

CANADA-WIDE STANDARD FOR PETROLEUM HYDROCARBONS IN SOIL 2003 REPORT TO MINISTERS

Implementation Summary

Since the endorsement of the PHC CWS in 2001, almost 10,000 sites across Canada have been treated under the standard. Having participated in its development, industry is now complying with the standard. Eighty-five percent of signatory jurisdictions have implemented the PHC CWS, resulting in changes to regulations, guidelines and policy. Those signatory jurisdictions currently not implementing the PHC CWS are in the process of implementation or are considering doing so in the near future.

Introduction

PHC contamination is the most common form of soil and groundwater contamination in Canada. Contamination leads to problems with soil quality affecting productivity, potable groundwater and intrusion of vapour into buildings. The large numbers of sites and the extent of contamination makes this a multibillion dollar problem in Canada. Precise management is needed to protect human health and environment while controlling costs.

The Canada-wide Standard for Petroleum Hydrocarbons in Soil (PHC CWS) was endorsed by Ministers of Environment, with the exception of Quebec, in May 2001. The PHC CWS includes commitments for jurisdictions to report to Ministers and to the public on implementation of the PHC CWS at specified intervals. This report represents a summary of the implementation actions for Canadian jurisdictions to serve as the first report to Ministers for calendar year 2003.

Description of the Standard

The PHC CWS is a remediation standard that specifies the environmental endpoints and assessment procedures necessary to address releases of PHC to the soil and subsurface environment under four land uses. In order to address the diversity of PHC types (e.g., crude oils, light fuels, lubricants) CCME defined four hydrocarbon fractions. The standard is based on an application of risk analysis that identifies acceptable concentrations of each PHC fraction in soil in consideration of exposure pathways and protection goals for receptors (humans, plants, animals) applicable for each land use. The standard does not specify timelines for identification or response to individual PHC releases. Jurisdictions make these determinations in relation to release reporting, complaints, redevelopments and land transfers.

Responsibilities of Jurisdictions

Canada-wide standards are enabled by the sub-agreement on standards under the Harmonization Accord, which was endorsed by Ministers in January 1998. The Sub-Agreement distinguishes two types of CWS. Those developed under Clause 6.2 of the Sub-Agreement require development of shared (trans-jurisdictional) implementation plans and coordinated implementation actions and reporting. Conversely, specifics of implementation are entirely up to individual jurisdictions for CWS developed under Clause 6.1 of the Sub-Agreement on Standards. The PHC CWS was developed under Clause 6.1.

Jurisdictional responsibility for *reporting* on implementation of the PHC CWS is specified in Section 5 of the PHC CWS Ministerial Agreement. Ministerial reports are required on a 5-year basis commencing in 2003. Public reporting is required on a 5-year basis commencing 2005.

Consultation and Training

Most jurisdictions met their consultation requirements through the national CCME process to develop the PHC CWS. Most jurisdictions also participated in the national multi-stakeholder roll-out workshop held in May 2001. Jurisdiction specific consultation and training activities are indicated below.

Implementation Actions – Summary of Jurisdiction Activities

British Columbia

As BC is currently not implementing the PHC CWS, the BC Science Advisory Board (SAB) for Contaminated Sites conducted an initial review of the PHC CWS to provide BC with advice related to the scientific credibility of the PHC CWS and whether adoption by BC of the CWS would constitute a better scientific basis relative to the current petroleum hydrocarbon soil standards contained in BC's Contaminated Sites Regulation.

The review compared and contrasted development of the PHC CWS against the development of the standards contained in BC's Contaminated Sites Regulation. The review concluded that

- the current generic petroleum hydrocarbon standards of the Contaminated Sites Regulation are based on professional judgement as opposed to risk-based principles as per the PHC CWS;
- the protocols and procedures used by CCME to establish the PHC CWS are similar to risk based protocols originally developed by the Contaminated Sites Standards Task group and subsequently adopted by BC to derive matrix standards for use under the Contaminated Sites Regulation; and
- the PHC CWS protocol benefits from recent advances in science and incorporates a number of new protocol elements, which are not considered within the existing BC protocol.

The SAB notes that differences exist which are related to the underlying policy decisions, defined exposure scenarios (acceptable cancer risk for example) and underlying science policy decisions exist between CCME and BC. The CWS in any event would require some revision before they would be consistent with the BC regulatory system.

