CSAP Technical Guidance for Risk Assessment COPC Screening

CSAP Technical Review #10

February 16, 2012

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Preparation of CSAP Technical Guidance for Risk Assessment COPC Screening

Three issues associated with the screening of contaminants of potential concern (COPC) in risk assessments have been identified as issues for which guidance is required. The three issues are as follows:

1. Unregulated Substances – should substances that were analyzed at a site, but for which there is no standard, be included in the risk assessment?

2. Applicable Standards – if substances only exceed standards for either human receptors or ecological receptors but not both, do the substances need to be included in both the human health risk assessment and the ecological risk assessment or just in the particular risk assessment relevant to the type of receptor for which the substance was exceeded?

3. Use of Statistics – should site data be subjected to statistical analysis prior to comparison to standards for identification of COPCs or should maximum (or 95th percentile) concentrations be used?

"White papers" addressing these three issues were prepared by the Science Advisory Board for Contaminated Sites in BC. The CSAP Society would like to thank the Science Advisory Board for making the white papers available to CSAP for review. This guidance document was prepared by the CSAP members Reidar Zapf-Gilje and Greg Sutherland. The guidance contained in the document was based on the recommendations made in the white papers and comments provided by the Ministry of Environment and members of CSAP.

CSAP Guidance on Selected COPC Screening Issues

Introduction

Three issues regarding screening of contaminants of potential concern (COPC) in risk assessments were identified as issues for which guidance was needed for CSAP members. The three COPC screening issues were associated with the following:

- the use of statistics;
- the process of evaluating whether substances exceed numerical standards for the protection of human health or ecological receptors; and
- unregulated substances.

White papers addressing these three issues were recently finalized by the Science Advisory Board for Contaminated Sites in BC (SAB). The three white papers are appended. The objective of this CSAP Guidance document is to provide clear guidance/recommendations to CSAP members on these issues.

Disclaimer/Limitation

This document is intended only for use by members of the Society of Contaminated Sites Approved Professionals (CSAP) of British Columbia conducting reviews of sites/reports for which they may be making recommendations in accordance with BC Ministry of Environment (BCMOE) Protocol 6: Eligibility of Applications for Review by Approved Professionals.

The guidance provided in this document reflects what is considered good practice for conditions found at most sites. The guidance is based on the current regulatory regime and scientific methods, and hence may be updated as new information becomes available. Please note that the guidance may not be applicable to all sites, and therefore that sound professional judgment must be applied to ensure that the guidance is applicable to the particular site/report under consideration.

COPC Screening - Use of Statistics

Based on a review of the appended SAB white paper regarding the use of statistics, the following recommendation is provided:

If a statistical approach is utilized in a Detailed Site Investigation (DSI) to conclude that a substance meets numerical standards, this conclusion (and the statistical approach upon which it is based) does not need to be re-evaluated in the risk assessment. Therefore, provided the substance is not relevant to the exposure of rare and endangered species or is a bioaccumulative substance, the substance would not be considered a COPC.

COPC Screening – Applicable Standards

Based on a review of the appended SAB white paper regarding applicable standards, the following recommendations are provided:

Soil

All substances that exceed the generic CSR soil standards of Schedule 4 should be considered COPC for both human and ecological risk assessments.

All substances that exceed the generic CSR soil standards of Schedule 10 unless listed in the matrix of numerical standards of Schedule 5) should be considered COPCs for human risk assessments.

Substances which are not bioaccumulative and which only exceed the Schedule 5 "intake of contaminated soil" or the "groundwater used for drinking water" standards should be considered COPC for human risk assessments only and not for ecological risk assessments.

Substances which are not bioaccumulative and which only exceed the applicable Schedule 5 standards protective of ecological receptors should be considered COPC for ecological risk assessments only and not for human health risk assessments.

All bioaccumulative substances that exceed any of the applicable Schedule 5 standards should be considered COPC for both the human and ecological risk assessments.

Sediment

In sediments, substances which are not bioaccumulative substances and which only exceed Schedule 9 standards should be considered COPC for ecological risk assessments only and not for human health risk assessment.

In intertidal sediments, any substance which is not bioaccumulative and which exceeds Schedule 4 or Schedule 5 "intake of contaminated soil" standards, or Schedule 10 soil standards, if the substance is not listed in Schedule 4 or 5, should be considered a COPC for human risk assessments.

