CSAP

SOCIETY OF CONTAMINATED SITES APPROVED PROFESSIONALS OF BRITISH COLUMBIA

Stage 14 – Anticipated Real World Impacts

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OVERVIEW

1. Anticipated impacts to Consultants
2. Anticipated impacts to Industry
3. Anticipated impacts to ENV
4. Predications for High Volume Receiver Sites (HVRS)
5. Boots-on-the-Ground Scenarios
6. Implications of Soil Vapour changes

Anticipated Impacts to Consultants

Challenges before March 1, 2023:

- Identifying projects and clients that will be impacted
- Communicating regulatory changes to clients
- Planning amidst uncertainty (e.g., sampling frequencies)
- Planning for sites where previous assessments of Schedule 2 activities are now outdated
- Being the bearer of bad news

Anticipated Impacts to Consultants

Challenges starting March 1, 2023:

- Limited driller availability & laboratory capacities?
- Rush requests for soil assessments (schedule pressure)
- Gathering the info required to prepare notifications
- Additional remedial excavations
- More background assessments (P4), site-specific standards (P2/27)
- More disposal at sea
- Being the bearer of bad news
- More work?

Anticipated Impacts to Industry

For Developers / Property Owners:

- Identifying impacted projects and planning accordingly
- Increased schedule
- Increased costs
- Decreased soil disposal risks

For Excavation / Trucking Contractors:

- Uncertainty during bidding
- Down-time resulting from unplanned receiver site change
- Delays caused by sporadic “contamination”
- Being the bearer of bad news
- Decreased soil disposal risks

Anticipated Impacts to Industry

For Clean Fill Receivers:

- Increased pressure to “pre-approve” soil
- Increased uncertainty regarding soil volumes
- Increased QEP due-diligence efforts / costs
- Pros and Cons of HVRS designation
- Increased certainty of soil chemical quality

For Contaminated Soil Receivers:

- Potential increase in material received

Anticipated Impacts to Industry: **Costs**

Hypothetical Excavation:

- Large shopping centre redevelopment, 5-level underground parkade.
- Approx. 500,000 m^3 of soil requiring disposal.
- Based on Final Policy Paper frequency table, will require a total of 347 samples to be analysed (50 + 67 + 230).
- Up for debate, but assumed 70 boreholes, 5 samples per hole.

Anticipated Impacts to Industry: **Costs**

Estimated Costs:

- Consultant Fees → $45,000
- Lab Fees → $60,000.
- Driller/Locator → $45,000.
- **Total Cost → $150,000**

Assumes solid stem auger drilling. Need sonic?

→ Add another $25,000

Anticipated Impacts to ENV

- Lots of questions
- New auditing & enforcement responsibilities
- Unlikely to encourage soil re-use or discourage “simple disposal”
- Potential unintended consequences:
  - Increase in NIR submissions?
  - Increase to development / housing costs?
  - Further incentivizes disposal at sea
  - Confusion for concerned citizens (soil movement from sites without Schedule 2 activities won’t be registered)
- Increased transparency and certainty for the public

Predictions for HVRS

Assumptions:

1. **Very few clean fill receivers currently accept Commercial / Industrial Quality Soil (>RL_{HD})**
2. **Significant costs to satisfy HVRS requirements:**
   - Soil Management Plan
   - Seasonal Groundwater Monitoring
   - Appropriate Containment
   - Record Keeping
3. **HVRS are beneficial for limited soils:**
   - Soil from Schedule 2 sites; AND
   - Soil that is >RL_{HD} but <CL / IL) – this ‘Goldilocks’ soil **not** common

HVRS 'Goldilocks' Metals

No Change from RHD to CL

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Manganese
- Molybdenum
- Nickel
- Selenium
- Silver
- Sodium ion
- Thallium
- Tin
- Uranium
- Vanadium
- Zinc

Change from RHD to CL

- Aluminum
- Boron
- Iron
- Lead
- Lithium
- Mercury
- Strontium
- Tungsten

HVRS 'Goldilocks' PAHs

No Change from RHD to CL

- Anthracene
- Benz(a)anthracene
- Benzo(b+j)fluoranthenes
- Benzo(k)fluoranthene
- Dibenz(a,h)anthracene
- Fluoranthene
- Indeno(1,2,3-c,d)pyrene
- Naphthalene
- Phenanthrene
- Pyrene