Further to a review of technical issues (of the PHC CWS), the SAB recommends that BC move as expeditiously as possible to replace the existing professional judgement based generic soil standards for petroleum hydrocarbons found within Schedule 4 of the Contaminated Sites Regulation with risk based matrix soil standards developed using the ministry's current soil standard derivation protocol suitably modified to incorporate those new elements contained in the CCME approach which are deemed to have scientific merit. In the longer term, to ensure an appropriate and consistent level of environmental protection, BC should initiate a review and re-assessment of its current soil standards derivation protocol with the aim of updating the protocol to reflect current "best science" and facilitate the subsequent recalculation of existing matrix soil standards for all substances currently listed within Schedule 5 of the Contaminated Sites Regulation.

While the SAB identifies that there are components of the PHC CWS which should be adopted by BC, the review also identified that some components of the PHC CWS should be reviewed to ensure that the PHC CWS represents the best available science. Overall, the SAB recommends that the Province not adopt the PHC CWS for regulatory purposes at this time. A decision on how to proceed is forthcoming.

Yukon

It is estimated that the PHC CWS will apply to some 100-plus contaminated sites within the Yukon that have not yet been fully assessed and/or remediated. Additionally, Canada will apply the PHC CWS to some 200-plus sites that are the subject of assessment and/or remediation under the Yukon Devolution Transfer Agreement (DTA). The Yukon has not implemented the PHC CWS and is considering a decision to do so. Should the Yukon proceed with implementation of the PHC CWS, the following implementation steps are anticipated:

- a) Research to determine how other jurisdictions have incorporated the PHC CWS, what has worked, what has not.
- b) Development of options for the incorporation of the PHC CWS into the CSR.
- c) Re-activation of the Contaminated Sites Advisory Committee during the CSR amendment process for the purpose of soliciting input from affected parties, other government agencies, First Nations, and interested non-governmental organizations. The committee will be asked to consider the various ways in which the PHC CWS can be incorporated into the CSR and provide advice as to the practicality, costs and benefits of the various options.

- d) A 60-day public review period will be provided, with information made available to the public via a variety of media.
- e) After a Cabinet decision regarding the amendments, implementation of a revised CSR would include preparing and distributing factsheets to explain the amendments, and possibly providing workshops to local consultants regarding the use and application of the new standards.
- f) The provision of additional staff training may be required to ensure that the PHC CWS is incorporated into the CSR and is correctly interpreted when evaluating contaminated sites submissions from proponents.

Should the Yukon decide against implementation of the PHC CWS, it is expected to result in a few sites requiring more stringent remediation and many sites requiring similar or less stringent remediation. A failure to implement the PHC CWS may result in some contaminated sites in the Yukon not being remediated. Environmental groups may also object to a lack of scientifically defensible standards being used to remediate contaminated sites in the Yukon.

Alberta

It is estimated that the PHC CWS has been applied at roughly 6000 upstream oil and gas sites and 1200 PST sites since adoption of the standard in June 2001. Alberta coordinates implementation of the PHC CWS across three Departments: Environment, Sustainable Resource Development and the Energy and Utilities Board (Energy). Joint information and input sessions began in 1999 and were repeated at 6-month intervals throughout the standards development process. Implementation occurred in four phases: (a) revision of regulatory products, (b) training sessions for internal staff, (c) rollout workshops, and (d) monitoring and support. The PHC CWS was reviewed by the Sustainable Development Coordinating Committee, which includes Deputy Ministers from several Departments including Environment, Energy, and Sustainable Resource Development.

No specific regulations were passed to support the PHC CWS. However:

- new remediation guidelines incorporating the PHC CWS were developed and released for upstream oil and gas facilities;
- revisions were made to two existing guidance's to update remediation and treatment endpoints and a third guideline is being revised to incorporate the PHC CWS;
- guideline values in the PHC CWS for soil-to-groundwater pathways were calibrated to respond to Alberta's climate;
- an equivalency protocol was released in 2003 for performance-based elements of the analytical method specified in the PHC CWS;
- demonstration of compliance with the PHC CWS was made an application requirement under the certification program for upstream oil and gas facilities; and
- upstream oil and gas guidelines, PST guidelines and SCH Code revisions were posted to the AENV website in fall 2001.

An adaptation of the CCME PHC CWS Tier 2 spreadsheet that incorporates Alberta climatic adaptations is under development. It will be released to the public for use at Alberta sites following completion of an internal test cycle.

In addition to national consultation events, Alberta held extensive public presentations and bearpit sessions, parallel development of complementary guidelines for Benzene, Toluene, Ethyl benzene, and Xylenes, and peer review through the university and consulting communities. Alberta also held subsequent roll out sessions in 2001 and 2002 with analytical laboratories, upstream oil and gas facilities, and analysts. Staff training was held between 2000 and 2003.