Any bioaccumulative substance that exceeds any of the applicable Schedule 9, Schedule 4 or Schedule 5 "intake of contaminated soil" standards, or Schedule 10 standards, if the substance is not listed in Schedule 4, 5 or 9, should be considered a COPC for both the human and ecological risk assessments.

Groundwater

Provided hydrogeological assessment has indicated that contamination has reached steady state conditions in groundwater, and that current groundwater contaminant concentrations represent reasonable worst case conditions, for actual exposure of ecological or human receptors via groundwater, COPCs should be identified based on comparing maximum current groundwater concentrations to the applicable Schedule 6 water use standards, as groundwater data reflects actual exposure rather than the inference of potential groundwater exposure from soil data.

For typical short-term trench/excavation workers, quantifying groundwater related dermal and ingestion exposure is necessary unless it can be assured that groundwater is typically removed prior to humans entering a trench/excavation and/or there are controls in place to mitigate exposure. Exposure to soil vapour from chemicals in groundwater must be considered.

Air

All substances that exceed, or are predicted to exceed through modelling or the use of MOE attenuation factor, the Schedule 11 standards in the breathing zone (under current or future scenarios) should be included as COPCs for human health risk assessments.

Because the objective of ecological risk assessments is to protect populations, rather than individuals (as is the case in human health risk assessments and rare and endangered species), substances that exceed, or are predicted to exceed through modelling or the use of MOE attenuation factors, the Schedule 11 standards in the breathing zone may be excluded as COPCs for ecological risk assessments, except in the case that an ecological receptor present at the site is a rare or endangered species.

COPC Screening – Unregulated Substances

Based on a review of the appended SAB white paper regarding unregulated substances, the following recommendations are provided:

Non-Prescribed substances:

It is the ministry's policy that non-prescribed substances (i.e. substances which are not specifically listed in a CSR schedule of soil, sediment, water and vapour standards) may or may not be included as COPCs in risk assessments, at the proponent's discretion.

In the case that a non-prescribed substance is retained for a risk assessment and can be shown to comply with risk-based standards of the CSR, the ministry will list the substance and indicate compliance with ministry requirements for the substance in any risk based instrument issued for the site.

In the case that a non-prescribed substance is not retained for a risk assessment the ministry will not list the substance nor indicate compliance with ministry requirements for the substance in any risk based instrument issued for the site.

Non-prescribed substances should be considered in the COPC selection if the substances are identified in the DSI as being:

i.) present at concentrations higher than background for the area; and

ii.) attributed to on-site or off-site use.

For example, in accordance with example #2 in the appended SAB white paper, iron/manganese may, at the proponent's discretion, be considered COPCs for the ecological risk assessment, if iron/manganese are:

- *present at concentrations more than ten times the water quality guidelines in close proximity to a surface water body (as defined in Draft Technical Guidance #5 – Compliance Points for the Protection of Aquatic Receiving environments);*
- *present at concentrations higher than background for the area; and*
- *directly or indirectly attributable to activities at the Site.*

Furthermore, in accordance with example #3 in the appended SAB white paper, unregulated PAHs need not be included as COPCs in risk assessments. As discussed in the SAB paper, the regulated PAHs are considered to be the most toxic and therefore an assessment based on this subset of PAHs is considered to be sufficiently protective to human health and the environment for PAH containing products most commonly associated with Schedule 2 activities. In addition, risk assessments for unregulated PAHs are limited by the relative scarcity of information on fate/transport and toxicity data.

Prescribed substances:

It is the ministry's policy that any prescribed substance for an environmental medium for which no scheduled numerical standard is provided may or may not be included, at the proponent's discretion, as COPCs in risk assessments.

In the case that a prescribed substance, for which no scheduled numerical standard is provided, is retained for a risk assessment and can be shown to comply with risk-based standards of the CSR, the ministry will list the substance and indicate compliance with ministry requirements for the substance in any risk based instrument issued for the site.

In the case that a prescribed substance, for which no scheduled numerical standard is provided, is not retained for a risk assessment, the ministry will not list the substance nor indicate compliance with ministry requirements for the substance in any risk based instrument issued for the site.

Appendix A

SAB Risk Forum
DRAFT Recommendations
COPC Screening – Applicable Standards

Version Date: October 3, 2010

Original Contributors: Geoff Wickstrom (Hemmera), Tara Siemens-Kennedy (SLR), Sanya Petrovic (Health Canada), Trish Miller (Golder), Doug Walton (MOE) for the SAB Risk Forum – April 2009.

