CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

7th ANNUAL GENERAL MEETING

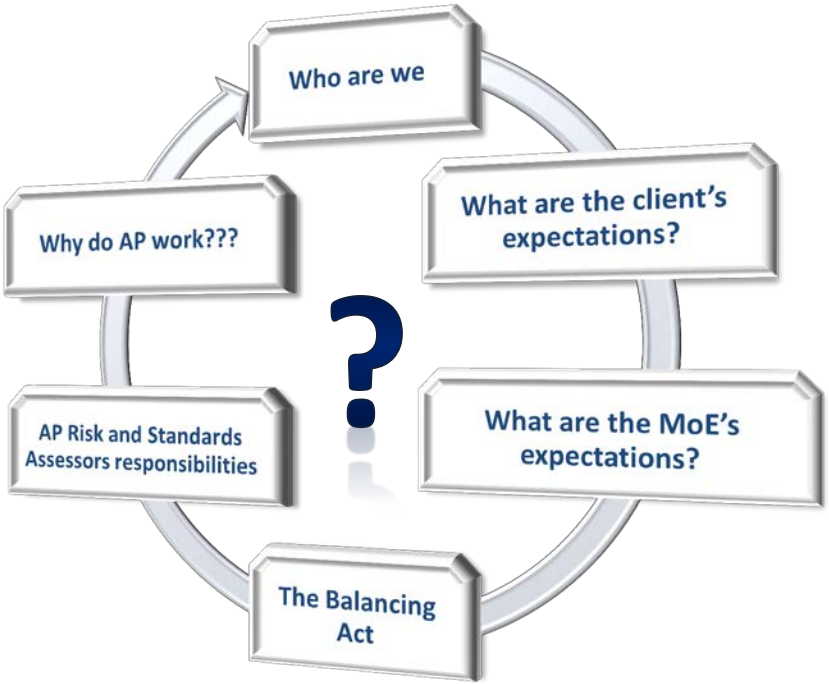
& PD Workshop | June 4, 2014

Risk and Standards Assessors Responsibilities

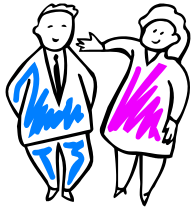
Cindy Ott

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Presentation Framework



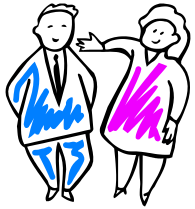
CSAP
Society of Contaminated Sites Approved Professionals of British Columbia



WHO are we?

- Senior/Expert Scientists and Engineers
- We are contracted by clients to provide AP services- applying for and receiving MoE instruments, preparing AP letters, etc.
- We review instrument submissions on behalf of the MoE

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia



WHO are we?

- We are trusted by our client and the MoE to conduct a thorough review of submissions following protocol, guidance and procedures from MoE
- We review and provide other types of AP approvals and/or letters, for example Scenario 5 releases

WHAT are the client's expectations?

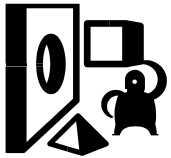
- Timeliness in receiving instrument
- Cost effectiveness in an AP review
- Complete and thorough review of submission so that there are no delays in receiving instrument

WHAT are the client's expectations?

- AP understands MoE expectations for the submission, both regulatory and technical
- AP is involved at the appropriate stages so that the submission is readily accepted by MoE
- Wording on instruments is communicated to them and is correct

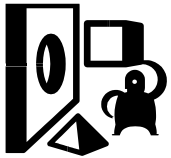
WHAT are MoE's expectations?

- Complete and thorough review of submission
- Complete and thorough review of non CSAP submissions, for example Scenario 5 releases
- CSAP level review and product for all submissions by an AP to MoE, for example High Risk sites
- AP understands MoE expectations for the submission – regulatory and technical



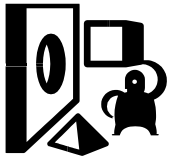
The Balancing Act

- Money
- Timing
  - Timing commitments i.e. seasonal sampling expectations
  - Timing requirements for instruments by client
  - MoE time to sign instruments



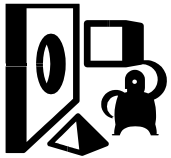
The Balancing Act

- Changing expectations from MoE
- Changing interpretations or new interpretations of technical challenges
- Evolving rigidity in interpretations
- Perceived precedent, for example, what was accepted on one site may not apply to your site



The Balancing Act

- New technical areas where there is varying experience by both MoE and APs,
  - resulting in increased uncertainty of expectations
  - Professional Judgement and what is required by MoE
- MoE staffing issues – too much work for too few people



The Balancing Act

- Instrument wording difficulties
- Arm's length review – Greg will speak to this
- We are all human- we get it wrong sometimes

AP Risk and Standards Assessors

RESPONSIBILITIES

- **Communications between the APs**
  - **Standards AP and Project Manager need to communicate with Risk AP and Risk Lead**
    - **Summary and conclusions of the DSI and COR**
    - **Which chemicals in what media need to be included in the RA**
    - **Contamination was/is delineated**
    - **Any Pre Approvals that were obtained**
  - **Depending on the project, this may be best in writing**

AP Risk and Standards Assessors

RESPONSIBILITIES

- **Documentation is correct**
  - **SoSC review by AP prior to signing**
  - **Instrument review by AP – all the clauses are correct, all the COC are in the right category, etc**
  - **AG 11 review so that all the items covered**
  - **Paragraph included in cover letter to CSAP regarding AG11 compliance**

AP Risk and Standards Assessors

RESPONSIBILITIES

- All Protocol 6 requirements are met including:
  - Contamination is delineated
  - Site meets standards or risk based standards
  - Preapprovals have been obtained
  - Arms length requirements are met
- Option - Submission Review Letter for submission to CSAP during a PA

WHY DO AP WORK???

- **Squeezed to meet both our client's and MoE's expectations...**

Is it worth it??

WHY DO AP WORK???

- Challenging and always learning
- Unique relationship with MoE
- Distinctive professional organization which is multidisciplinary
- Recognized professional expertise in contaminated sites by other provinces and federal agencies

CSAP Vision Statement

Trusted resource for sound environmental stewardship

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Review of “Arm’s Length”

Greg Sutherland, Ph.D., R.P.Bio.

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Outline

- When required?
- Definition of Arm's Length
- Interpretation and Application

Required for What Type of Submissions[1]

AIP/COC

based on numerical standards (including SLRA) with offsite contamination

AIP/COC

based on risk-based standards

- *numerical standards and risk AP must both be arm's length[2]*

CSRA

based on a risk assessment (other than SLRA) for the receiving site

1-Ministry Procedures for the Roster of Approved Professionals, Nov.12,2009

2-CSAP Summer 2013 Member's Update

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Requirements for Arm's Length Submissions

Summary of Site Condition requires that APs indicate and sign off on the types of arm's length reviews they have performed

If there is insufficient evidence that arm's length review has been carried out where one is required, the application and recommendation of the AP must be returned to CSAP

BCMOE Procedure 12: Procedures for preparing and issuing contaminated sites legal instruments, January 14, 2014

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Requirements for Arm's Length Submissions

The indemnification does not apply if an Arm's Length Review was required and did not take place

Approved Professionals Indemnity, March 2009

Definitions of Arm's Length - BCMOE

"arm's length review" means Approved Professional work consisting of a review by an Approved Professional of a reviewable document where:

(a) the Approved Professional performing the review and any person involved in the preparation of the reviewable document **did not directly supervise or report to the other** either at the time the reviewable document was prepared or at the time of the review, and

(b) the Approved Professional performing the review **did not participate in the preparation** of the reviewable document nor give any instructions as to its preparation except through the issuance of **general guidance regarding the approach and methodology** to be used in relation to the preparation of that document.

BCMOE Procedure 8: Definitions and Acronyms for Contaminated Sites, February 1, 2014 Version 2.1

Definitions of Arm's Length - CSAP

"Arm's Length Review" means AP Work consisting of a review by an AP of documents comprising a submission under Protocol 6 where the AP performing the review **did not participate in the preparation** of the supporting documents to the submission (including preparation and execution of work plans and field work), nor give any direction as to its preparation except through the issuance of **general (i.e., non-directed) guidance regarding the approach and methodology** to be used in relation to completion and execution of work plans and field work, and of the preparation of the supporting documents.

CSAP Practice Guidelines for Approved Professionals, Nov. 2010

Early Involvement of AP - CSAP

It is also recognized that there **may be benefits to the limited early involvement of the AP** providing Arm's-Length Review in the preparation stage of plans, assessments, and reports to be reviewed by the AP.

Any involvement by an AP providing Arm's-Length Review prior to commencing AP work should **be limited and should in no way obstruct the APs objectivity**. Under no circumstances should an AP conducting Arm's-Length Review perform any function of **project management**. While an AP providing Arms-Length Review may provide **general advice, the AP should not outline or assign work or specific methods and procedures to be followed,** or review or evaluate work for accuracy or adequacy prior to commencing AP work.

CSAP Practice Guidelines for Approved Professionals, Nov. 2010

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Early Involvement of AP

As an Arm`s Length AP, be careful about communication with, and commitments to, the client

- Maintain Arm`s Length status
- Limit communication to that associated with the AP review, not project management or directing any future work

General Advice/Guidance (Non-Directed)

Review of Investigation Results

✓ Need more data to support this conclusion

X Need a borehole in this location to be analyzed for…

Review of Reports

✓ Need more rationale to support this conclusion

X Need to state the following….

Historical Involvement at a Site

Does historical involvement at a site prevent Arm's Length Review?

- prior to the CSR
- more than 10 years ago
  - *substantial work completed since*
  - *conclusions based on recent work*
- 5 years ago, 2 years ago?

Historical Involvement at a Site

Does historical involvement in assessment work at a site prevent Arm's Length Review of a risk assessment by a risk-based standards AP?

- Stage 1 PSI
- Stage 2 PSI
- DSI
- Remediation

Summary – Arm's Length Review

- Required if:
  - Offsite contamination
  - Remediation to risk-based standards
- If not done:
  - application returned to CSAP
  - indemnity does not apply
- No supervisory relationship between report authors and AP
- Must be limited to general guidance

Available Resources for Making a Submission

Colin Dunwoody

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

MoE documents regulating instrument submissions

- Legislation
- Regulations
- Protocols/ Procedures/ Policies
- Guidance

MoE information documents

- Fact Sheets
- Q&A
- Approvals Workbook
- MoE checklists 10 and 11

CSAP information documents

- CSAP Guidance
- Submission cover letter (list of attachments)
- CSAP templates
- Submission Manager

Legislation

- *Environmental Management Act*
- Regulations
  - Contaminated Sites Regulation
  - Spill Reporting Regulation
  - Hazardous Waste Regulation
  - Transportation of Dangerous Goods (Federal)

Protocols Procedures and Policies

- **Protocols** are technical procedures that are *legally required* under the Contaminated Sites Regulation.
  - "… a director may refuse to accept anything governed by the **protocol** that is not in compliance with it."
- **Procedures** are used *by ministry staff to guide their administration* of the contaminated sites legislation and regulations.
- The ministry has adopted **policies** for contaminated sites which focus on scientific, technical and legal policy decisions.

Approvals

- Several protocols require approvals from the MoE (P4, P6, P9) under certain conditions
- The submitting AP may want to get pre-approval to ensure their argument will be accepted.
- The MoE has an *approvals workbook* which provides info on approvals that have been granted.
  - "A Director's decision for one site cannot be adopted for a different site. However, in some cases the details and rationale used to support a previous Director's decision made at a particular site may be relevant and appropriate for use at another site."

Guidance

- These are guidance documents, application forms, instructions and schedules to be used by site owners and operators, consultants and others involved in assessing and cleaning up contaminated sites.

Guidance

- **Technical**
  - These documents *advise on* technical and scientific matters.
- **Administrative**
  - These documents *advise on* administrative matters.

Guidance

- Guidance sets out the ministry's expectations for the technical content of submissions. As it states guidance is *advise* only.
- If you can make an alternate argument which is technically supportable and offers a different way of meeting the same objectives, you can depart from the guidance.
- You have to clearly document your alternate approach with technical references.
- Some guidance requires MoE pre-approval (TG6 under certain conditions).

Q&A

- MoE has a Q&A section on their website where questions that have been asked of the ministry have been answered.

- Check the dates – some may not still be current

Fact Sheets

- Explanations of regulations for specific applications
  - Stakeholders
  - Land uses and specific types of contamination

MoE forms

- MoE provides standardized forms for various aspects of submissions.
  - Found on the MoE website

www.env.gov.bc.ca/epd/remediation/

CSAP Guidelines

- Guidelines for conducting reviews of various types of reports
  - What needs to be included to be considered complete
- CSAP transmittal letter (list of attachments)
- CSAP screening list

Summary

- Know what regs apply and whether alternative arguments are acceptable
- Know the precluding conditions
- Know when approvals / pre-approvals are required (may hear more on this later today)
- Review whether your questions have been asked/answered before and know what decisions have already been made.
- If you are making an alternative argument, make it completely and clearly . Don't expect the CSAP reviewers or MoE to read your mind.
- Follow all the info documents in completing your submission so CSAP/MoE don't have to come after you for additional information (takes up a lot of Anna and Dave's time and slows the processing of your instrument)
- There are now fees for incomplete submissions.

