

F1 to F4

[2018 Re-Evaluation of F2 and F3 Petroleum Hydrocarbon Management Limits](#)

[2015 Field Validations of the F2:F3b Ratio and BOC-adjusted PHC F3 Calculation for Resolving False Detections of Crude Oil and Diesel Petroleum Hydrocarbons in Clean Soils](#)

- [2009 UoW_DRAFT Part 1 Biogenic Petrogenic F3a F3b DRAFT Report](#)
- [2009 UoW_DRAFT BiogenicPetrogenicF3aF3bDRAFTReport](#)
- [2012 University of Waterloo_Petroleum Index Presentation](#)
- [2016 CH2M_ Field Validations of PHC Fractions F2 and F3](#)

[2013 Proposed Management Limits for F2 and F3 Hydrocarbons at Remote Alberta Green Zone Sites](#)

- [2013 MEMS and AITF_Green Zone Presentation](#)
- [2013 MEMS and AITF_Proposed Management Limits for F2 and F3 Petroleum Hydrocarbons at Remote Alberta Green Zone Sites](#)

[2013 Subsoil Guidelines for Green Zone Sites, Proposed Exclusion Depths for the Ecological Direct Contact Exposure Pathway at Remote Alberta Green Zone Sites](#)

- [2013 MEMS and AITF_ReportAlberta Green Zone](#)

Rooting Depth Study

2013 Residual Saturation, Fire/Explosion Hazard and Hydrophobicity

- 2013 AITF_Residual Saturation Fire Explosion Report

2012 Validation of Petroleum Hydrocarbon Stratified Remediation Subsoil Criteria

- 2012 AITF_Validation of Petroleum Hydrocarbon Stratified Remediation Subsoil Criteria Report
- 2013 AITF_Validation of PHC Stratified Remediation Subsoil Criteria Presentation

2011 Validation of Petroleum Hydrocarbon Stratified Remediation Subsoil Criteria

- 2010 AITF_Validation of Subsoil Hydrocarbon Criteria for Stratified Remediation Report
- 2011 AITF_Validation of Petroleum Hydrocarbon Stratified Remediation Subsoil Criteria Report

2011 Standardization of an Analytical Method to Differentiate Petrogenic and Biogenic Inputs in Contaminated and Background Soils

- 2009 UoW and Env Canada_Biogenic Presentation
- 2012 Env Canada__Standardization of an Analytical Method to Differentiate Petrogenic and Biogenic Inputs in Contaminated and Background Soils_Report

- [2012 ENV Canada Analytical Method to Differentiate Petrogenic and Biogenic Inputs Report](#)

[2011 Utilizing Carbon Ranges, Unresolved Complex Mixtures and Carbon Preference Index Signatures as a New Tool for Quantifying Biogenic vs. Petrogenic Hydrocarbons in Soils Contaminated with Heavy Petroleum Products](#)

- [2010 UofWaterloo Oil Contaminated Soil from Background Presentation](#)
- [2013 UoWaterloo Publication IS IT CLEAN OR CONTAMINATED SOIL Report](#)
- [2013 UoWaterloo Publication IS IT CLEAN OR CONTAMINATED SOIL Tables](#)
- [2013 UoWaterloo IS IT CLEAN OR CONTAMINATED SOIL Figures](#)

[2010 Evaluating the Ecotoxicity of PHC F3 in Peat Soils versus Mineral Soils](#)

[2010 Weathered PHC F2 and the Eco-Contact Pathway, Phase 2, Effects of Soil Texture](#)

- [2012 Axiom Weathered F2 Eco-Contact Guideline Report](#) [2010 Axiom Weathered PHC F2 and the Eco-Contact Pathway Phase I Report](#)

[2009 Paragon Soil Comprehensive Literature Review on effect of Petroleum Hydrocarbons \(PHC\) on soil invertebrates with a focus on sub-soils below 1.5 m in both agricultural and natural areas in Alberta](#)

- [2010 AITF and Paragon_Stratified Approach Soil Remediation Presentation](#)