Subsequent Contributors: Risk Symposium 2010 Subgroup lead by Christine Thomas

Issue Definition

A detailed site investigation (DSI) confirms site contaminants following an evaluation of contaminants of potential concern (COPC) originally put forth from the preliminary site investigation (PSI). The contaminants identified in the DSI can then be carried forward to a human health and ecological risk assessment in a risk-based approach to remediation. Chemical concentrations in environmental media are again compared to standards in the problem formulation of the risk assessment to determine contaminants of potential concern (COPCs) for the risk assessment. While some risk assessment practitioners carry all COPCs through the quantitative assessment for both human and ecological receptors, some practitioners stream COPCs (for which Matrix Standards are available) for human (HHRA) and ecological risk assessments (ERA) based on the standard exceeded (i.e. chemicals that exceed only Matrix Standards for the protection of human receptors are evaluated in the human health risk assessment). This later approach is consistent with Health Canada risk assessment COPC screening policy. It might be simplest to include all COPCs from the DSI in both the quantitative human health and ecological risk assessment, but does this represent 'best practise'?

Problem

Two approaches for identifying COPCs for risk assessment has lead to a difference in opinion regarding COPCs and errors or perceived errors when conducting external reviews and performance assessments.

Issue Analysis

The group's approach to addressing the topic of screening/identification of COPCs in risk assessments included two important assumptions that were necessary to constrain the myriad of approaches that would otherwise be plausible. The primary assumptions were:

- Detailed Site Investigation level data were available for the site – in other words, there were sufficient numbers of samples in each potential exposure media such that the site contamination had been adequately characterized and delineated;

- The risk assessment was being conducted under the jurisdiction of the BC MOE with the intention of pursuing an Environmental Management Act instrument.

Our approach for this topic was to consider each media from a *human health* perspective as well as from an *ecological* perspective. In general, there was consensus within the group, that identification of COPCs specific to Human, Terrestrial Ecological, and Aquatic Ecological Receptors was appropriate to conduct within the Problem Formulation.
The applicable provincial screening thresholds include the Contaminated Sites Regulation (CSR) Schedule 4, 5, 6, 9, 10 and 11 Standards promulgated under the *Environmental Management Act*.

For identifying COPCs in soil, the Schedule 4 Generic Numerical Standards do not discriminate between receptors or exposure pathways. In contrast, the Schedule 5 Matrix Numerical Standards are divided into two groups (Human Health Protection and Environmental Protection) and then are further divided into exposure pathways for specific receptor groups.

Under Human Health Protection, the Intake of Contaminated Soil Standard, according to the Contaminated Sites Soils Tasks Group (CSST, 1996) procedure, is derived based on standard assumptions for incidental ingestion of soil and the Tolerable Daily Intake for the chemical. The derivation procedure incorporates a 20% allocation factor such that only 20% of the Tolerable Daily Intake (TDI) is allocated to soil ingestion. Therefore, although this standard is derived considering only one exposure pathway, there is allowance for exposure from other potential exposure pathways.

According to the CSST procedure, the standard derived for the Protection of Soil Invertebrates and Plants is the primary standard used for protection of all ecological receptors. Toxicity studies endpoints ingeffects on growth, reproduction and mortality for a range of species were used to derive these standards. As described in the CSST procedure, the LC20 and EC50 (for a non-lethal endpoint) were used in the derivation of the Standard. The lower of these two values was used for the standard for agricultural, residential and urban parklands, while the higher value was used for commercial and industrial lands.

Note that the neither the human health Intake of Contaminated Soil Standard nor any of the Environmental Protection Standards were derived to protect higher trophic level receptors from contaminants that biomagnify in the food chain (e.g. low Kow>4.1; BCF>5000; EC, 2003).

Many of the Matrix Standards are protective of receptors indirectly by protecting groundwater that is subsequently used by human or ecological receptors. In such cases, within the context of a risk assessment, assuming that a hydrogeological assessment has indicated that contamination has reached steady state and that current groundwater concentrations represent reasonable worst case conditions, it is recommended that assessors look to the actual groundwater data for identification of COPCs, rather than soil for the protection of a water use, and provide supporting rationale for doing so directly in the Problem Formulation.

Recommendations:

Soil
Chemicals that exceed generic Standards (Schedule 4) should be carried forward to the quantitative steps of both the human and ecological risk assessments.