Questions?

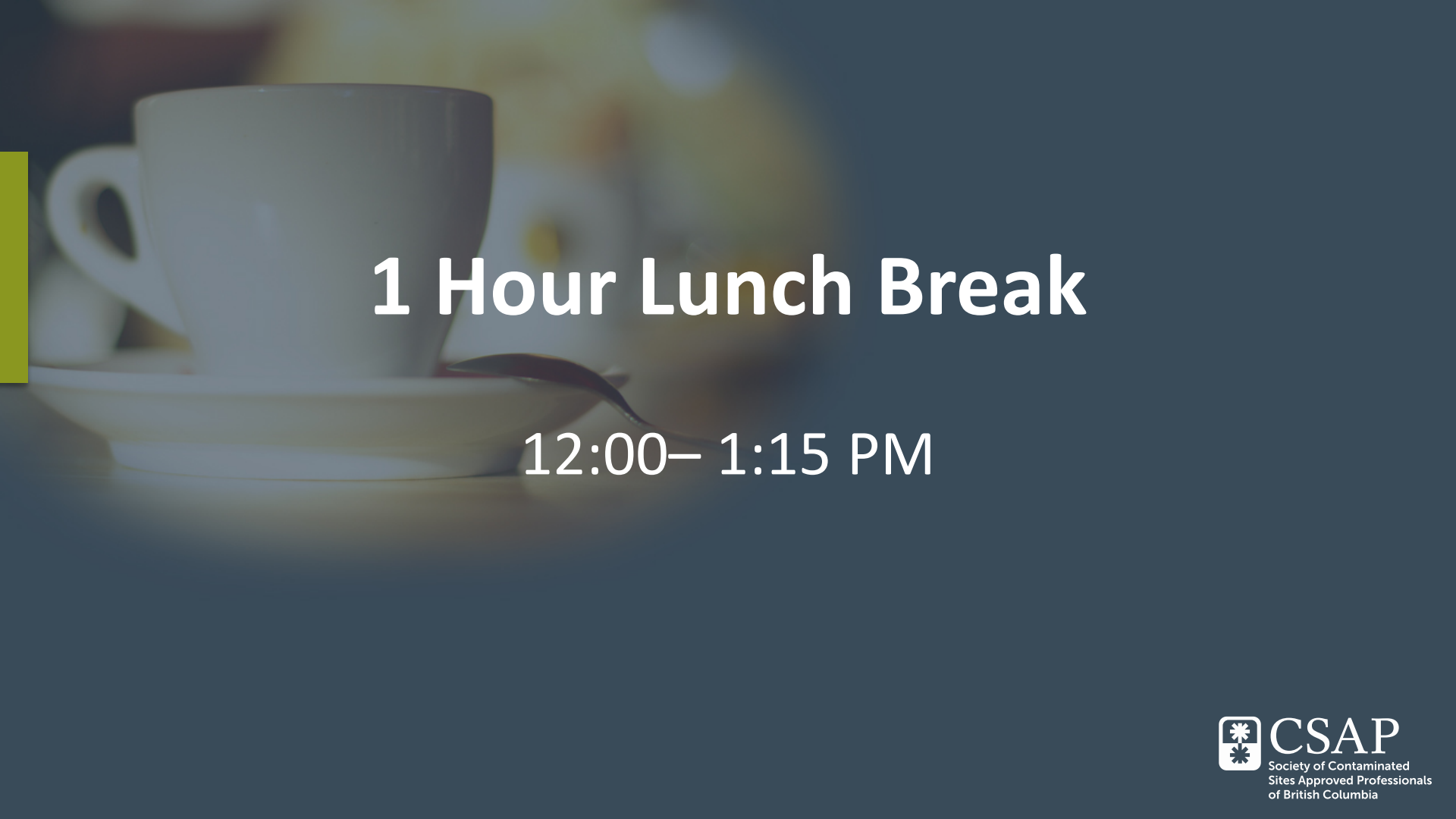
CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

2014 CSAP Scholarship Awards

Beth Power, Technical Review Committee

- Jarod Devries – UBC, Contaminant Hydrogeology
- Jayda Guy – SFU, Environmental Toxicology
- Mohsen Saeedi – UBC, Geoenvironmental Engineering

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia



1 Hour Lunch Break

12:00– 1:15 PM

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Welcome to the Ministry of Environment of BC

Ross Wilson

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

AP REVIEW OF REMEDIATION – REGULATORY ASPECTS

CSAP AGM AND PD WORKSHOP
SFU SEGAL BUILDING - VANCOUVER
JUNE 4, 2014

Alan W. McCammon, MSc, PGeo
Manager, Remediation Assurance & Brownfields

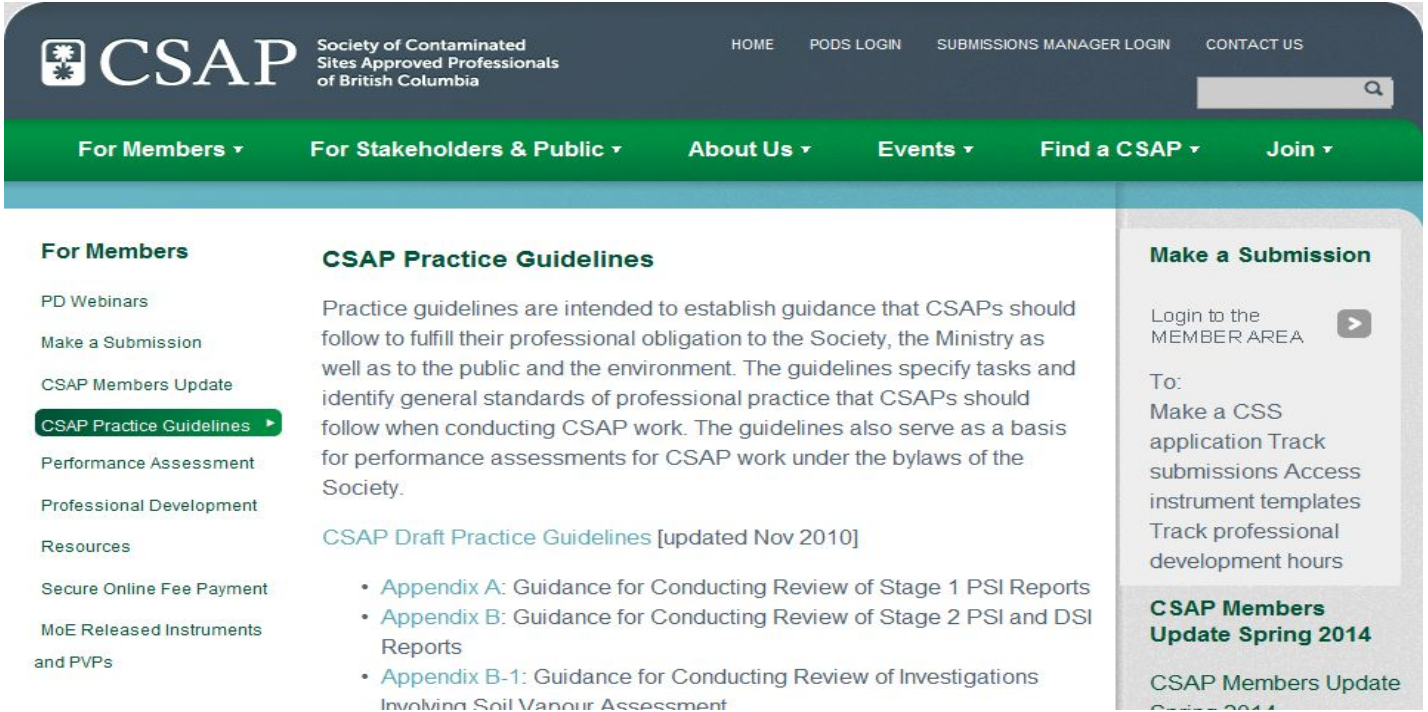
BRITISH COLUMBIA | Ministry of Environment

BACKGROUND/CONTEXT

- Approved Professionals (APs) qualify for membership in CSAP and appointment to the Roster, in part, by passing technical and regulatory examinations.
- Scope of AP practice therefore includes both
    - Technical aspects of site remediation, and
    - Regulatory aspects of site remediation
- Ministry and CSAP presentations typically focus more on technical aspects than regulatory… so, to help provide a bit more balance and to support the ministry's increasing focus on compliance promotion and verification, we wish to present some REMINDERS about AP review work under the CSAP Practice Guidelines.

BRITISH COLUMBIA | Ministry of Environment

CSAP PRACTICE GUIDELINES



BRITISH COLUMBIA | Ministry of Environment

CSAP PRACTICE GUIDELINES (EXCERPTS)

3.2 Responsibilities of Participants

3.2.3 Approved Professional

f) The primary responsibility of the AP is to determine if the work reviewed meets requirements of the Act, Regulations and Protocols. Because other legislation, regulation, bylaws and guidelines may also need to be complied with or recognized to remediate or manage a contaminated site, it is also the responsibility of the AP to determine, using a reasonable level of diligence, if required aspects of other relevant environmental legislation and guidelines have been followed.

CSAP PRACTICE GUIDELINES (EXCERPTS) (CONT'D)

3.2 Responsibilities of Participants

3.2.3 Approved Professional

(g) If, during the course of his review, the AP becomes aware of deviations from requirements of the Act, Regulations and Protocols (for example, lack of notification of independent remediation, lack of notification of potential for off-site migration of contamination, lack of timely notification of the Ministry of changes to remediation completed under an AiP, relocation of contaminated soil without a CSRA when a CSRA is required, blending of hazardous waste, transporting of a hazardous waste without manifest, etc.), the AP must bring this to the attention of the Client in writing. The Client must resolve the situation to the satisfaction of the AP prior to the AP recommending an Instrument. Resolution of these issues may require discussion with the Ministry.

[+ waste discharge without EMA authorization)]

BRITISH COLUMBIA | Ministry of Environment

CSAP PRACTICE GUIDELINES (EXCERPTS) (CONT'D)

APPENDIX C: Guidance for APs Conducting <u>Review of Remediation Plans</u> In Support of an Approval in Principle

Management of wastes

17. Does the remediation plan:

a. identify waste streams and adequate characterization and disposal methods, alternatives and locations for material to be relocated;

b. describe a management plan for wastes (i.e., excavated soil, discharge effluent [water, vapour], etc.); and,

c. identify any required authorizations (e.g., CSRA, effluent or emissions discharge permit)?

BRITISH COLUMBIA | Ministry of Environment

CSAP PRACTICE GUIDELINES (EXCERPTS) (CONT'D)

APPENDIX C: Guidance for APs Conducting Review of Remediation Plans In Support of an Approval in Principle

Third Parties / Consultation

If the remediation plan pertains to off-site lands/property, has the responsible person or their agent:

a. provided a Notice of Offsite Migration to the affected parties,;

b. obtained the written agreement of the offsite affected parties, where a risk-based approach is considered;

c. identified and discussed the effects of known regulatory requirements on remediation, including any federal, provincial or municipal authorizations that will be required to implement remediation; and,

d. identified any public consultation or review of remediation that has occurred or which is proposed during remediation?

BRITISH COLUMBIA | Ministry of Environment

CSAP PRACTICE GUIDELINES (EXCERPTS) (CONT'D)

APPENDIX D: Guidance for APs Conducting Review of Confirmation of Remediation Reports

8. If the remediation was completed under Independent Remediation, was notification at commencement and completion sent to the ministry and a copy of each appended to the report?

9. If remedial excavations extended off the property to remove off-site contamination, was a notification of migration provided, if not done already at the site investigation stage?