[2009 Distinguishing Natural vs Petroleum F3 Hydrocarbons in Diesel Invert Biopiles](#)

- [2009 UoW_Distinguishing Natural vs F3 Presentation](#)

[2009 Application of Different Measures of Bioavailability to Support the Derivation of Risk-Based \(Tiers 2 or 3\) Remedial Benchmarks for PHC-Contaminated Sites](#)

- [2009_910651 PTAC Progress Report](#)
- [2009 Stantec_Bioavailability Presentation](#)
- [2010 Stantec_RiskBased Remedial Benchmarks for PHC Presentation](#)

[2008 Weathered PHC F2 and the Eco-Contact Pathway – Phase 1 – Quantifying the Effects of Weathering](#)

- [2008 AENV_Draft Tier 2 Soil Ecocontact Guidelines PHC Presentation](#)
- [2009 BodyCote and Axiom_Weathered PHC F2_Phase 1 Presentation](#)
- [2009 Stantec_Weathered F2_Phase 1 Report](#)
- [2010 Axiom_Weathered PHC F2 and EcoContact Pathway_Phase 2 Presentation](#)
- [2012 Stantec_Weathered F2_Phase 2 Report](#)

[2008 Validation of Subsoil Hydrocarbon Criteria for Stratified Remediation at Upstream Oil and Gas](#)

Facilities in Alberta: Field Study

- 2010 AITF and Paragon_Stratified Approach Soil Remediation Presentation

2007 Validation of Subsoil Hydrocarbon Criteria for Stratified Remediation at Upstream Oil and Gas Facilities in Alberta

- 2008 AITF and Paragon_Stratified Approach Soil Remediation Presentation

2007 Environmentally Acceptable Endpoints for Weathered/Aged (Residual) Petroleum Hydrocarbons CCME CWS Fraction F3 in Soil, Phase 3

- 2007 Axiom_ENVIRONMENTALLY ACCEPTABLE ENDPOINTS FOR WEATHERED:AGED PETROLEUM HYDROCARBON FRACTION F3 Report
- 2007 Worley_Bioremediation of Weathered Petroleum Hydrocarbons Literature Review

2007 Distinguishing Natural vs Petroleum F3 Hydrocarbons in Oil Spill Impacted Muskeg Material

- 2007 UofWaterloo_Natural vs F3 in Oil Spill Impacted Muskeg Project Scope
- 2007 UofWaterloo_Natural vs F3 in Oil Spill Impacted Muskeg Presentation

2006 Field-Scale Assessments of the Phytoremediation of Weathered Hydrocarbons in Soil

- 2006 UoS_Phytoremediation in SK Report Yr 4

- [2006 UoS_Phytoremediation in SK Presentation Yr 4](#)
- [2007 UoS_Phytoremediation in SK Project Update](#)

[2006 Ecotoxicity Evaluation of Composted Site and Reference Soils Contaminated Predominantly with PHCs and Arsenic](#)

- [2006 Stantec_ECOTOXICITY EVALUATION OF SOILS CONTAMINATED WITH PHCS AND ARSENIC](#)
- [2006 WorleyParsons_Bioremediation of F3 Presentation](#)

[2006 Assessment and Refinement of Ecotoxicity Methods for Development of Tier 2 Soil Eco-contact Standards and Application to Site-specific Risk Assessments \(Tier 3\)](#)

- [2007 Stantec_Tier 2 Soil EcoContact Site Specific Risk Assessments Presentation](#)

[2005 Environmentally Acceptable Endpoints for Weathered/Aged \(Residual\) Petroleum Hydrocarbons CCME CWS Fraction F3 in Soil, Phase 2](#)

- [2005 Matrix and Axiom_Acceptable Endpoints for PHC Fraction F3 Presentation](#)
- [2005 Axiom_ENVIRONMENTALLY ACCEPTABLE ENDPOINTS FOR F3 Presentation](#)

[2005 Investigations into the Fraction-specific Toxicity of PHC in Soil: Evaluation of the Toxicity of Fraction F3 on the Exposure, Uptake and Toxicity of](#)