For chemicals with Matrix Standards, screen COPCs for inclusion in the human health risk assessment using the Intake of Contaminated Soil Standard and screen COPCs for ecological risk assessment using the Standards protective of ecological receptors. A separate screening procedure may be necessary when contaminants that biomagnify in the food chain occur in soil and food chain exposure to ecological or human receptors is possible.

Sediment
Use Schedule 9 Standards to identify aquatic ERA COPCs.

Use Schedule 4 and 5 Standards to identify HHRA COPCs for intertidal sediments. Note that neither the sediment nor soil standards were derived for the protection of higher trophic level receptors from biomagnifying contaminants. Therefore, a separate screening procedure may be necessary when contaminants that biomagnify in the food chain occur in sediment and food chain exposure to either human or ecological receptors is possible.

Health Canada is in the process of evaluating the need for sediment quality guidelines for the protection of human health. If these guidelines are developed, this recommendation should be re-visited.

Groundwater
In general, the Risk Forum group agreed that groundwater itself is rarely a significant human exposure media unless used as a drinking water source. For those specific sites/situations where it is, or could be a significant exposure route, this exposure route should be addressed explicitly. However, for typical short-term utility or excavation scenarios, the groundwater is pumped out or removed prior to humans entering the area and/or there are health and safety controls in place to control exposure (i.e., environmental remediation excavation) and therefore, quantifying exposure from groundwater in this type of scenario is not considered necessary.

If contamination of groundwater is identified in the DSI, it is recommended that risk assessors identify potential COPCs in groundwater for the risk assessment, using groundwater data rather than soil data, and that maximum chemical concentrations in groundwater be compared to applicable Schedule 6 Water Use Standards.

Surface Water
See BC MOE Technical Guidance 15 for applicable Standards/guidelines for screening surface water data.

Air

Identify human health COPCs based on Schedule 11 Standards and technical guidance outlined in B.C. MOE Technical Guidance 4.

At this time we recommend not identifying ecological COPCs based on air measurements because of the significant uncertainties in terms of application. However, as credible information becomes available for evaluating this exposure pathway, we recommend re-evaluating this recommendation.

Further Work

As noted above, the current CSST protocol for derivation of soil quality guidelines incorporates the use of a SAF in the derivation process since the Intake of Contaminated Soil Standard does not include other exposure pathways, such as dermal contact or inhalation of dust. The CSST protocol is currently under review. Changes to the derivation procedure may impact on recommendations for COPC screening in risk assessment. At the time of drafting this discussion paper, it was our understanding that there are no plans to eliminate the use of the SAF in the CSST protocol.

It was recognized that exposure to volatile COPCs in soil for burrowing terrestrial receptors, in particular, could be a significant exposure pathway. Additional work is warranted in this area to determine appropriate standards or other methods for the protection of this receptor group from this potentially significant exposure pathway.

The World Health Organization has recommended that inorganic COPCs in water can be screened for recreational purposes using the drinking water standard multiplied by ten. This rationale was not applied to organic contaminants. Guidelines for screening organic chemicals in water for recreational use would facilitate the risk assessment process.

References:

Contaminated Sites Soil Task Group, 1996. Overview of CSST Procedures for the Derivation of Soil Quality Matrix Standards for Contaminated Sites. Risk Assessment Unit, Environmental Protection Department, BC Environment. January 31, 1996

Environment Canada, 2003. Guidance Manual for the Categorization of Organic and Inorganic Substances on Canada's Domestic Substances List. Determining Persistence, Bioaccumulation Potential and Inherent Toxicity to Non-human Organisms. Existing Substances Branch, June, 2003.

Appendix B:

SAB Risk Forum
DRAFT Recommendations
COPC Screening – Use of Statistics

Version Date: October 3, 2010

Contributors: Cindy Ott, Geoff Wickstrom, David Williams, Jo-Ann Aldridge, Trish Miller, Doug Walton

Subsequent Contributors: Risk Symposium 2010 Subgroup lead by Sam Reimer

Issue Definition

Chemical concentrations in environmental media are compared to standards in the problem formulation of the risk assessment to determine contaminants of potential concern (COPCs). Should Site data be subjected to statistical analysis prior to comparison to standards for identification of COPCs or should maximum concentrations be used.