Saskatchewan

The PHC CWS has been applied to 177 sites throughout Saskatchewan since adoption of the standards in April 2002. No specific regulations were passed to support implementation of the PHC CWS. The *Hazardous Substances and Waste Dangerous Goods Regulations* provides the regulatory backdrop for implementing and enforcing the program in Saskatchewan.

A guideline document Risk Based Corrective Actions (RBCA) for Petroleum Contaminated Sites incorporating the PHC CWS was developed and released in April 2002. This document was later replaced by an Interim Guideline document in 2003. A comprehensive document is planned to be finalized in 2004/05 that will incorporate CWS for PHC along with the latest BTEX guidelines. Implementation of this document will occur after consultation and training have been completed.

Supplementary consultations were delivered in Saskatchewan by making presentations to stakeholders and providing information on the Saskatchewan Environment (SE) website.

Manitoba

Between May 2001 and January 2003 there were approximately 150 recorded new sites that had petroleum hydrocarbon contamination. This total does not include sites impacted primarily by metals that may also have had PHC impacts. Manitoba began its planning activities during the development of the standard. Discussions and information exchange between Contaminated Site Program staff and Regional Operations staff was conducted. Specific tasks were identified including review of regulations, guidelines, codes of practice and standard operating procedures, and development of consultation workshops and staff training.

No specific regulations were passed to support the PHC CWS. The PHC CWS was adopted pursuant to section 57(1) of The Contaminated Sites Remediation Act. The following Manitoba guidelines were amended to reflect the application of the PHC CWS in Manitoba:

- A Guideline for the Dismantling and Removal of Underground and Aboveground Petroleum Storage Tank Systems in Manitoba June 1991
- Manitoba Guideline 98-01 – Guideline for Environmental Site Investigations in Manitoba
- Manitoba Guideline 96-05 – Treatment and Disposal of Petroleum Contaminated Soil June 1996
- Contaminated Soil Criteria for Acceptance at Licensed Waste Disposal Grounds 2002-02E

Consultations supplementary to the national process were delivered in Manitoba specifically targeting stakeholders and information on the PHC CWS was provided on Manitoba Conservation (Environment) and CCME web sites.

Manitoba Conservation has conducted a variety of stakeholder seminars since December 2000. Staff training on the application of PHC CWS is on-going and was initiated in June 2001 through the department's Contaminated Sites Working Group. Manitoba Conservation staff respond to client inquiries on an ongoing basis.

Northwest Territories

Following endorsement of the PHC CWS in 2001, the Government of the Northwest Territories (GNWT) began revisions to the 1998 Environmental Guideline for Site Remediation. The Department of Resources, Wildlife and Economic Development (RWED) consulted with interested stakeholders including territorial and federal departments, the Northwest Territories Power Corporation and the Association of Professional Engineers, Geologists, and Geophysicists of the Northwest Territories and Nunavut (NAPEGG). Presentations were also made at NAPEGG technical workshops in Yellowknife before and after the guideline revisions. In November 2003, GNWT adopted the revised Environmental Guideline for Contaminated Site Remediation containing the PHC CWS criteria. Since the guideline revision, the PHC CWS has been used on all contaminated site management projects in the Northwest Territories.

The next step in support of the GNWT implementation plan is to revise RWED's website to include information on the PHC CWS and all the other CCME Canada-Wide Standards.

Ontario

The Record of Site Condition Regulation (O.reg.153/04) was passed in June 2004 effectively incorporating the PHC CWSs in the Soil Groundwater and Sediments Standards for use under part XV.1 of the *Environmental Protection Act*. As the new Regulations are implemented, a program is in place to inform and educate stakeholders, consultants and analytical laboratories of the new criteria including the new PHC CWS.

As of October 1, 2004, the PHC CWS will apply to all hydrocarbon contaminated sites for which a Record of Site Condition is filed.

Ontario is continues to evaluate the incorporation of the PHC CWS (particularly the Tier 1 criteria) in the Regulations developed and finalized under the Brownfield's legislation. An implementation period, in which proponents, consultants and laboratories could prepare fully for the coming into force of the new standards, is likely. Consultants developing site remediation plans are being encouraged to consider the PHC CWS standard in their plans.

Ontario is continuing to consider how to incorporate a Tier 2 process (i.e. modifications to generic criteria such as the CCME spreadsheets) into its handling of petroleum contaminated sites. Consultants inquiring about risk assessment at PHC contaminated sites are already being advised of the CCME CWS Tier 2 procedures that may be used in risk assessments for contaminated sites.