Individual and Binary Mixtures of CCME PHC Fractions

- Stantec and UoWaterloo_PHC Fraction 3 Phase 3 Presentation
- 2005 Stantec_CCME F3 Binary Yr 2 Presentation
- 2006 Stantec and UoWaterloo_F3 Report

2005 Summary of Chronic Screening Toxicity Test Results with Reference Soils and Soils Contaminated with Petroleum Hydrocarbon Residuals

- 2005 Stantec_Toxicity Tests with Soils Contaminated with Petroleum Hydrocarbon Residuals Report

2005 PHC CWS Ecotoxicity Data Compliation and Analysis

- 2001 UMA and Komex_Petroleum Hydrocarbon CanadaWide Standards
- 2005 Axiom_PHC CWS ECOTOXICITY DATA_Report
- Norwest_Validation of the Alternate CCME method_Project Proposal

2005 Ecotoxicity Risk Assessment of Hydrocarbon Residuals in Bioremediated Oil-Contaminated Clay Soils

- 2003 ERAC_Ecotoxicity Risk Assessment of PHC in Clay
- Matrix_PHC Bioremediated Oil Contaminated Clay Soil
- 2003 Matrix_Petroleum Hydrocarbons to Soil Organisms_Phase 3 Final Report

- [2005 Matrix_F3 Presentation](#)

[2005 Case Study Analysis on Phytoremediation across Canada](#)

- [2005 Imperial_Phytoremediation of Salt Sites](#)
- [2005 UoWaterloo_Phytoremediation_Part 1](#)
- [2005 UoWaterloo_Phytoremediation_Part 2](#)
- [2005 UoWaterloo_Phytoremediation_Part 3](#)
- [2005 UoWaterloo_Phytoremediation_Part 4](#)

[2004 Environmentally Acceptable Endpoints \(EAE\) of CCME Canada-Wide Standards \(CWS\) Petroleum Hydrocarbons Fraction F3 for Weathered Petroleum Hydrocarbons in Soil, Phase 1](#)

- [2004 EAE CWS PHC F3 in Soil_Project Scope](#)
- [2004 EAE CWS PHC F3 in Soil_Letter](#)
- [2004 Axiom_ Environmentally Acceptable Endpoints for Fraction 3 Report](#)

[2004 Compost amendment of oil field waste to remediate high concentrations of petroleum hydrocarbons F3 and F4 fractions](#)

[2003 Framework Foundation and Guidance for Tier 2 Site-Specific Development of Soil Contact Cleanup Standards for PHC-contaminated sites](#)

- [2001_ERAC Framework Foundation for Tier 2 Soil Contact Cleanup Standards for PHC Contaminated Sites](#)
- [2002 Gladys_Tier 2 Site Specific Development of](#)

Soil Contact Cleanup Standards for PHC Contaminated Sites Presentation

- 2003 Stantec_Framework for Tier 2 Presentation
- 2003 Stantec_Tier 2 Site Specific Development of Soil Contact Cleanup Standards for PHC Presentation
- 2003 Stantec_FRAMEWORK AND GUIDANCE FOR TOXICITY ASSESSMENT OF CONTAMINATED LANDS Report
- 2005 Stantec_Toxicity Tests with Soils Contaminated with Petroleum Hydrocarbon Residuals Report

2003 Toxicity of Petroleum Hydrocarbons to Soil Organisms and the Effect on Soil Quality, Field Studies, Phase 2

- 2003 Matrix and Stantec_Petroleum Hydrocarbons to Soil Organisms_Phase 2 Field Studies
- 2003 Matrix and Stantec_Toxicity and Guideline Development for Crude Oil_Phase 2 and 3_Presentation
- 2003 Matrix_Petroleum Hydrocarbons to Soil Organisms_Phase 3 Final Report
- 2003 EBA_Environmentally Acceptable Endpoints for F3 Presentation

2003 Toxicity of Petroleum Hydrocarbons to Soil Organisms and the Effect on Soil Quality, Fraction-Specific Toxicity of Crude Oil, Phase 1

- Matrix and Stantec_Toxicity and Guideline Development for Crude Oil_Phase 1_Field Studies