Waste Management… Disposal/discharge… Hazardous waste…

BRITISH COLUMBIA | Ministry of Environment

http://www.env.gov.bc.ca/epd/remediation

P6 SUMMARY OF SITE CONDITION HOW TO INCLUDE TG6 INFORMATION

ANNETTE MORTENSEN AND AMY SLOMA
SENIOR CONTAMINATED SITES OFFICERS
June 4, 2014

BRITISH COLUMBIA | Ministry of Environment

WATER USE DETERMINATIONS

Review from last year

TG6 Exemptions

- Site can be exempted directly through TG6 using site-specific data

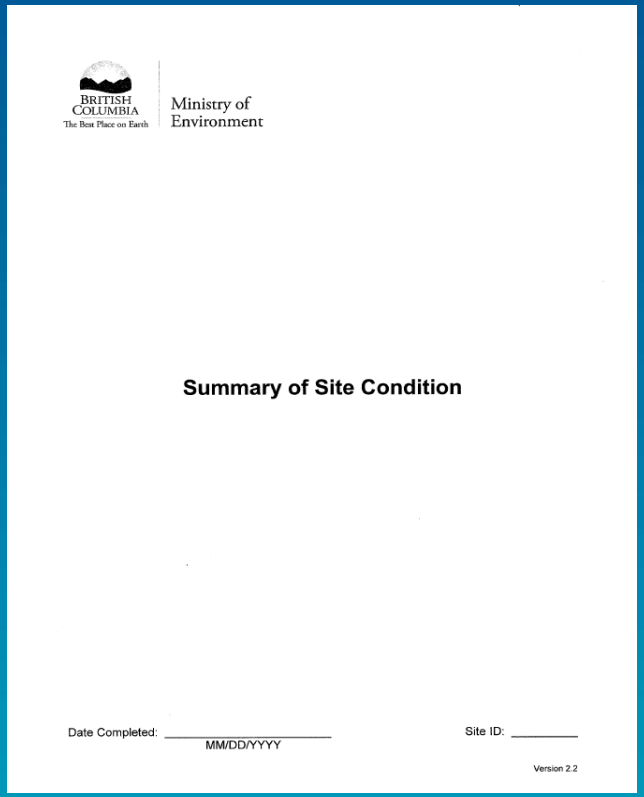
- Present arguments in Roster submission
- Include arguments in SOSC

Director's Determinations

- Site cannot be exempted through TG6

- Directors determination following a Multiple Lines of Evidence approach
- Apply for water use determination through the ministry

SUMMARY OF SITE CONDITION



BRITISH COLUMBIA
The Best Place on Earth

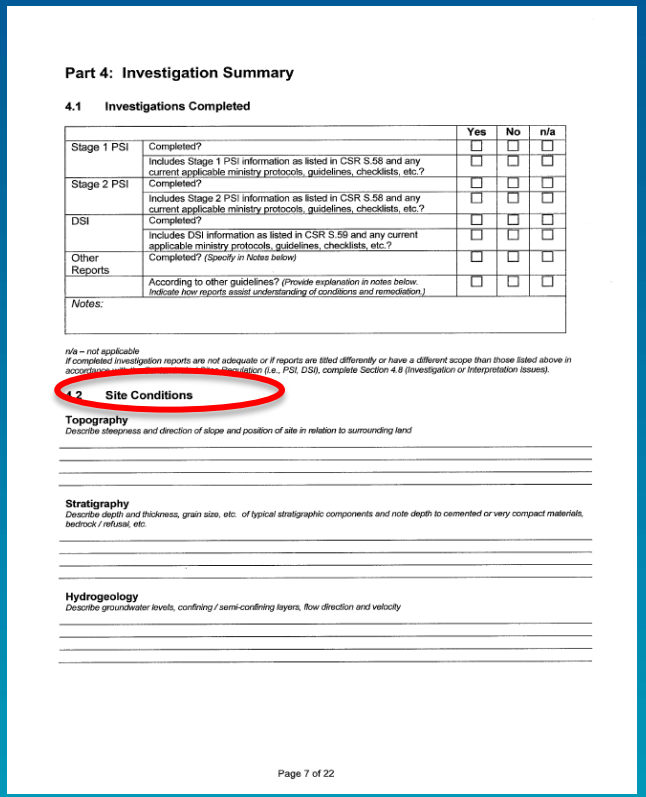
Ministry of Environment

Summary of Site Condition

Date Completed: _____
MM/DD/YYYY

Site ID: _____

Version 2.2



Part 4: Investigation Summary

4.1 Investigations Completed

		Yes	No	n/a
Stage 1 PSI	Completed?	☐	☐	☐
	Includes Stage 1 PSI information as listed in CSR S.58 and any current applicable ministry protocols, guidelines, checklists, etc.?	☐	☐	☐
Stage 2 PSI	Completed?	☐	☐	☐
	Includes Stage 2 PSI information as listed in CSR S.58 and any current applicable ministry protocols, guidelines, checklists, etc.?	☐	☐	☐
DSI	Completed?	☐	☐	☐
	Includes DSI information as listed in CSR S.59 and any current applicable ministry protocols, guidelines, checklists, etc.?	☐	☐	☐
Other Reports	Completed? *(Specify in Notes below)*	☐	☐	☐
	According to other guidelines? *(Provide explanation in notes below. Indicate how reports assist understanding of conditions and remediation.)*	☐	☐	☐
Notes:				

n/a – not applicable
If completed investigation reports are not adequate or if reports are titled differently or have a different scope than those listed above in accordance with the Contaminated Sites Regulation (i.e., PSI, DSI), complete Section 4.8 (Investigation or Interpretation Issues).

4.2 Site Conditions

Topography
Describe steepness and direction of slope and position of site in relation to surrounding land

Stratigraphy
Describe depth and thickness, grain size, etc. of typical stratigraphic components and note depth to cemented or very compact materials, bedrock / refusal, etc.

Hydrogeology
Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

Page 7 of 22

SUMMARY OF SITE CONDITION

Exemption of DW through TG6

- Information in SOSC has to be sufficient to show compliance with TG6

Examples of statements and data required

- No current DW use
- Unit not viable aquifer
  - include K values (yield for bedrock)
- Natural confining barrier
  - include K values, thickness, contamination data, uniform and fracture free
- Exemption of shallow aquifers:
  - not hydraulically connected to underlying viable aquifer
  - saturated thickness
  - peat; include organic content
  - natural quality; include TDS

SUMMARY OF SITE CONDITION

Status after more than 50 SOCS


Information sufficient to determine DW does not apply


Information insufficient to determine DW does not apply


DW exemption requires Director's Water Use Determination


DW applies

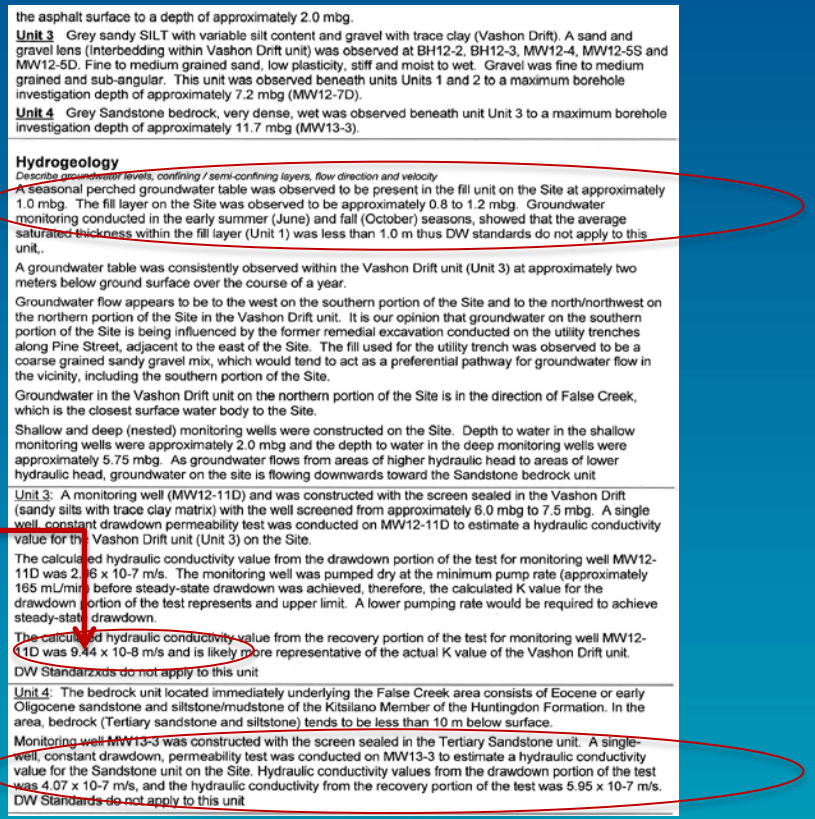
BRITISH COLUMBIA | Ministry of Environment

SOSC – SUFFICIENT INFORMATION

Provided information

- Thickness, k or yield has been measured in each unit
- Saturated fill thickness < 2m
- k < 1 x 10^{-6} m/s in each overlying unit
- Onsite pump test indicates yield in bedrock is less than 1.3 L/min
- No aquifers present

DW does not apply



the asphalt surface to a depth of approximately 2.0 mbg.

Unit 3 Grey sandy SILT with variable silt content and gravel with trace clay (Vashon Drift). A sand and gravel lens (Interbedding within Vashon Drift unit) was observed at BH12-2, BH12-3, MW12-4, MW12-5S and MW12-5D. Fine to medium grained sand, low plasticity, stiff and moist to wet. Gravel was fine to medium grained and sub-angular. This unit was observed beneath units Units 1 and 2 to a maximum borehole investigation depth of approximately 7.2 mbg (MW12-7D).

Unit 4 Grey Sandstone bedrock, very dense, wet was observed beneath unit Unit 3 to a maximum borehole investigation depth of approximately 11.7 mbg (MW13-3).

Hydrogeology

Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

A seasonal perched groundwater table was observed to be present in the fill unit on the Site at approximately 1.0 mbg. The fill layer on the Site was observed to be approximately 0.8 to 1.2 mbg. Groundwater monitoring conducted in the early summer (June) and fall (October) seasons, showed that the average saturated thickness within the fill layer (Unit 1) was less than 1.0 m thus DW standards do not apply to this unit,.

A groundwater table was consistently observed within the Vashon Drift unit (Unit 3) at approximately two meters below ground surface over the course of a year.

Groundwater flow appears to be to the west on the southern portion of the Site and to the north/northwest on the northern portion of the Site in the Vashon Drift unit. It is our opinion that groundwater on the southern portion of the Site is being influenced by the former remedial excavation conducted on the utility trenches along Pine Street, adjacent to the east of the Site. The fill used for the utility trench was observed to be a coarse grained sandy gravel mix, which would tend to act as a preferential pathway for groundwater flow in the vicinity, including the southern portion of the Site.

Groundwater in the Vashon Drift unit on the northern portion of the Site is in the direction of False Creek, which is the closest surface water body to the Site.

Shallow and deep (nested) monitoring wells were constructed on the Site. Depth to water in the shallow monitoring wells were approximately 2.0 mbg and the depth to water in the deep monitoring wells were approximately 5.75 mbg. As groundwater flows from areas of higher hydraulic head to areas of lower hydraulic head, groundwater on the site is flowing downwards toward the Sandstone bedrock unit

Unit 3: A monitoring well (MW12-11D) and was constructed with the screen sealed in the Vashon Drift (sandy silts with trace clay matrix) with the well screened from approximately 6.0 mbg to 7.5 mbg. A single well, constant drawdown permeability test was conducted on MW12-11D to estimate a hydraulic conductivity value for the Vashon Drift unit (Unit 3) on the Site.

The calculated hydraulic conductivity value from the drawdown portion of the test for monitoring well MW12-11D was 2.96 x 10-7 m/s. The monitoring well was pumped dry at the minimum pump rate (approximately 165 mL/min) before steady-state drawdown was achieved, therefore, the calculated K value for the drawdown portion of the test represents and upper limit. A lower pumping rate would be required to achieve steady-state drawdown.

The calculated hydraulic conductivity value from the recovery portion of the test for monitoring well MW12-11D was 9.44 x 10-8 m/s and is likely more representative of the actual K value of the Vashon Drift unit.

DW Standarzxds do not apply to this unit

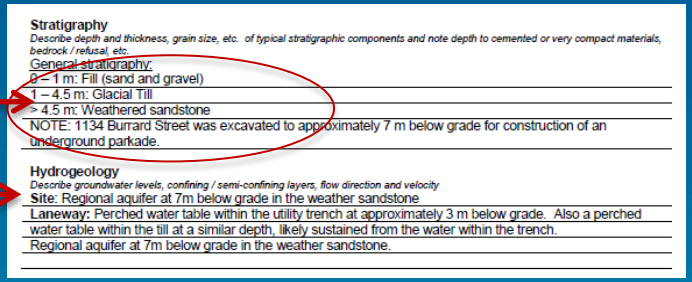
Unit 4: The bedrock unit located immediately underlying the False Creek area consists of Eocene or early Oligocene sandstone and siltstone/mudstone of the Kitsilano Member of the Huntingdon Formation. In the area, bedrock (Tertiary sandstone and siltstone) tends to be less than 10 m below surface.

Monitoring well MW13-3 was constructed with the screen sealed in the Tertiary Sandstone unit. A single-well, constant drawdown, permeability test was conducted on MW13-3 to estimate a hydraulic conductivity value for the Sandstone unit on the Site. Hydraulic conductivity values from the drawdown portion of the test was 4.07 x 10-7 m/s, and the hydraulic conductivity from the recovery portion of the test was 5.95 x 10-7 m/s. DW Standards do not apply to this unit

SOSC – INSUFFICIENT INFORMATION

Provided information

- Stratigraphy of fill, till, bedrock
- Aquifer in bedrock



Stratigraphy

Describe depth and thickness, grain size, etc. of typical stratigraphic components and note depth to cemented or very compact materials, bedrock / refusal, etc.