Ontario held public consultation on the PHC CWS prior to the signing of the standard. The proposed standards were posted on the Environmental Bill of Rights Registry. The results of the consultation coupled with the economic analysis, which indicated only moderate increases in costs, did not point to any barriers to Ontario signing the agreement. Additional consultation was conducted with analytical laboratories across the province through a workshop in May of 2003. Consultation has not shown major concerns with the proposal of Ontario adopting the PHC CWS, and most comments indicated general support.

Nunavut

After the development of the Canada-Wide Standard (CWS) for Petroleum Hydrocarbons in Soil and the endorsement by Ministers, Nunavut initiated application of the new CWS to all territorial clean-up. Remediation activities in Nunavut is not easily carried out as a result of the extreme climate and permafrost. As a result Nunavut is in the process of considering a more appropriate application of the CWS for PHC in remote areas, where spills have occurred more than 20 years ago. The Federal Government has been applying this PHC to all its remediation activities in Nunavut.

Nunavut intends to review and update its Environmental Guideline for Site Remediation so that it reflects the new CCME CWS for Petroleum Hydrocarbon.

Although Nunavut is large in regard to land mass, it is extremely small in population size, and has limited financial resources. As a result Nunavut is very dependent on CCME products such as the CWS for Petroleum Hydrocarbon in Soil.

Atlantic Provinces (Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island)

There is a harmonizing agreement between the Atlantic Provinces for the use of the Atlantic Partnership in RBCA Initiative (PIRI) PHC Guidelines that have been generated using Atlantic PIRI RBCA model. The Atlantic PIRI RBCA model was modified to incorporate new scientific information used by the PHC CWS. Although there are still some differences between the PHC CWS and the Atlantic PIRI PHC guidelines, the modifications made to the Atlantic PIRI RBCA model have allowed the Atlantic Provinces to meet their commitment under the CWS agreement.

Canada

It is estimated that PHC is a contaminant of concern on approximately 650 properties currently listed in the Federal Contaminated Sites Inventory. The federal government began its implementation planning activities in fall 2001, with a focus on federal contaminated sites. A PHC CWS implementation sub committee was formed and an implementation plan was developed which includes the following key aspects:

- Approach to implementation;
- Terms of Reference of the interdepartmental committee responsible for the implementation;
- Schedule and deliverables; and,
- Performance evaluation.

No specific regulations were passed to support the PHC CWS. However, on June 1, 2002, the Federal Contaminated Sites Management Policy was approved. This policy includes a requirement for federal departments to follow the PHC CWS.

A guideline under the *Canadian Environmental Protection Act* (CEPA) is being considered as a mechanism to cover the balance of the federal house, i.e. Crown corporations and federal works and undertakings.

Environment Canada has also drafted a proposed federal petroleum storage tank regulation, under Part 9 of CEPA (Government Operations), designed to prevent releases of PHC to the soil, water and subsurface environment. Once in force, this regulation should lead to a decrease in the number of fuel releases on federal lands and for federal works and undertakings.

A web-based training application currently under development will be finalized within this fiscal year (2004/05) and made available to federal departments and their contractors. Environment Canada will continue to carry out research and development related to the reference analytical method.

Feedback on PHC CWS implementation has been sought from all the custodial departments and agencies that are members of the Contaminated Sites Management Working Group (CSMWG). Both quantitative and qualitative reporting templates were circulated to the departments. Information and viewpoints received have been compiled so as to be available for the 5-year review of the standard. Based on the responses received to date, the PHC CWS has been applied either during assessment or remediation at approximately 50% of the sites with PHC contamination which were addressed during the 2003/04 reporting period.

Subsequent consultation and training activities include the development of a Federal User Guide, a workshop based on the User guide, and the development (still in progress) of a web-based training application for the PHC CWS. Environment Canada participated in the Canadian Association for Environmental Analytical Laboratories (CAEAL)-sponsored round robin testing of the PHC CWS Tier 1 reference analytical method.

Benefits and Challenges

Jurisdictions have noted the following benefits and challenges when implementing the PHC CWS.

Benefits identified include:

- Consistency in approach and outcome across Canada;
- Approach based on current science;
- Flexibility to address different land uses, soil textures, exposure pathways, depths and tiers;
- Effectively deals with disparate product types; and
- The requirements are clear; proponents understand what is expected of them.

Some challenges to the consistent implementation of the PHC CWS or requested upgrades include:

- the standard does not explicitly address weathered or bio-treated PHCs;
- Subsoil standards are difficult to implement (administrative controls often required);
- F1 standards are regarded as too permissive, F3 standards are regarded as too stringent;
- Organic soils and forest soils are not explicitly addressed;
- Stakeholders have identified that the current Parkland land use does not accurately reflect natural parklands and wildlife areas; and
- Continuity and comparability with assessments conducted prior to the release of the standard;