Issue Analysis

Statistics can be used to determine if a substance is a contaminant in a Detailed Site Investigation (DSI), as per guidance provided in Technical Guidance 2 (Statistical Criteria for Characterizing a Volume of Contaminated Material). If a risk assessment (RA) uses a more conservative approach, (e.g. use of maximum concentrations to identify COPCs in risk assessment) then a disconnect between the DSI and RA could arise, as additional COPCs could be identified for the risk assessment beyond the COPCs identified in the DSI. Substances evaluated in a risk assessment are listed on an Approval in Principal (AIP) or Certificate of Compliance (COC) potentially leading to confusion or ambiguity regarding which substances actually are COPCs and required risk assessment.

Recommendations

If using a risk-based approach to remediation, there is a regulatory requirement for the risk assessment to address the contaminants identified by the DSI. If a statistical approach is used to characterize contaminants in the DSI, then consistent with that, the same statistical approach can be used for identifying COPCs the risk assessment. It is recommended that the rationale for the use of statistics (or not) be provided in the risk assessment.

Note that if rare or endangered species are receptors for the Site, consideration should be given to using a more conservative screening approach.

Limitations

There may be situations when it is appropriate to use other criteria to identify COPCs for a quantitative risk assessment. For the recommendation above, it has been assumed that a DSI has

been conducted and is compliant with the standards outlined in the Contaminated Site Regulation. The quantitative risk assessment is to be conducted for the purposes of obtaining a regulatory instrument (e.g. certificate of compliance, approval in principle).

Appendix C:

SAB Risk Forum
DRAFT Recommendations
COPC Screening – Unregulated Substances

Version Date:	October 13, 2010
Original Contributors:	Michael McLeay, Tiona Todoruk, Cindy Ott, Dave Williams, Trish Miller, Doug Walton for the SAB Risk Forum, April 2009
Subsequent Contributors:	Risk Symposium 2010 Subgroup lead by Audrey Wagenaar

Issue Definition

A detailed site investigation (DSI) confirms site contaminants following an evaluation of contaminants of potential concern (COPC) first put forth in the preliminary site investigation (PSI). The contaminants identified in the DSI can then be carried forward to a human health and ecological risk assessment in a risk-based approach to remediation. Chemical concentrations in environmental media are again compared to standards in the problem formulation of the risk assessment to determine COPCs for the risk assessment. Laboratory data for a Site often includes substances for which there is no standard. Should these substances be included in the risk assessment?

Recommendation

In general, substances not specifically regulated under the Contaminated Sites Regulation (CSR) should be included as COPCs in the quantitative risk assessment if they are: i) present in environmental media on the Site at higher concentrations than background for the area and, ii) can be attributed to Site use.

Rationale

Although all substances are not listed specifically under the CSR, subsection 11(1)(d) enables a Direction of Waste Management to regulate any substance for which there is no standard on a site. Furthermore, the Environmental Management Act (EMA) Part 2, Section 6 (2-4), states that a "person must not introduce waste into the environment in such a manner or quantity as to cause pollution." Therefore, any substance that is introduced to the environment from site use could be considered pollution.

The Science Advisory Board (SAB) group members generally felt that, although it is considered to be best practice to include in the quantitative risk assessment substances found at higher concentrations than background and related to site use, for practical reasons, it is not always reasonable to do so.

Illustrative Examples

Site use and COPCs are first identified in the PSI, although subsequent investigation phases focus on regulated substances. The following examples have been drafted to provide some clarification.

1. A DSI was conducted for a service station upgradient of a creek (~100 m). Groundwater at the service station is contaminated with petroleum hydrocarbons. Groundwater met all applicable CSR standards for metals. However, groundwater within 12 m of a valued aquatic habitat also contained 25,000 μg/L dissolved iron.

There is no CSR Schedule 6 AW standard for iron. Iron was not identified as a contaminant in the site's DSI. Is iron a groundwater COPC with respect to aquatic life?

In this case, the group determined that iron should be included in the quantitative risk assessment with the following rationale. Upgradient wells at the site's perimeter contained only 2,000 μg/L dissolved iron. The elevated iron is believed to be associated with reducing conditions caused by the biodegradation of the petroleum hydrocarbons. The 25,000 μg/L dissolved iron concentration is significantly greater than the CCME/BC water quality guideline X 10 (= 3,500 μg/L), under the standard BCMOE assumption of a ten-fold dilution-attenuation of contaminants between the groundwater and the receiving environment.