General stratigraphy:

0 – 1 m: Fill (sand and gravel)

1 – 4.5 m: Glacial Till

> 4.5 m: Weathered sandstone

NOTE: 1134 Burrard Street was excavated to approximately 7 m below grade for construction of an underground parkade.

Hydrogeology

Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

Site: Regional aquifer at 7m below grade in the weather sandstone

Laneway: Perched water table within the utility trench at approximately 3 m below grade. Also a perched water table within the till at a similar depth, likely sustained from the water within the trench.

Regional aquifer at 7m below grade in the weather sandstone.

Missing information

- Hydraulic data for bedrock
- Hydraulic data for till
- Statement regarding current use

Resubmit SOSC

SOSC – INSUFFICIENT INFORMATION

Provided information

- Stratigraphy of fill, till, bedrock
- Measure onsite K < 1x10^{-6} m/s for bedrock (no yield)
- Seasonal water table in till

Stratigraphy

Describe depth and thickness, grain size, etc. of typical stratigraphic components and note depth to cemented or very compact materials, bedrock / refusal, etc.

General stratigraphy:

0 – 1 m: Fill (sand and gravel)

1 – 4.5 m: Glacial Till

> 4.5 m: Weathered sandstone

NOTE: 1134 Burrard Street was excavated to approximately 7 m below grade for construction of an underground parkade.

Hydrogeology

Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

A perched water table is present in the laneway in the native till. The perched water table is at approximately 3 m below grade, which corresponds to the approximate depth of the storm sewer trench. The regional aquifer at 7m below grade in the weather sandstone.

DW Standard Assessment:

The site has been excavated to bedrock for the construction of the building. There is a seasonal perched water table soil in glacial till, and as the perched water table in the glacial till is not permanent, this unit is not suitable as a drinking water aquifer.

The unconfined aquifer at the site is present in the underlying sandstone/siltstone bedrock. The geometric mean of six single well hydraulic conductivity tests was estimated to be 7.8 x 10^{-7} m/s which is under the threshold definition for a drinking water aquifer of 1.0 x 10^{-6} m/s. As the K value was lower than what is specified for a drinking water aquifer, the DW standards do not apply.

The hydraulic conductivity derived for the siltstone/sandstone unit tested was found to be 5 to 10 times higher relative to what is typically found within the same rock unit on other properties in the Vancouver region. The higher conductivity found at this Site likely reflects greater weathering of the upper siltstone/sandstone as all monitoring wells were screened near the upper portion of this unit. It is expected that the deeper rock would exhibit lower K values more reflective of the regional geology, as it would be less weathered and fractured than at surface.

AW Standard Assessment:

The perched groundwater in the laneway does not enter the storm sewer. The building drains that are located at the base of the building at about 7 m depth drain to the sanitary sewer (permit was obtained).

The groundwater contamination was delineated and found to be limited in extent to within 20 m of the site in the laneway, including two wells that were installed in the storm sewer trench to assess this potential preferential pathway. The groundwater contamination is located approximately 700 m from the nearest aquatic receiving environment, which is False Creek. No significant contaminant migration has occurred during the 50-plus years that the residential heating oil tanks were present, and as the tanks and contamination have now been removed the groundwater contamination is expected to reduce over time.

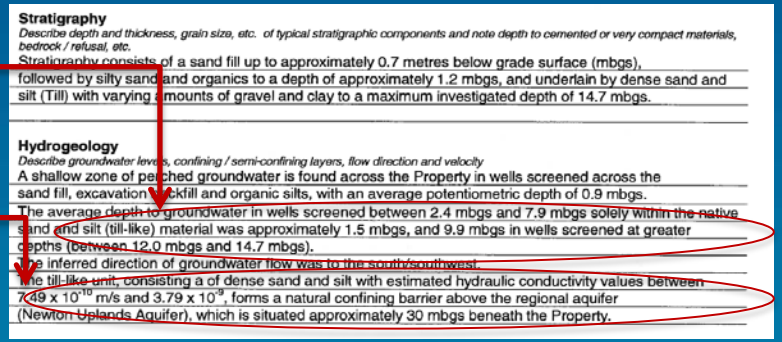
As the groundwater contamination has been delineated to within 20 m of the site, and the absence of preferential pathways; it is concluded that the AW standards do not apply to the Site and the Laneway.

DW does not apply

SOSC – INSUFFICIENT INFORMATION

Provided information

- Thickness > 5m
- Measure onsite k < $1x10^{-7}$ m/s in natural confining unit
- Protective of underlying aquifer



Stratigraphy

Describe depth and thickness, grain size, etc. of typical stratigraphic components and note depth to cemented or very compact materials, bedrock / refusal, etc.

Stratigraphy consists of a sand fill up to approximately 0.7 metres below grade surface (mbgs), followed by silty sand and organics to a depth of approximately 1.2 mbgs, and underlain by dense sand and silt (Till) with varying amounts of gravel and clay to a maximum investigated depth of 14.7 mbgs.

Hydrogeology

Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

A shallow zone of perched groundwater is found across the Property in wells screened across the sand fill, excavation backfill and organic silts, with an average potentiometric depth of 0.9 mbgs. The average depth to groundwater in wells screened between 2.4 mbgs and 7.9 mbgs solely within the native sand and silt (till-like) material was approximately 1.5 mbgs, and 9.9 mbgs in wells screened at greater depths (between 12.0 mbgs and 14.7 mbgs).

The inferred direction of groundwater flow was to the south/southwest.

The till-like unit, consisting a of dense sand and silt with estimated hydraulic conductivity values between 7.49×10^{-10} m/s and 3.79×10^{-9}, forms a natural confining barrier above the regional aquifer (Newton Uplands Aquifer), which is situated approximately 30 mbgs beneath the Property.

Missing information

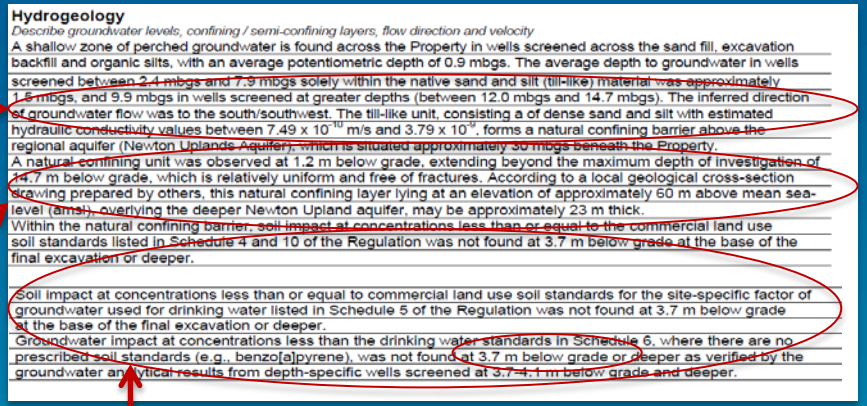
- Uniform and fracture free
- Contaminant free according to Schedule 4, 5 (gw used for DW), 10 (or Sch6 when no soil stds)
- At what depth

Resubmit SOSC

SOSC – INSUFFICIENT INFORMATION

Provided information

- Thickness > 5m
- Measure onsite k < $1x10^{-7}$ m/s in natural confining unit
- Protective of underlying aquifer
- Uniform and fracture free
- Contaminant free according to Schedule 4, 5 (gw used for DW), 10 (or Sch6 when no soil stds)
- Clean at 3.7 mbg



Hydrogeology

Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

A shallow zone of perched groundwater is found across the Property in wells screened across the sand fill, excavation backfill and organic silts, with an average potentiometric depth of 0.9 mbgs. The average depth to groundwater in wells screened between 2.4 mbgs and 7.9 mbgs solely within the native sand and silt (till-like) material was approximately 1.5 mbgs, and 9.9 mbgs in wells screened at greater depths (between 12.0 mbgs and 14.7 mbgs). The inferred direction of groundwater flow was to the south/southwest. The till-like unit, consisting a of dense sand and silt with estimated hydraulic conductivity values between 7.49 x 10^{-10} m/s and 3.79 x 10^{-9}, forms a natural confining barrier above the regional aquifer (Newton Uplands Aquifer), which is situated approximately 30 mbgs beneath the Property.

A natural confining unit was observed at 1.2 m below grade, extending beyond the maximum depth of investigation of 14.7 m below grade, which is relatively uniform and free of fractures. According to a local geological cross-section drawing prepared by others, this natural confining layer lying at an elevation of approximately 60 m above mean sea-level (amsl), overlying the deeper Newton Upland aquifer, may be approximately 23 m thick.

Within the natural confining barrier, soil impact at concentrations less than or equal to the commercial land use soil standards listed in Schedule 4 and 10 of the Regulation was not found at 3.7 m below grade at the base of the final excavation or deeper.

Soil impact at concentrations less than or equal to commercial land use soil standards for the site-specific factor of groundwater used for drinking water listed in Schedule 5 of the Regulation was not found at 3.7 m below grade at the base of the final excavation or deeper.

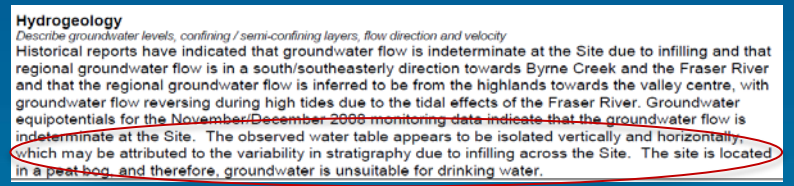
Groundwater impact at concentrations less than the drinking water standards in Schedule 6, where there are no prescribed soil standards (e.g., benzo[a]pyrene), was not found at 3.7 m below grade or deeper as verified by the groundwater analytical results from depth-specific wells screened at 3.7–4.1 m below grade and deeper.

DW does not apply

SOSC – DW APPLIES

Provided information

- Site is located in peat bog



Hydrogeology

Describe groundwater levels, confining / semi-confining layers, flow direction and velocity

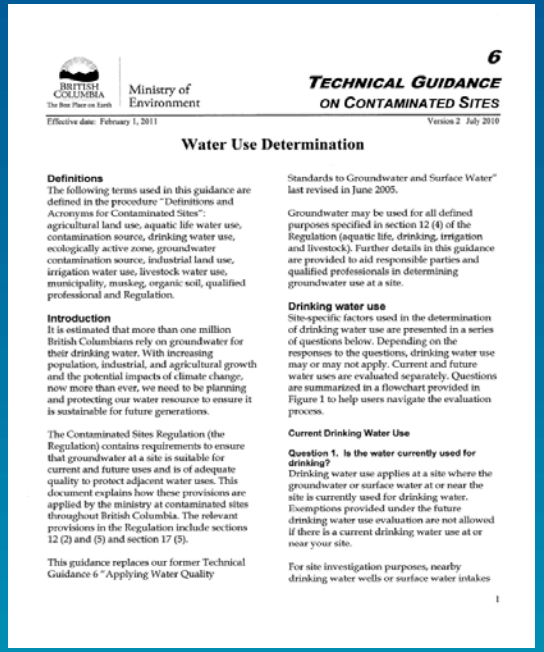
Historical reports have indicated that groundwater flow is indeterminate at the Site due to infilling and that regional groundwater flow is in a south/southeasterly direction towards Byrne Creek and the Fraser River and that the regional groundwater flow is inferred to be from the highlands towards the valley centre, with groundwater flow reversing during high tides due to the tidal effects of the Fraser River. Groundwater equipotentials for the November/December 2008 monitoring data indicate that the groundwater flow is indeterminate at the Site. The observed water table appears to be isolated vertically and horizontally, which may be attributed to the variability in stratigraphy due to infilling across the Site. The site is located in a peat bog, and therefore, groundwater is unsuitable for drinking water.

Missing information

- No evaluation of deeper aquifers / no k measurements
- No measurement of natural water quality – TDS/organic content in shallow or deep aquifers
- No discussion of current DW use
- No confining unit; shallow aquifers can not be exempted

DW applies

PROTOCOL 21



6

Ministry of Environment

TECHNICAL GUIDANCE ON CONTAMINATED SITES

Effective date: February 1, 2011 Version 2 July 2010

Water Use Determination

Definitions
The following terms used in this guidance are defined in the procedure "Definitions and Acronyms for Contaminated Sites": agricultural land use, aquatic life water use, contamination source, drinking water use, ecologically active zone, groundwater contamination source, industrial land use, irrigation water use, livestock water use, municipality, muskeg, organic soil, qualified professional and Regulation.

Introduction
It is estimated that more than one million British Columbians rely on groundwater for their drinking water. With increasing population, industrial, and agricultural growth and the potential impacts of climate change, now more than ever, we need to be planning and protecting our water resource to ensure it is sustainable for future generations.