Presentation

- 2003 Stantec and Matrix_TOXICITY OF PHCs TO SOIL ORGANISMS AND THE EFFECTS ON SOIL QUALITY, PHASE 1_Report

2003 Comparison of the Soil Ecotoxicity of the Light and Heavy Ends of Fraction 3

- 2003 ERAC_Soil EcoToxicity of PHC F3 Fraction
- Stantec_Soil Test Methods for Assessing Toxicity in Contaminated Soil Presentation
- Stantec_Soil Ecotoxicity of Fraction 3 Presentation

2002 Field-Scale Assessments of the Phytoremediation of Weathered Hydrocarbons in Soil

- 2001 Germida & Farrell_Phyto Proposal
- 2002 UoS_Phytoremediation_Field Studies Report
- 2002 ARC_Phytoremediation to Enhance Hydrocarbon Remediation in Landfarms
- 2004 UoS_Phytoremediation_Presentation

2001 Modification of plant roots to accelerate microbial degradation of hydrocarbons

2001 Treatment Of Hydrocarbon Contaminated Water Using Constructed Wetlands Phase 3

- 2004 Komex_CONSTRUCTED WETLAND PILOT PROJECT AT THE STRACHAN GAS PLANT
- 2000 Komex_Constructed Wetlands for Treatment of Condensate Presentation

- [2000 Komex_Constructed Wetlands](#)
- [2001 Komex_Constructed Wetlands for Treatment of PHC Presentation](#)

[2001 Plant Uptake And Degradation Of Process Chemicals And Hydrocarbons in Wetlands](#)

- [2002_Constructed Wetlands for Hydrocarbon Removal ERAC Update](#)
- [2002 Komex_Wetlands_Field Update Presentation](#)

[2001 Monitored Natural Attenuation for Upstream Oil and Gas](#)

- [2000 Komex_Uptake of Sulfolane by Cattails Report](#)
- [2001 Komex_MNA Presentation](#)
- [2001 UoA_Natural Attenuation](#)
- [2002_Remediation by MNA_ERAC](#)
- [2002 Komex_MNA Letter Update](#)
- [2002 Komex_Diffusion Samplers in MNA Letter Update](#)
- [2002 Armstrong_Assessment MNA Report](#)
- [2003 ERAC_Remediation of PHC Site by MNA](#)
- [2004 Komex_Sulfate Reduction_MNA](#)
- [2004 Komex_MNA Presentation](#)
- [2005 Komex_MNA Presentation](#)

[2001 Assessment of Phytoremediation In Situ Technique for Cleaning Oil Contaminated Sites Phase 2](#)

- [2000 UoS_Phytoremediation as an InSitu Technique for Cleaning OilContaminated Sites_Final Report](#)

- [2001_ERAC_Phytoremediation](#)
- [2001_UoS_Phytoremediation](#)

[2000 Assessment of Fraction Specific Toxicity and Derivation of Recommended Soil Quality Guidelines for Crude Oil in Agricultural/Grassland Soils](#)

- [1998 Assessment of fraction specific toxicity and derivation of recommended soil quality guidelines](#)
- [2001 Matrix and Stantec_Soil Quality Guideline for Crude Oil in Agricultural Soils_Presentation](#)
- [Matrix and Stantec_Toxicity and Guideline Development for Crude Oil_Phase 1_Field Studies Presentation](#)
- [2003 Matrix and Stantec_Toxicity and Guideline Development for Crude Oil_Phase 2 and 3_Presentation](#)
- [Matrix and Stantec_Toxicity and Guideline Development for Crude Oil in Agricultural Soils_V2 Presentation](#)

[1999 Assessment of Phytoremediation In Situ Technique for Cleaning Oil Contaminated Sites Phase 1](#)

- [1999 UoS_Phytoremediation Presentation](#)
- [UoS_Database of Plants that Play a Role in the Phytoremediation of Petroleum Hydrocarbons](#)
- [1999 UoS_Phytoremediation as an InSitu Technique for Cleaning Oil Contaminated Sites_Report](#)