Change from RHD to CL

- Acenaphthene
- Benzo(a)pyrene
- Chrysene
- Fluorene
- 1 and 2-methylnaphthalenes
- Quinoline

HVRS 'Goldilocks' Hydrocarbons/VOCs

No Change from RHD to CL

- VPH
- Benzene
- Ethylbenzene
- Toluene
- Xylenes
- Styrene
- Tetrachloroethylene (PCE)
- Trichloroethylene (TCE)
- Carbon tetrachloride
- Cis/trans-1,2-dichloroethylene (DCE)

Change from RHD to CL

- LEPH
- HEPH
- MTBE
- Tetra-ethyl lead
- Vinyl chloride

Predictions for HVRS

- Few clean fill receivers will seek HVRS designation
- Disposal costs will increase for >RL_{HD} soil from Schedule 2 sites
- Majority of >RL_{HD} soil will continue to be disposed to contaminated soil facilities (this trend may actually increase)

Boots-on-the-Ground Scenarios

1. **Owner/Contractor is slow to select receiver sites**
   - ➢Delay for notification at outset

2. **Unplanned receiver site change during project**
   - ➢Delay for notification mid-way through excavation

Boots-on-the-Ground Scenarios

3. **Owner not aware of requirements during design/tender**
   - Delay for soil assessment and notification at outset
   - Costs for soil assessment and associated delays
   - Discussions/disagreement about the responsible party (costs)

Boots-on-the-Ground Scenarios

4. Sub-Contractor Capacity Limitations

- Driller availability – proceed with excavator (in lifts)?
- Laboratory turnaround delays
- = Moderate cost and schedule impacts

Boots-on-the-Ground Scenarios

5. Unexpected contamination identified

a) Localized spill or zone of poor quality fill

- NIR, remedial excavation, closure sampling (all rush)
- Moderate cost and schedule impacts

b) Sporadic/widespread background metals at depth

- Statistical assessment (TG2) if effective
- Physical remediation = significant cost impacts
- Site-Specific Standards (P2/27) = cost and schedule impacts, uncertain outcome, uncertain acceptance by receivers

Soil Vapour Implications

Recap - When is soil vapour assessment required?

- When chlorinated VOCs are detected in soil.
- When any (volatile) substance concentration in soil exceeds RL_{LD} standards.

How much soil will be affected due to vapour contamination?

- Reviewed drilling investigations completed in last 12 months and selected the following for further evaluation.

Soil Vapour Implications

Case Study 1

- Strip mall on Vancouver Island with active gas station
- Four vapour probes installed
- All four vapour probes had raw exceedances for at least one parameter, most had several.
  - 1,2,4-trimethylbenzene
  - 1,3-butadiene
  - Benzene
  - Naphthalene
  - VPH
- Soil was non-detect in all four boreholes

Soil Vapour Implications

Case Study 2

- Industrial property in Fraser Valley, currently office use
- Three vapour probes installed
- One of three vapour probes had raw exceedances for:
  - Benzene
  - VPH
- Soil sample from pertinent borehole was non-detect
- So now what….delineate raw vapour hits?

Soil Vapour Implications

Case Study 3

- Tire change facility on Vancouver Island (formerly auto repair)
- Two vapour probes installed
- Both vapour probes had raw exceedances for at least one of:
  - 1,2,4-trimethylbenzene
  - Benzene
  - VPH
- Soil samples from both boreholes were non-detect

Soil Vapour Implications

Case Study 4

- Strip mall in Metro Vancouver with active dry cleaner
- Five vapour probes installed
- Four out of five vapour probes had raw exceedances for at least one of:
  - TCE
  - PCE/PERC
  - VPH
- Soil samples from all boreholes were non-detect

Soil Vapour Implications

What to take away from all this?

- Raw vapour hits are common, particularly for VPH and benzene → drill related?
- Use soil quality exemption wherever possible
- Many sites already have vapour data → possible to reassess?
- Unclear how to deal with isolated raw vapour hit → delineate?
- Leave as much time as possible between drilling and sampling

Q&A / Discussion

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