The Contaminated Sites Regulation (the Regulation) contains requirements to ensure that groundwater at a site is suitable for current and future uses and is of adequate quality to protect adjacent water uses. This document explains how these provisions are applied by the ministry at contaminated sites throughout British Columbia. The relevant provisions in the Regulation include sections 12 (2) and (3) and section 17 (3).

This guidance replaces our former Technical Guidance 6 "Applying Water Quality Standards to Groundwater and Surface Water" last revised in June 2005.

Groundwater may be used for all defined purposes specified in section 12 (4) of the Regulation (aquatic life, drinking, irrigation and livestock). Further details in this guidance are provided to aid responsible parties and qualified professionals in determining groundwater use at a site.

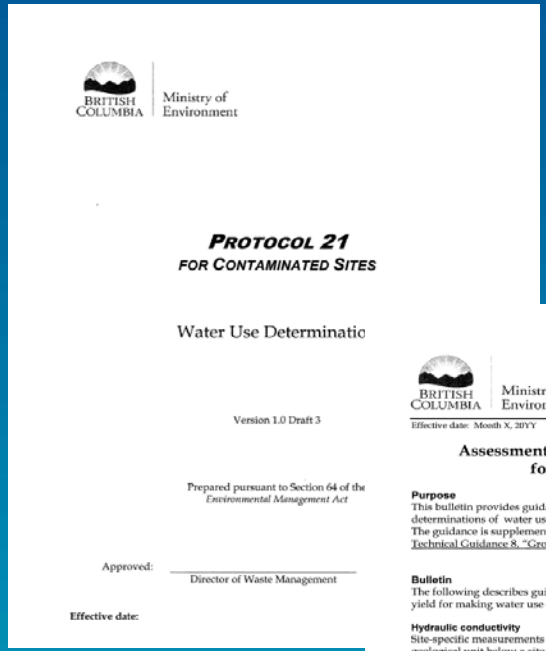
Drinking water use
Site-specific factors used in the determination of drinking water use are presented in a series of questions below. Depending on the responses to the questions, drinking water use may or may not apply. Current and future water uses are evaluated separately. Questions are summarized in a flowchart provided in Figure 1 to help users navigate the evaluation process.

Current Drinking Water Use

Question 1. Is the water currently used for drinking?
Drinking water use applies at a site where the groundwater or surface water at or near the site is currently used for drinking water. Exemptions provided under the future drinking water use evaluation are not allowed if there is a current drinking water use at or near your site.

For site investigation purposes, nearby drinking water wells or surface water intakes

1



Ministry of Environment

PROTOCOL 21 FOR CONTAMINATED SITES

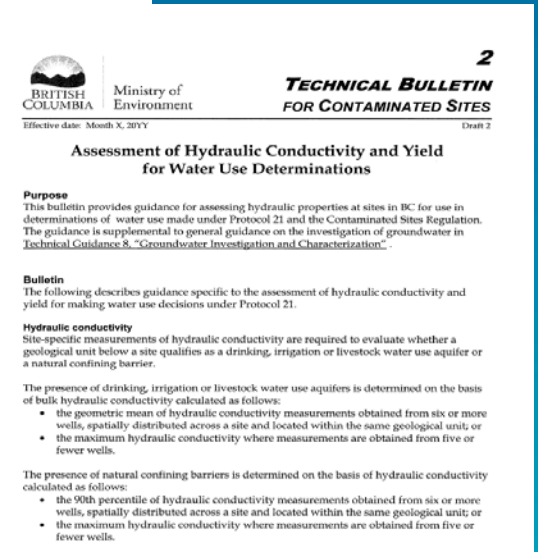
Water Use Determinatio

Version 1.0 Draft 3

Prepared pursuant to Section 64 of the *Environmental Management Act*

Approved: _____
Director of Waste Management

Effective date:



2

Ministry of Environment

TECHNICAL BULLETIN FOR CONTAMINATED SITES

Effective date: Month X, 20YY Draft 2

Assessment of Hydraulic Conductivity and Yield for Water Use Determinations

Purpose
This bulletin provides guidance for assessing hydraulic properties at sites in BC for use in determinations of water use made under Protocol 21 and the Contaminated Sites Regulation. The guidance is supplemental to general guidance on the investigation of groundwater in Technical Guidance 8, "Groundwater Investigation and Characterization" .

Bulletin
The following describes guidance specific to the assessment of hydraulic conductivity and yield for making water use decisions under Protocol 21.

Hydraulic conductivity
Site-specific measurements of hydraulic conductivity are required to evaluate whether a geological unit below a site qualifies as a drinking, irrigation or livestock water use aquifer or a natural confining barrier.

The presence of drinking, irrigation or livestock water use aquifers is determined on the basis of bulk hydraulic conductivity calculated as follows:

- the geometric mean of hydraulic conductivity measurements obtained from six or more wells, spatially distributed across a site and located within the same geological unit; or
- the maximum hydraulic conductivity where measurements are obtained from five or fewer wells.

The presence of natural confining barriers is determined on the basis of hydraulic conductivity calculated as follows:

- the 90th percentile of hydraulic conductivity measurements obtained from six or more wells, spatially distributed across a site and located within the same geological unit; or
- the maximum hydraulic conductivity where measurements are obtained from five or fewer wells.

PROTOCOL 21

Status on P21

- Document restructured and rewritten
- Majority of changes already in effect as presented at last AGM
  - Exemption of unconfined aquifers (thickness < 2m; composed of fill)
  - Definition of natural confining barrier (equivalent thickness)
  - Use of statistics to calculate hydraulic K
  - Bedrock evaluation (yield, data within 500 m, mapped aquifers)
- CSAP Review done
- Public comments this summer

THANK YOU

AMY SLOMA
AMY.SLOMA@GOV.BC.CA

ANNETTE MORTENSEN
ANNETTE.MORTENSEN@GOV.BC.CA

DRAFT
ADMINISTRATIVE GUIDANCE 15

Peggy Evans & John Ward
Ministry of Environment

CSAP Society AGM

June 4, 2014

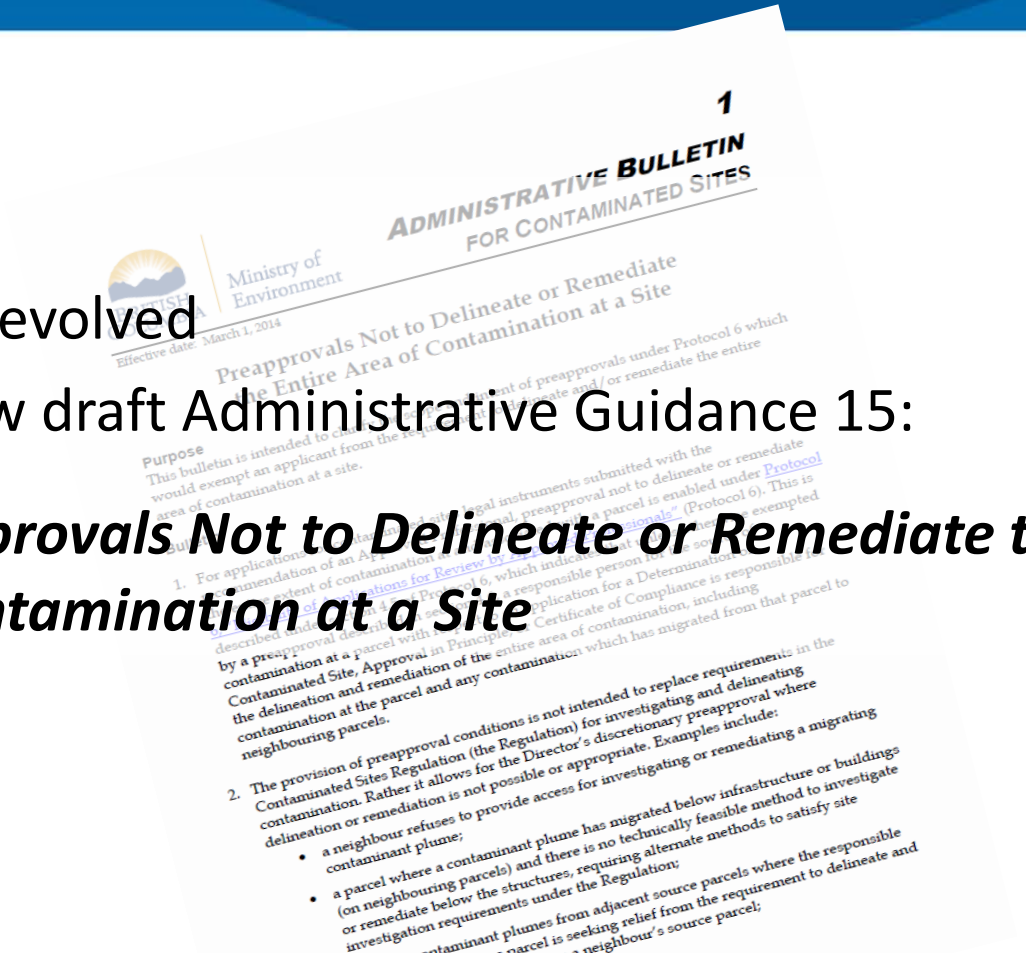
BRITISH COLUMBIA | Ministry of Environment

OUTLINE

Administrative Guidance 15

- Purpose
- Regulatory context
- Scope
- Reporting Expectations
- Scenarios

DID YOU CATCH ADMINISTATIVE BULLETIN 1?


1

ADMINISTRATIVE BULLETIN
FOR CONTAMINATED SITES

Ministry of Environment

Effective date: March 1, 2014

Preapprovals Not to Delineate or Remediate
the Entire Area of Contamination at a Site

Purpose

This bulletin is intended to

would exempt an applicant from the

area of contamination at a site.

1. For application

by a prep

Contaminated Site, Approval in Principle

the delineation and remediation of the

contamination at the parcel and any contamination which has migrated from that parcel to

neighbouring parcels.

2. The provision of preapproval conditions is not intended to replace requirements in the Contaminated Sites Regulation (the Regulation) for investigating and delineating contamination. Rather it allows for the Director's discretionary preapproval where delineation or remediation is not possible or appropriate. Examples include:

- a neighbour refuses to provide access for investigating or remediating a migrating contaminant plume;
- a parcel where a contaminant plume has migrated below infrastructure or buildings (on neighbouring parcels) and there is no technically feasible method to investigate or remediate below the structures, requiring alternate methods to satisfy site investigation requirements under the Regulation;
- contaminant plumes from adjacent source parcels where the responsible parcel is seeking relief from the requirement to delineate and neighbour's source parcel;

It's evolved

Now draft Administrative Guidance 15:

Approvals Not to Delineate or Remediate the Entire Area of Contamination at a Site

BRITISH COLUMBIA | Ministry of Environment

PURPOSE

Administrative Guidance 15

Describes situations where a Director may recognize that full delineation or remediation is not possible or appropriate when issuing a legal instrument.

REGULATORY CONTEXT

Protocol 6, Version 8

4.5 Subject to section 4.6…any applicant who is a responsible person for the source of contamination with respect to an application for an AiP or CoC is responsible for the delineation and remediation of the entire area of contamination including contamination at a parcel and that which has migrated from that parcel to neighbouring parcels.

[See EMA 1 and CSR 59, 47 and 48]

Addressing the "entire extent" of contamination has been required in Protocol 6 since 2003 (Version 2)

An exception introduced in Protocol 6, Version 4 (2004)…

REGULATORY CONTEXT

Corollary to P6, Clause 4.5:

*4.5 Subject to section 4.6, any applicant who is **NOT** a Responsible Person for the source of contamination with respect to an application for an AiP or CoC is **NOT** responsible for the delineation and remediation of the entire area of contamination including contamination at the source parcel and that which has migrated from that parcel to neighbouring parcels, other than the parcel for which the instrument is sought..*

*4.5 Subject to 4.6…any applicant who is **NOT** a Responsible Person for the source of contamination with respect to an application for an AiP or CoC is **NOT** responsible for the delineation and remediation of the entire area of contamination including contamination at a parcel and that which has migrated from that parcel to neighbouring parcels.*

?

Legal instruments confirm that CSR standards and procedures have been or will be met on the parcel they are issued for regardless of responsibility.

REGULATORY CONTEXT

Subject to section 4.6…

4.6 Any application for a legal instrument of a type listed in Table 2 must be preapproved by a Director.

Table 2. Applications requiring preapproval by a Director of Waste Management

No.	Types of Applications for Contaminated Sites Legal Instruments Requiring Preapproval
Involving the extent of the area of contamination delineated and remediated	
1	If the applicant for a contaminated sites legal instrument is a responsible person for the source parcel and has not delineated and/or remediated the entire area of contamination including contamination at a parcel and contamination which has migrated from that parcel to neighbouring parcels.

