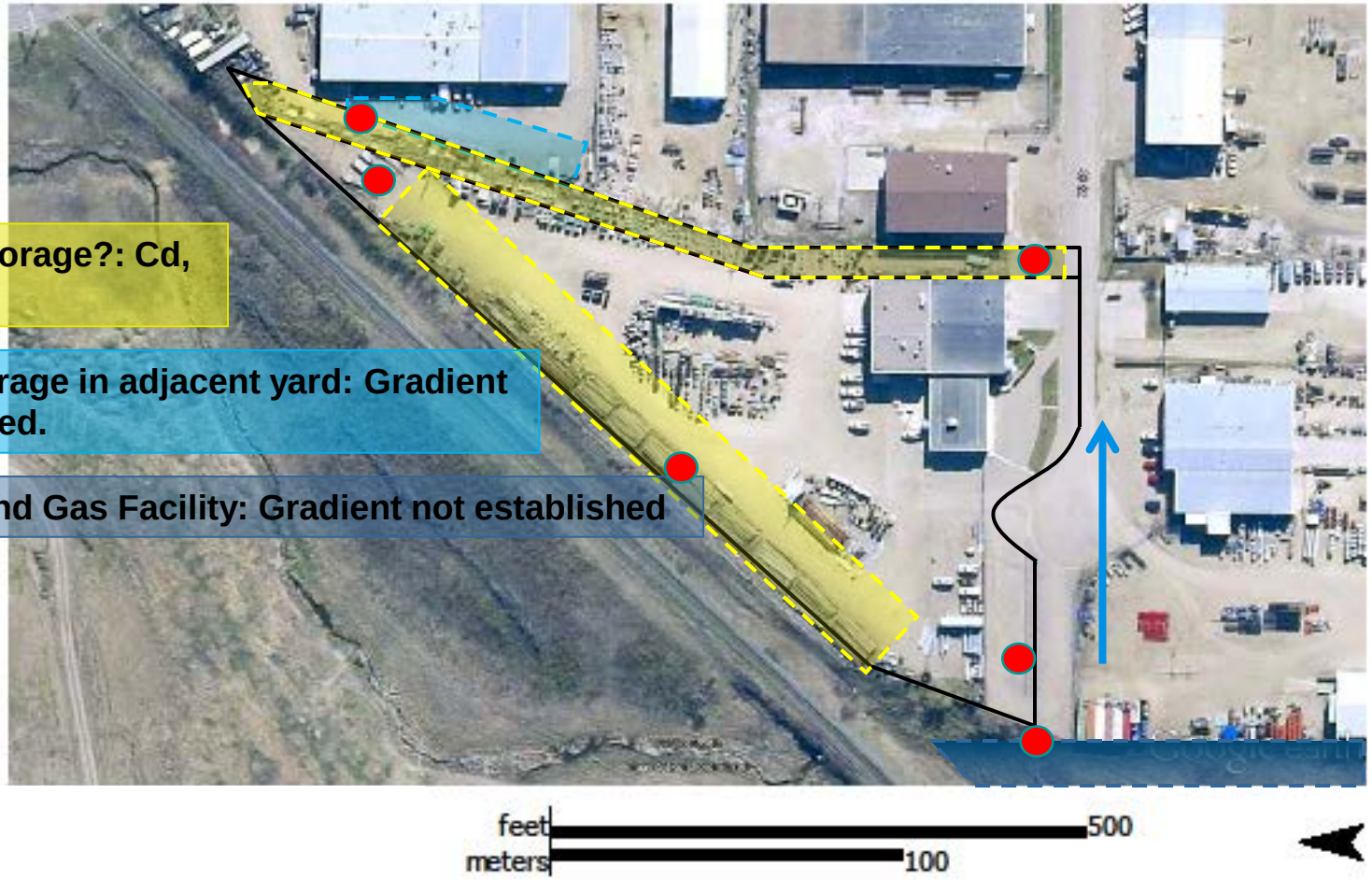
Example site: Remaining Issues



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Story Sheet

Date of Discovery

Event

Risks Identified

Risk Response

Date Mitigated

Example Site Story Sheet

Regional Groundwater Flow: Northwest
Site Stratigraphy: Silty clay underlain by clay t
Groundwater Table: 3-6 mbgs

Date of Discovery	Event	Risk(s) Identified	Risk Response	Date Mitigated
1-Sep-2012	Phase 1 ESA	• Utility pole storage, tranformer storage, USTs, abandoned pipelines, adjacent waste oil storage, adjacent railway tracks and adjacent abandoned oil and gas facility. COPCs include: PHCs, PAHs, PCB and salts.	• Phase 2 ESA	N/A
1-Feb-2013	Preliminary Phase 2 ESA	• Sterilants were added to the COPC list. • Five boreholes were drilled and analyzed for various COPCs. • The only exceedances noted were for a soil sterilant.	• Phase 3 ESA	N/A
1-Jul-2013	Supplemental Phase 2 ESA	• Sterliant impacts were delineated. • Additional samples were analyzed for hydrocarbons and salinity.	• Site was sent out for a remedial action plan.	N/A
Present	Supplemental Phase 2 ESA	• A new consultant identified data gaps of Metals, Phenols, PHCs, and salinity analysis at various areas of the site.	• Parks requested that additional assessment be done	N/A

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Types of Data Required

- **Proving background or Off-site conditions**
  - Definitive groundwater flow direction.
  - 3 wells: Up-gradient, down-gradient and cross-gradient.
  - They can be on-site as long as you can prove the up-gradient wells are truly up-gradient from all sources.

- **Proving groundwater is clean**
  - Three consecutive clean monitoring events.
  - Sampling events span a minimum of two years.
  - Sampling events reflect seasonality.

Data Presentation

- **Site summary: Only include necessary data.**
  - Describe all of the parameters that exceeded guidelines, their identified sources and how each issue was remediated or mitigated.
  - On complicated sites this can be done as a separate letter report.

- **Have a professional opinion. The regulators will.**
  - Merely presenting the raw data is not enough. We are trained and paid to interpret data and make conclusions.
  - Remember that the regulator on the other end of your report is developing a professional opinion based on the data they are presented with.

Data Presentation

- **Make it an opinion you can be proud of.**
  - These are “our sites”: The regulator usually has far less far site-specific knowledge than we do.
  - Lay conclusions out clearly along with the supporting data and logic that we used to arrive at those conclusions.
  - Do we believe in the job we did strongly enough to fight for it?
  - Would you certify a site based on the following statement?
    - “…this conclusion does not likely need more evidence to substantiate.”

Road blocks

- **Except for extremely simple and text book cases, interpretation of the guidelines is required.**

- **It is often your interpretation vs. their interpretation.**
  - **The best science needs to win.**
  - **Keep pushing until either:**
    - **You get the answer you want; or**
    - **Your science is disproven.**

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Questions?

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