2. A DSI was conducted for a waterlot with a wharf in an urban harbour. The DSI identified copper, lead, and PAHs as contaminants in waterlot sediments based on CSR Schedule 9 criteria. Laboratory data provided to the risk assessor included other metals. Silver and nickel and thallium were also present in some of the samples.

No CSR nor CCME sediment criteria/guidelines exist for silver and nickel; however BC does have Working guidelines for these substances. Are silver and nickel sediment COPCs with respect to aquatic life? No CSR nor CCME nor BC criteria/guidelines exist for thallium. Is thallium a sediment COPC with respect to aquatic life?

The group determined that there is no evidence to suggest that silver, nickel or thallium were used on the Site. Furthermore, the reference area sediment samples had similar silver, nickel, and thallium concentrations to those at the Site.

3. A DSI was conducted for a terrestrial commercial site that had previously been used for shipbuilding. The DSI indicated surficial soil on the site had both low level hydrocarbon contamination and polycyclic aromatic hydrocarbons (PAH) contamination (regulated PAHs). Laboratory data provided to the risk assessor showed several site samples contained fluoranthene at concentrations ranging from 12 to 40 mg/kg.

No CSR soil standards/guidelines exist for fluoranthene. However, the presence of fluoranthene is likely associated with site use and its concentrations are likely above background. Is fluoranthene a COPC with respect to terrestrial biota (soil invertebrates, plants, wildlife) and humans?

Identifying fluoranthene as a COPC and including it in the risk assessment was considered 'Best Practise' by many in the group, but based on input from the MOE, it isn't necessary to do so. The family of chemicals that make up PAH is large and only a small subset are routinely quantified by analytical laboratories. Those PAH with standards[1] are the ones considered to be the most toxic, and hence the most hazardous if present in significant concentrations. There may be very little information about some of these family members, making their contribution to risk difficult or uncertain to quantify. It is recommended that the uncertainty associated with individual unregulated members of families of chemicals, like PAH, be addressed in the uncertainty section of the risk assessment.

Following the 2009 Risk Forum, this example became known as the 'PAH' rule. Note that some practitioners at the Risk Symposium 2010 did not agree with the 'PAH rule'. It should be stressed that including unregulated PAH in the quantitative risk assessment was considered best practise when information is available to support this approach. However, information is not always available. Therefore, if unregulated PAH are not included in the quantitative risk assessment, this is considered to be acceptable.

4. A PSI conducted for an industrial site where a large quantity of an unregulated pesticide was stored on the property. Analysis of soil and groundwater samples in the DSI revealed higher concentrations of the pesticide in soil and groundwater in the vicinity of where the pesticide was stored compared to upgradient parts of the Site. Should the unregulated pesticide be considered a COPC for a risk assessment?

The group determined that because the pesticide was present in higher than background concentrations in soil and groundwater and was considered related to Site use, it should be considered a COPC for the quantitative risk assessment.

Further Work

In the past, conducting an assessment of an unregulated substance, specifically iron in groundwater, has created confusion when completing a Certificate of Compliance. For the case of iron in groundwater, a site owner applying for a COC is not required, under the Contaminated Sites Regulation, to meet either generic or risk-based standards when drinking water or irrigation standards do not apply. However, depending on the proximity to surface water habitat, other regulations may apply to the Site (e.g. Environmental Management Act, Fisheries Act). To date,

[1] CSR standards exist for benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno [1,2,3-cd] pyrene, naphthalene, phenanthrene and pyrene.

some Approved Professionals have handled this issue by notifying Site owners having Sites with elevated iron concentrations in groundwater that, although not required under the CSR, an assessment may be warranted under EMA or the Fisheries Act. However, based on discussions among practitioners, this approach is not universal.

Risk assessors may wish to include in the assessment unregulated substances that are present on a Site at higher than background concentrations due to Site activity. However, clients may not wish to pay for such assessments if not required to obtain a COC and there is no mechanism for mitigative action, should the risk assessment indicated it is warranted.

The MOE have indicated that substances that exceed standards should be handled differently than those that don't. Further work is needed to provide a clear path forward on this issue, as there are many Sites in BC to which this issue applies.

Secondly, clarification is necessary for determining when a substance is present at 'higher than background concentrations'. Is further guidance necessary or should this be left to professional judgement?

Finally, more specific guidance is necessary to determine when including unregulated substances is required. This applies to the many families of contaminants such as metals, PAH, polychlorinated biphenyls and dioxins and furans for which certain members are regulated, but there are many more that are not.

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