AFFECTED PROPERTY EXCEPTION

Protocol 6 Version 7, 2010

Table 2. Contaminated Sites Legal Instrument applications which must be accompanied by a recommendation by an Approved Professional

Column I	Column II	Column III
Legal Instrument	Site Risk Classification[1]	Additional Qualifications[2]
Determination of Contaminated Site	high risk non-high risk	
Approval in Principle	non-high risk	For remediation under the numerical standards, this requirement does not apply unless remediation can meet the requirements in the Approval in Principle within five years of the Approval in Principle being issued and a schedule of remedial commitments is provided to a Director by the responsible person indicating how this timeline will be met.
Approval in Principle or Certificate of Compliance	non-high risk	This requirement does not apply if the application: 1) Is based on a detailed risk assessment that does not comply with the guidance requirements and data hierarchies of Technical Guidance 7, "Supplemental Guidance for Risk Assessments." 2) Is based on a screening level risk assessment that does not comply with Protocol 13, "Screening Level Risk Assessment." 3) Is based on a risk assessment that includes one or more parcels affected by contamination migrating beyond a source site boundary, unless the application includes written statements confirming that each affected site owner agrees in writing to the risk management remedial approach. 4) Is for any parcel contaminated by substances migrating from a source site, unless the application includes the following written statements confirming that any measures necessary to prevent recontamination of that affected site by the contamination originating at the source site have been, in the case of a Certificate of Compliance, or will be, in the case of an Approval in Principle, put in place (i) by an Approved Professional, that the design of any works or implementation of other measures required in the opinion of the Approved Professional to prevent recontamination of the affected site from the source site will, if operated and maintained as specified by the Approved Professional, prevent recontamination of the affected site, or (ii) by the current owner or operator of the source site, that any works or measures intended to prevent recontamination of the affected site will be implemented, operated, and maintained according to the Approved Professional's specifications and any requirements in a Certificate of Compliance or Approval in Principle issued for the source site; or (iii) by the current owner or operator of the affected site, that any works or measures intended to prevent recontamination of the affected site will be implemented, operated, and maintained according to an Approved Professional's specifications and any requirements in a Certificate of Compliance or Approval in Principle issued for the affected site.

See Procedure 12

SCOPE

Administrative Guidance 15:

- Clarifies regulatory context
- Outlines eligible applications and reporting expectations
- Consolidates miscellaneous director's approvals under a single approval process
- Supports applications for both:
  - Legal instruments under Protocol 6; and
  - Site profile releases under Administrative Guidance 6

ELIGIBLE APPLICATIONS

Miscellaneous services and functions applications

- Area wide contamination (releases only)
- Merging plumes
- Responsible person requests for part site instruments for affected parcels
- Denied access
- Technical infeasibility (beyond scope of Technical Guidance)
- Flow through plumes (releases only)
- Beneficial use

REPORTING EXPECTATIONS

	Scenario	Applicable Lands	Legal Instrument or Release Request Requirements
1	Denied access	Affected parcels	Demonstrate that all reasonable efforts have been made to delineate and remediate the entire area of contamination in accordance with applicable tech guides and Admin Guide 11. Contamination must be bounded on a gross scale (e.g., on an adjacent roadway beyond the affected parcel).
2	Technical infeasibility	Source parcel or affected parcels	Submit: a) a description of, and rationale for the alternate method and a statement on its ability, versus ministry approved methods, to meet site investigation requirements, and b) a qualitative statement on the risks associated with the use of the alternate method versus ministry approved methods.
3	Merging plumes	Affected parcels	Submit: a) evidence that certain contaminants are not the responsibility of the applicant and are the responsibility of the neighbour, and b) communication records (per AG11) demonstrating all reasonable efforts have been made to work with the neighbouring RP.

Land Remediation
About Us
Contaminated Sites 101
Bulletins
Updates
Section Reports
Presentations
Comments Requests
Related Links
Contact Us

RESOURCES

CS e-Link Mailing List
SP e-Link Mailing List
Acronyms/Definitions
Q&As
Fact Sheets
Forms
Protocols, Proce s and Policie
Guidance
Approvals
Remediation Profiles
Reports

Land Remediation

Welcome

The Land Remediation Section administers the provisions for the investigation and remediation of contaminated sites in British Columbia under the *Environmental Management Act* and Contaminated Sites Regulation.

Our section focuses on the remediation of brownfields, orphan sites and complex, high risk contaminated sites, and facilitates the remediation of low and medium risk sites. We also manage the Site Registry, provide operational and procedural

Our Mailing Lists

Contaminated Sites:

» Subscribe Now
» Recent Messages

Site Profiles:

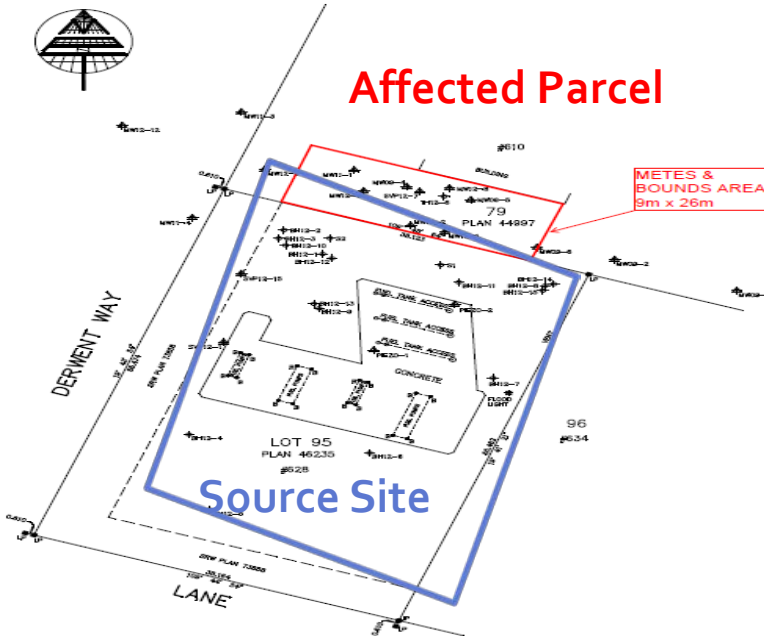
» Subscribe Now
» Recent Messages

Key Topics

» Information on Sites
» Residential Heating Oil Storage Tanks
» Our Services
» Site Risk Classification
» Legal & Regulatory Compliance
» Approved Professionals
» Independent Remediation
» Site Profiles
» Real Estate
» Brownfields
» Contaminant Migration
» Remediation Liability
» High Profile Sites

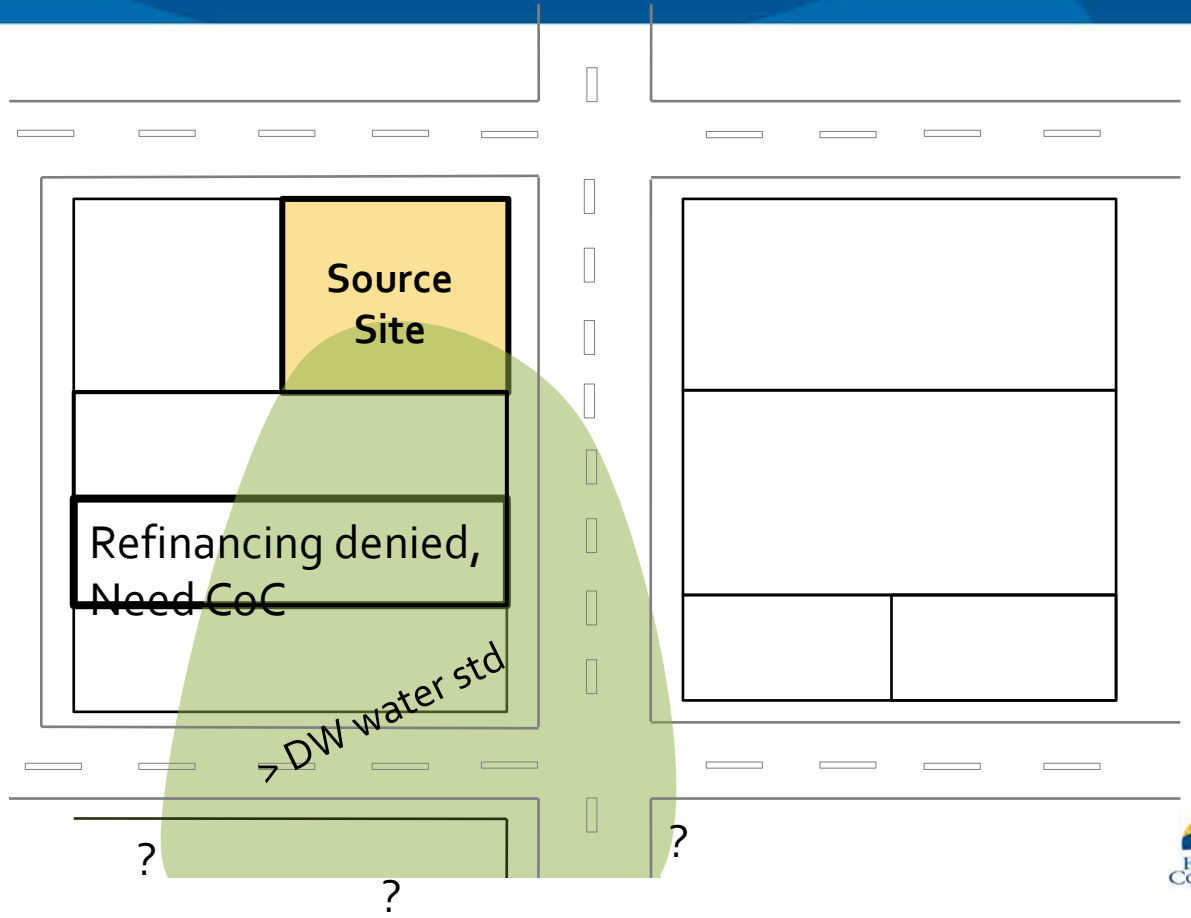
SCENARIO 1

CoC Application for Affected Parcel – Incomplete Remediation



- Operating source site.
- Entire extent of contamination delineated.
- Remediation of accessible source site via soil excavation/in-situ treatment
- LDPE barrier liner installed at boundary with affected parcel.
- Affected parcel remediated to numerical standards for all media.
- GW gradient away from the affected parcel.
- Written confirmation from the affected parcel owner for the numerical-based CoC.

SCENARIO 2



BRITISH COLUMBIA | Ministry of Environment

QUESTIONS?
THANK YOU!

30 Min Coffee Break

2:30 – 3:00 PM

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

COMPLETING SCHEDULE C

CONTAMINATED SITES LEGAL INSTRUMENT TEMPLATES (VERSION 8.0)

John E. H. Ward, PhD
Manager, Operations Management Unit

June 4, 2014

BRITISH COLUMBIA | Ministry of Environment

KEY TOPICS

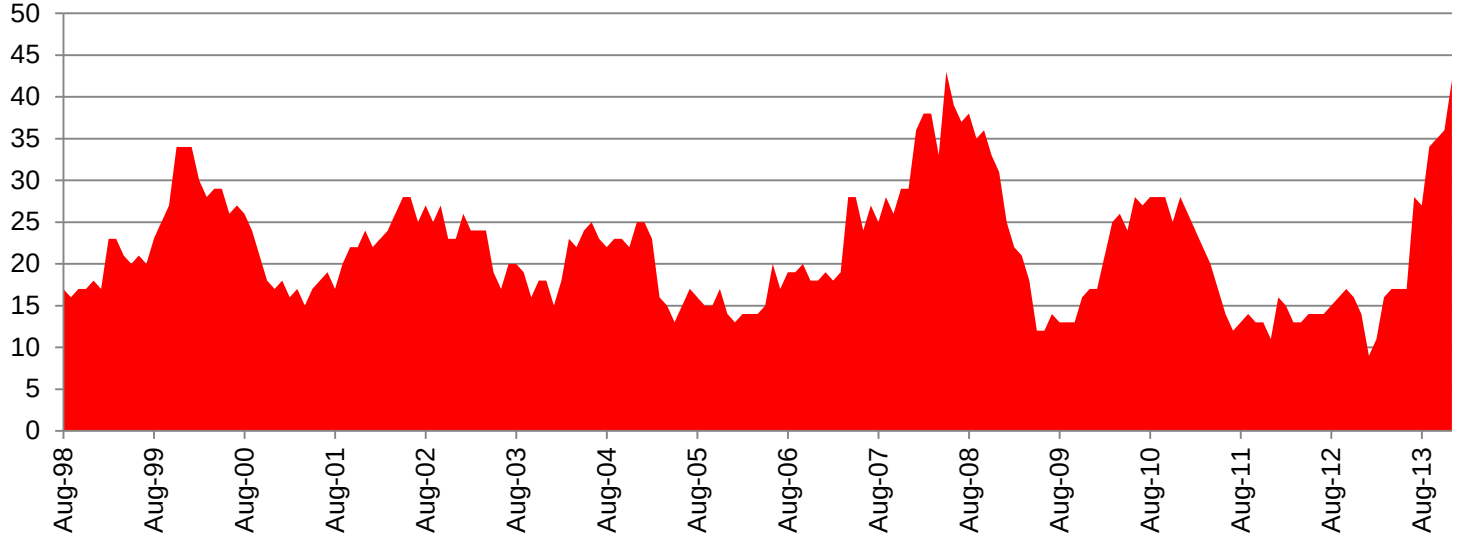
Instruments templates and Schedule C

- Recent contaminated sites legal instrument highlights
- What's new in Version 8.0 of the templates?
- How to complete Schedule C
- Current issues with instrument applications
  - Preparing draft instruments
  - Preparing Summaries of Site Condition
  - Assembling legal instrument application packages

LEGAL INSTRUMENT TRENDS

Determinations of Contaminated Site (42 last year)

Number Issued Annually
(Based on Moving 12 Month Totals)

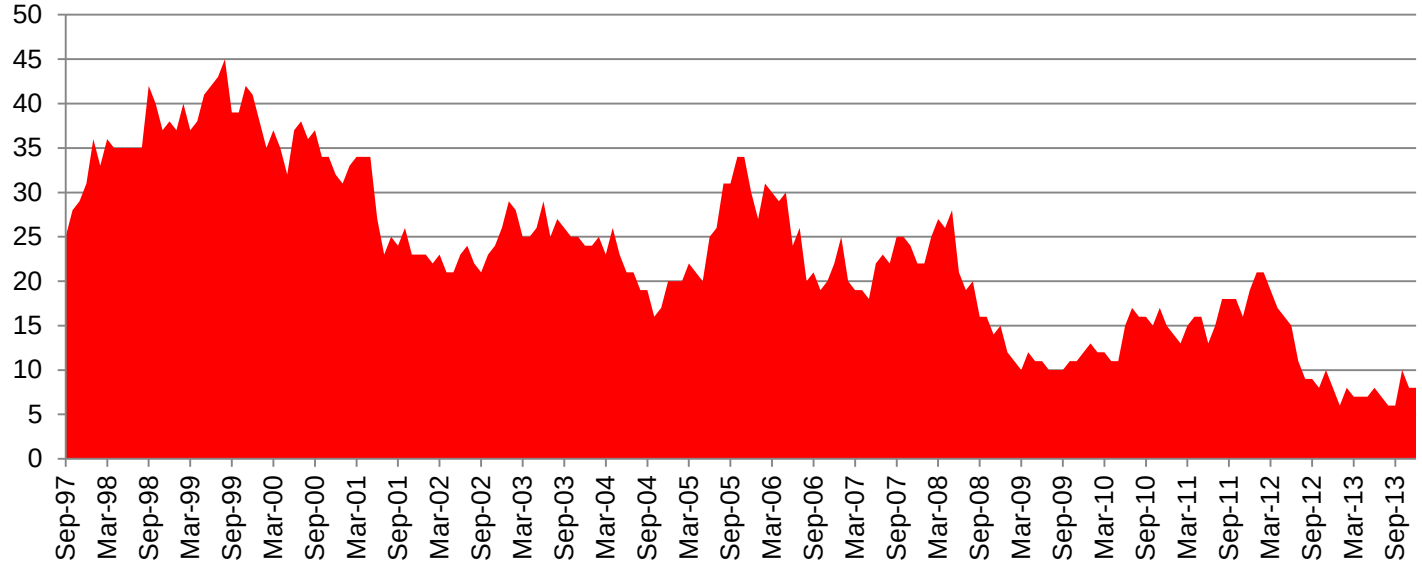


BRITISH COLUMBIA | Ministry of Environment

LEGAL INSTRUMENT TRENDS

Approvals in Principle (8 last year)

Number Issued Annually
(Based on Moving 12 Month Totals)

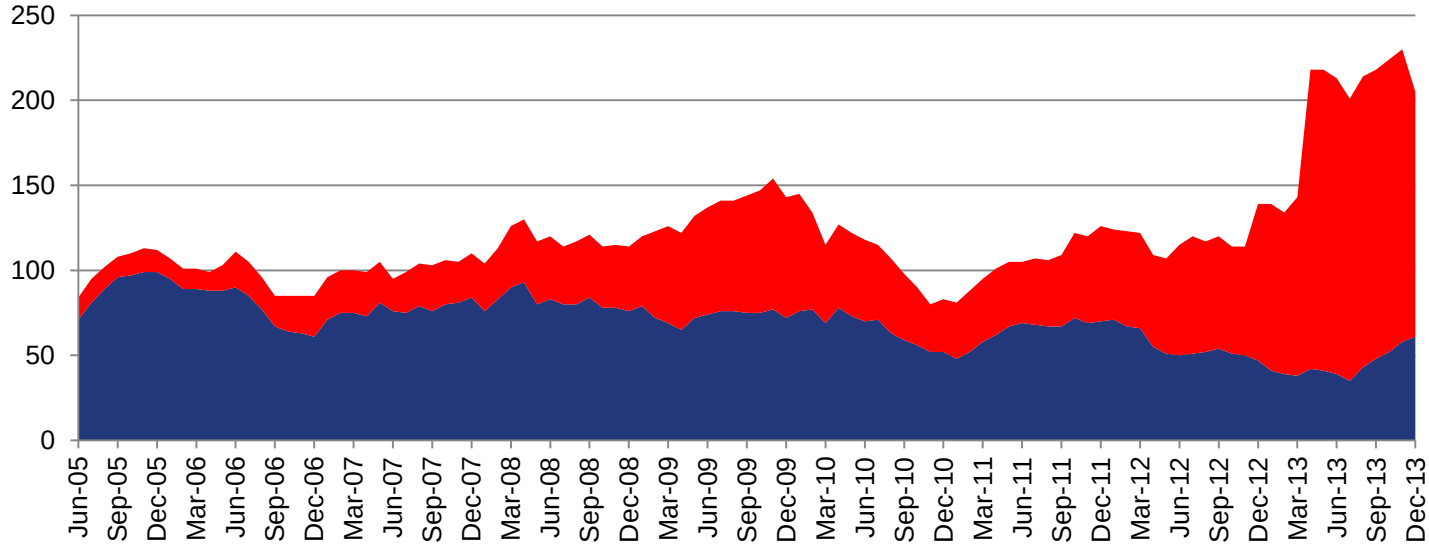


BRITISH COLUMBIA | Ministry of Environment

LEGAL INSTRUMENT TRENDS

Certificates of Compliance (203 last year)

Number Issued Annually
(Based on Moving 12 Month Totals)

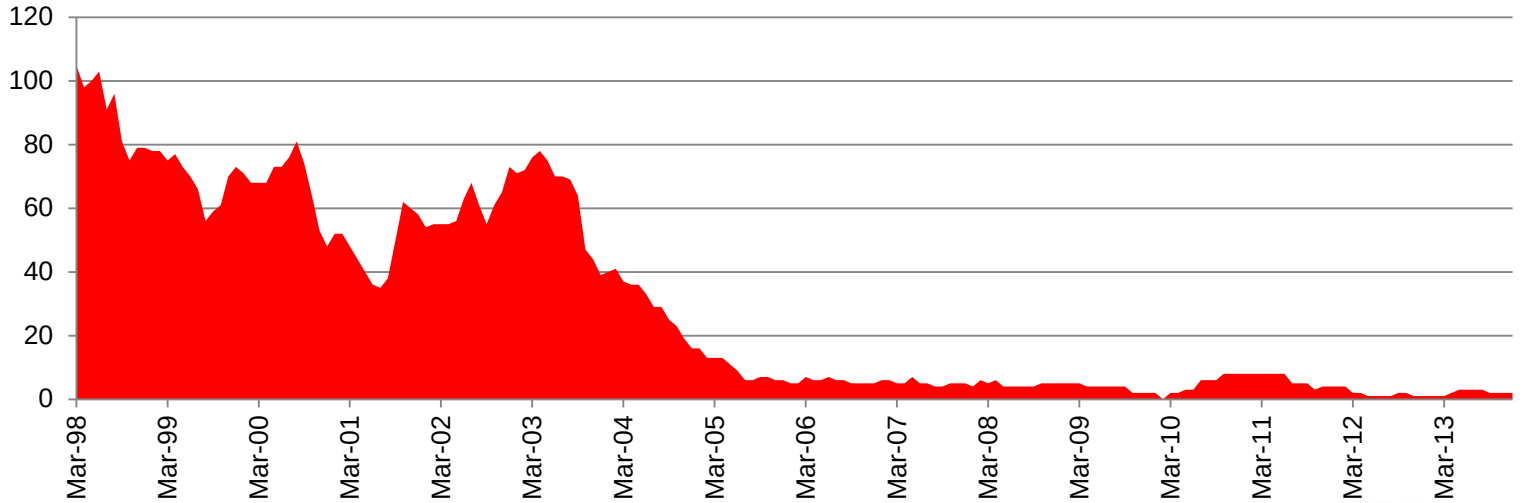


BRITISH COLUMBIA | Ministry of Environment

LEGAL INSTRUMENT TRENDS

Soil Relocation Agreements (2 last year)

Number Issued Annually
(Based on Moving 12 Month Totals)



BRITISH COLUMBIA | Ministry of Environment

KEY CHANGES TO THE TEMPLATES

BRITISH COLUMBIA Ministry of Environment

KEY CHANGES TO THE TEMPLATES

Changes common to all Version 8.0 templates

- *Must be used for instrument applications submitted to CSAP Society after April 1, 2014*
- Much shorter section before schedules
  - Location and site description data moved to Schedule A
  - Uses of environmental media moved to Schedule C
  - Documents now listed in new Schedule D
  - Requirement to have qualified professional for future subsurface work moved to cover letter

KEY CHANGES TO THE TEMPLATES

What's different about the Schedule C template

- New sections for part sites / multiple parcels
- New subsections for environmental medium uses (drinking water, commercial land, etc.) and multiple uses
- Now five types of environmental quality standards listed
  - Numerical standards
  - Risk-based standards
  - Local background concentrations
  - Site-specific numerical standards
  - Hazardous Waste Regulation standards

KEY CHANGES TO THE TEMPLATES

What's different about the Schedule C template

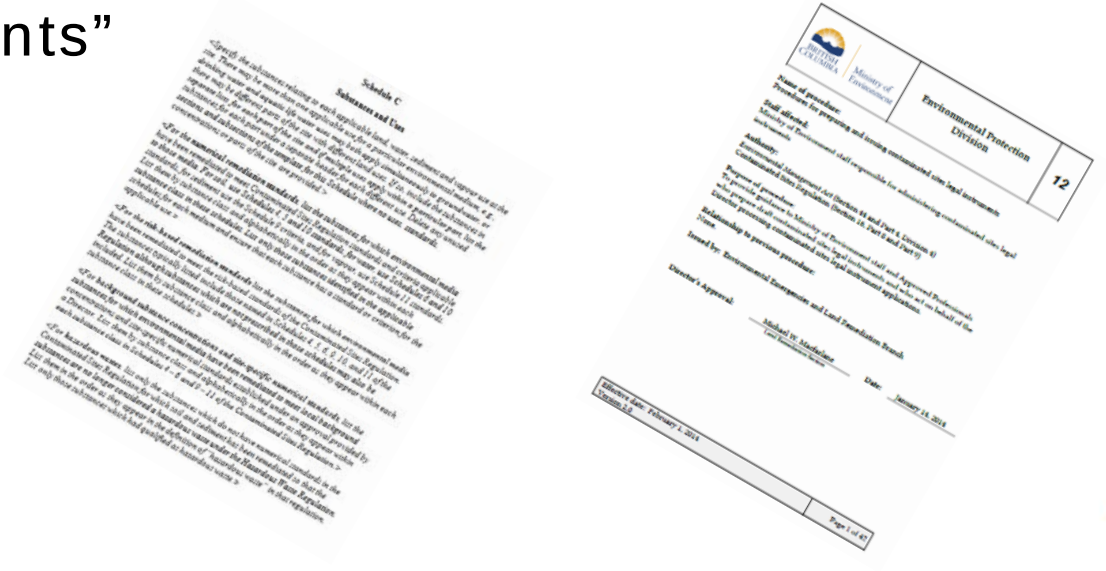
General hierarchy

- Site Part number (may be more than 1 – leave off if only 1)
  - Environmental medium use (may be several media or several within a medium)
    - Type of standard (up to 5 within a medium use)
      - List of substances

HOW TO COMPLETE SCHEDULE C

Step 1. Review the instructions and procedures

- See italicized information at the beginning of Schedule C
- See sections 9.3 and 9.4 of Procedure 12, “Procedures for Preparing and Issuing Contaminated Sites Legal Instruments”



BRITISH COLUMBIA | Ministry of Environment

HOW TO COMPLETE SCHEDULE C

Step 2. Assemble information

- The number of site parts and their labels – Schedule A
- The uses of environmental media at each site part
- The types of environmental quality standards involved
- The substances applicable to each part, use and type of standard

HOW TO COMPLETE SCHEDULE C

Step 3. Delete unnecessary template sections

- If there is only one part, delete all text for site parts
- Delete all headers for environmental media uses which don't apply
- Delete all headers for environmental quality standards which don't apply
- Delete all remaining template sections which won't be used
- Delete the italicized instructions

HOW TO COMPLETE SCHEDULE C

Step 4. Include additional sections as needed

- If there are more than 3 parts to the site, add new sections for the additional parts
- If there is more than one use for a medium, add new subsections for environmental media uses, as applicable

HOW TO COMPLETE SCHEDULE C

Step 5. Insert detailed information

- Insert site part information (number) where applicable
  - Refer to the site plan, legal descriptions, PIDs or metes and bounds descriptions in Schedule A
- Provide applicable uses for environmental media
  - Refer to the CSR for correct terminology and spelling
- List substances under the applicable types of standards
  - Refer to section 9.4 of Procedure 12 for further instructions

HOW TO COMPLETE SCHEDULE C

Step 6. Double check your work

HOW TO COMPLETE SCHEDULE C – EXAMPLE 1

Certificate for a simple site

- Site does not have separate parts
- Site only had soil contamination
- Soil will only have commercial land use
- Only numerical standards were used

HOW TO COMPLETE SCHEDULE C – EXAMPLE 1

Schedule C
Substances and Uses

Substances remediated in soil for commercial land use:

To meet numerical remediation standards:

- HEPHs; and
- Arsenic.

HOW TO COMPLETE SCHEDULE C – EXAMPLE 2

Certificate for a more complicated site

- Site had soil and groundwater contamination
  - Land will be used for commercial purposes
  - Groundwater will have drinking water and freshwater aquatic uses
- Site was remediated to both numerical and risk-based standards

HOW TO COMPLETE SCHEDULE C – EXAMPLE 2

Schedule C
Substances and Uses

Substances remediated in soil for commercial land use:

To meet numerical remediation standards:

- HEPHs; and
- Arsenic.

To meet risk-based remediation standards:

- Benzene, ethylbenzene, toluene and xylene;
- VPHs and LEPH; and
- Copper.

Substances remediated in water for drinking water use:

To meet risk-based remediation standards:

- Benzene and ethylbenzene.

Substances remediated in water for freshwater aquatic life water use:

To meet risk-based remediation standards:

- VPHw and LEPHw.

HOW TO COMPLETE SCHEDULE C – EXAMPLE 3

Certificate for an even more complicated site

- Site has two parts
  - Both owned by same company
  - Commercial development with roadway (industrial land use)
- Site had soil and groundwater contamination
  - Groundwater to be used for drinking water and aquatic life use
- Site was remediated to both numerical and risk-based standards

HOW TO COMPLETE SCHEDULE C – EXAMPLE 3

Schedule C
Substances and Uses

Part A of the site

Substances remediated in soil for commercial land use:

To meet numerical remediation standards:

- HEPHs; and
- Arsenic.

Substances remediated in water for drinking water use:

To meet risk-based remediation standards:

- Benzene and ethylbenzene.

Substances remediated in water for freshwater aquatic life water use:

To meet risk-based remediation standards:

- VPHw and LEPHw.

Part B of the site

Substances remediated in soil for industrial land use:

To meet numerical remediation standards:

- Arsenic.

.

RECENT INSTRUMENT APPLICATION ISSUES

Draft instruments

- Missing trench worker clause
- Not selecting correct uses for remediated environmental media in clause 1 of Schedule B

1. Any changes in <land>, <vapour>, <water> or <sediment> use<s> must be promptly identified by the responsible person<s> in a written submission to the Director. An application for an amendment or new Certificate of Compliance may be necessary. The use<s> to which this condition applies are described in Schedule C and in the site investigation documents listed in Schedule D.

- Including clause which belongs in cover letter
- Spelling and formatting substance names incorrectly
- Relabelling Version 7.0 template as Version 8.0

RECENT INSTRUMENT APPLICATION ISSUES

Draft instruments

- Listing nonexistent substances

Substances remediated in soil to Residential Land use (RL) standards:

- Ethylbenzene
- Xylene
- EPHs10-19
- EPHs19-32
- LEPHs
- HEPHs
- VPHs

- If both numerical and risk-based standards are used,
  - identifying the areas where each type of standard applies
  - linking the applicable environmental media uses to the areas where each type of standard applies
- Preparing administrative bulletin to describe requirements for additional information

RECENT INSTRUMENT APPLICATION ISSUES

Summaries of Site Condition

- Missing indication that preferential pathways had been considered
- Missing other contaminant migration information
  - Section 4.7 often not complete

4.7 Offsite Migration

	Yes	No
Is there evidence that one or more substances has migrated or is likely to have migrated to a neighbouring site and is or is likely causing contamination of the neighbouring property?	☐	☐
Has any sampling occurred offsite for PCOCs in any media?	☐	☐
Have preferential pathways been assessed? (including assessment of all neighbouring underground utility rights-of-way)	☐	☐

- Missing information to support no drinking water use determination
- Providing illegible or incomplete signature page
- Providing insufficient detail when listing substances

RECENT INSTRUMENT APPLICATION ISSUES

Application packages

- Missing or incomplete communication records expected under Administrative Guidance 11
- Missing performance verification plans (PVPs)
- Providing inadequate information to allow confirmation of full delineation of contamination

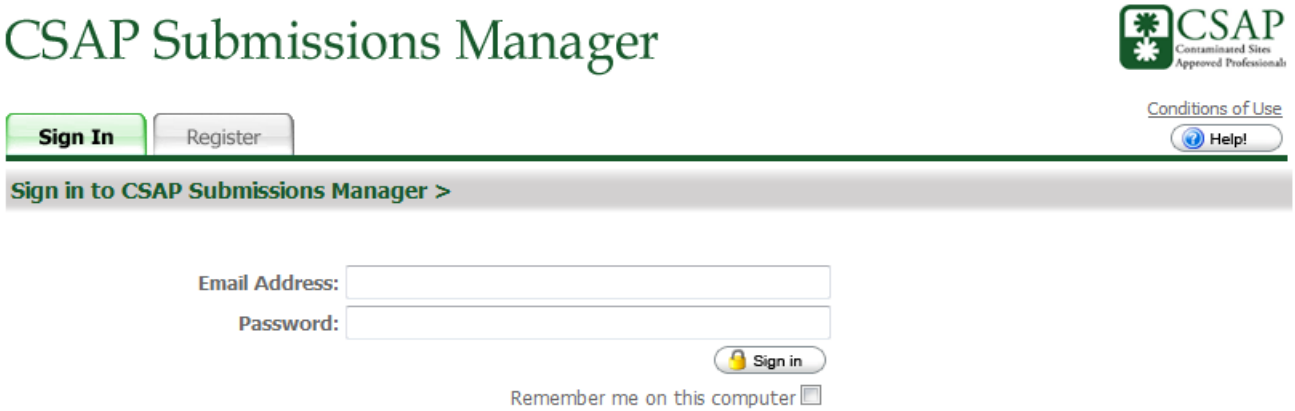
Service application requirement for disclaimers

Report authors must ensure that report waiver or liability clauses do not preclude ministry reliance on the information presented.

- On this basis, the ministry relies on information it is submitted with signed service applications, despite the use of disclaimers or other limitation clauses

USE THE SUBMISSIONS MANAGER

It will save our time and yours



BRITISH COLUMBIA | Ministry of Environment

QUESTIONS?
THANK YOU!

JOHN.WARD@GOV.BC.CA

OMNIBUS UPDATING OF CSR STANDARDS

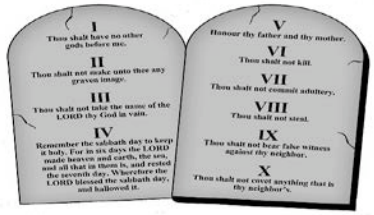
GLYN R. FOX
HEAD, SCIENCE & STANDARDS
June 4, 2014

CSAP 2014 AGM & PD Workshop
June 4, 2014

BRITISH COLUMBIA | Ministry of Environment

CSR STANDARDS – WHY UPDATE ?

Many CSR standards have never been updated:



- Soil/water standards date from 1996/97,
- Sediment standards date from 2004,
- Vapour standards date from 2009.

Ad hoc amendments to standards have focused on:

- Updating for “high profile” substances (arsenic, iron/manganese, lead),
- Keeping drinking water standards current with Canadian drinking water guidelines,
- Introducing standards for “new” categories of substances (non-prescribed substances – Schedule 10) and,
- “new” environmental media (vapours – Schedule 11).

BRITISH COLUMBIA | Ministry of Environment

CSR STANDARDS – NEW ISSUES FOR STANDARDS

Need to address new science related to the derivation of standards

- new groundwater model,
- new toxicology (bioaccumulation, genotoxicity, immunoactive/hormonal agents, toxic interactions),
- new TRVs (cadmium, dioxins & furans/PCB TEQs, lead, TCE),
- new routes of exposure (dermal, lactation, humoral),
- new toxicity derivation protocols (CCME, US EPA, WHO/EU),
- new exposure/landuse scenarios (high density residential, occupational, wildlands).

BRITISH COLUMBIA | Ministry of Environment

CSR STANDARDS – NEW ISSUES FOR STANDARDS

Need to address new emerging toxicants of concern:

Class	Substance	Toxicity
Antibacterials	triclosan	Aquatic toxicity
Antioxidants/preservatives Heterocyclic/organosilicons	1,4-dioxane, siloxanes, alkylated PAHs	Carcinogens
Endocrine disruptors	E2, BHA/BHT, nonoxinol, paraben alkylates, TBT	Infertility, intersex, congenital defects
Fire retardants	PBDEs, PFCs (e.g. PFOS)	Immunosuppression, neonatal mortality, thyroid/estrogen disruption
Plasticizers	Bisphenol A, alkylated phthalates	Estrogen mimic, neurotoxin, leukemia
Nanomaterials	nanosilver, nanocopper, carbon nanotubes	Physical/chemical toxicity at: molecular, cell, organ and physiological system levels

CSR STANDARDS – NEED FOR SCHEDULED MAINTENANCE

Need to provide certainty for maintenance of standards

Incorporate a fixed schedule for standards updating into the CSR (e.g. 5 year cycle?) to provide:

- Regulatory commitment to ensure standards are maintained, and
- Temporal certainty for responsible persons, environment consultants and public regarding when changes to standards would occur

CSR STANDARDS - UPDATING PROPOSED PLAN

LRS staff	CSR Schedule	Updating elements
GRF	Project lead	Overall responsibility - project & implementation
Lizzy	4 (Generic soil)	"Dual column" Sch 4 (discrete Human and Ecological Health stds) "migrate" Sch 4 substances into Sch 5
Lizzy Remi George Peter	5 (Matrix soil)	Human Health std revisions - recent TRVs, update D&F for WHO TEQs Ecological Health std revisions - develop protocol for Wildlands Re-calc Sch 5 soil to water stds using new GW model, consider need for new soil to water stds Develop protocol for High Density Residential stds
Heather	6 (Water)	Derive DW stds for substances lacking Can. DW Guidelines, Update AQ Life, Livestock and Irrigation stds
GRF	7 (CSRA	Consider major revision, replacement or elimination
Lizzy	9 (Sediments)	Convert criteria into standards, Update existing standards, consider adding new substances
Peter/GRF	10 (generic soil/ water)	Update/add new substances and standards
Peter	11 (vapour)	Update existing substances – recent TRVs, Consider need for new standards to address semi-volatile substances

CSR STANDARDS UPDATING – PROPOSED TIMELINE

Goal - Implement omnibus revisions to standards by Spring 2016

Proposed timeline:

Date	Task to be completed
April – Sept 2014	Schedule revision “proposal papers” - LRMT approved
Oct – Dec 2014	Proposal papers - focussed stakeholder review
Jan – March 2015	Proposal papers finalized to incorporate stakeholder review
April – Sept 2015	Calculate revised/updated standards for Minister’s approval
Oct – Dec 2015	Minister’s amendment package for new CSR Standards
Jan – March 2016	CSR Standards amendment – implemented and in effect

CSR STANDARDS UPDATING – IMPLICATIONS

LRS staff will be busy doing standards work over next 18 months!

Expect delays:

- RA reviews,
- RA Protocol 6 preapprovals,
- Background release approvals (soil, sediment, vapours),
- Communication & assistance

QUESTIONS ?

GLYN FOX

GLYN.FOX@GOV.BC.CA OR (250) 356-8374

Thank You

Workshop presentations will be posted at the CSAP Society website:

www.csapsociety.bc.ca

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia