Your File: Our File: 26250-20/0075 SITE 1017

Date:

VIA FAX ONLY: (604) 451-1347

Imperial Oil Limited Suite 405- 5945 Kathleen Avenue Burnaby, BC V5H 4J7

Attention: Adrian Michielsen

Dear Adrian Michielsen:

Re: Site Profile Submission – Demolition Permit/Site Decommissioning 452 East Broadway, Vancouver PID: 014-828-120, 014-828-138 & 014-828-162

This letter is to acknowledge receipt of a satisfactorily completed site profile pertaining to the above-referenced site. In accordance with section 7(1) of the Contaminated Sites Regulation the ministry requires that you submit for our review a detailed site investigation report for the subject site. Please be advised that investigations and remediation shall continue until you have applied for, and obtained, one of the following *Waste Management Act* instruments: an approval in principle of a remediation plan or a certificate confirming the satisfactory remediation of the site.

We also confirm that you have applied for an approval in principle of a remediation plan for surrounding impacted property. Please note that there currently is an outstanding requirement for data to support this application.

Please also be advised of the following:

- detailed site investigations are defined under section 59 of the Contaminated Sites Regulation. Please note that fees are applicable for the ministry's contaminated sites services, pursuant to section 9 of the Contaminated Sites Regulation. A Contaminated Sites Services Application Form and a letter and table summarizing key information requirements for investigation and remediation report submissions can be obtained from the ministry's regional contaminated sites web page located at http://www.env.gov.bc.ca/sry/p2/contam/index.htm. Please complete the right-hand column of the key requirements table and submit it together with your review application;
- in general, the ministry is not opposed to issuance of permits which will facilitate investigation and remediation of potentially contaminated sites. In cases of site demolition, we recommend that a survey of building materials and equipment be undertaken to identify any materials that require special management;

- the ministry recommends that you review all aspects of the government's contaminated sites legislation and supporting guideline documents and protocols to ensure that all required information is collected and documented during investigation and remediation of the site; and
- those persons undertaking site investigations and remediation at contaminated sites in British Columbia are required to do so in accordance with the requirements of the *Waste Management Act* and regulations (e.g. Contaminated Sites Regulation, Special Waste Regulation etc.). Please also be advised that the ministry considers these persons responsible for ensuring that "onsite" contaminants are not migrating "offsite" and that any associated human health or environmental impacts ("on" or "offsite") are identified and addressed, including written notification to any potentially affected parties (e.g. adjacent land owners/occupants, municipalities, utility companies etc.). The ministry shall be copied on all notifications.

Decisions of a manager may be appealed under part 7 of the Waste Management Act.

We request that you contact Vince Hanemayer at (604) 582-5273 to advise the ministry of your schedule to prepare and submit the required report and to address any questions you may have about this letter.

Yours truly,

Alan W. McCammon, M.Sc., P.Geo. Assistant Regional Waste Manager

kd/

cc: Hank Uyeyama, City of Vancouver, FAX: (604) 873-6963

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VIA FAX ONLY: (604) 451-1347

Imperial Oil Limited Suite 405 – 5945 Kathleen Avenue Burnaby, BC V5H 4J7

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Dear Adrian Michielsen:

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This letter is to acknowledge receipt of a satisfactorily completed site profile pertaining to the above-referenced site. For the purpose of the subject demolition permit application, the ministry does not presently intend to require, or order pursuant to section 26.2 of the *Waste Management Act*, a site investigation as long as the demolition does not involve any disturbance or excavation of soil other than that which is incidental to the demolition. The ministry generally recommends that a survey of building materials and equipment be undertaken in advance of demolition to identify any materials that will require special management.

For the purpose of site decommissioning, investigations and remediation shall continue until you have applied for, and obtained, one of the following *Waste Management Act* instruments, as applicable: an approval in principle of a remediation plan or a certificate confirming the satisfactory remediation of the site. This requirement pertains to the subject property, and is in addition to the existing requirement to obtain an approval in principle of a remediation plan for "offsite" contamination.

We confirm that you have applied for an approval in principle of a remediation plan for surrounding impacted property. Please note that there currently is an outstanding requirement for data to support this application.

Please also be advised of the following:

a Contaminated Sites Services Application Form and a letter and table summarizing key information requirements for investigation and remediation report submissions can be obtained from the ministry's regional contaminated sites web page located at http://www.env.gov.bc.ca/sry/p2/contam/index.htm. Please complete the right-hand column of the key information requirements table and submit it together with your review application;

- the ministry recommends that you review all aspects of the government's contaminated sites legislation and supporting guideline documents and protocols to ensure that all required information is collected and documented during investigation and remediation of the site; and
- those persons undertaking site investigations and remediation at contaminated sites in British Columbia are required to do so in accordance with the requirements of the *Waste Management Act* and regulations (e.g. Contaminated Sites Regulation, Special Waste Regulation etc.). Please also be advised that the ministry considers these persons responsible for ensuring that "onsite" contaminants are not migrating "offsite" and that any associated human health or environmental impacts ("on" or "offsite") are identified and addressed, including written notification to any potentially affected parties (e.g. adjacent land owners/occupants, municipalities, utility companies etc.). The ministry shall be copied on all notifications.

Decisions of a manager may be appealed under part 7 of the Waste Management Act.

We request that you contact Vince Hanemayer at (604) 582-5273 to advise the ministry of your schedule to prepare and submit the required report and to address any questions you may have about this letter.

Yours truly,

Alan W. McCammon, M.Sc., P.Geo. Assistant Regional Waste Manager

kd/

cc: Hank Uyeyama, City of Vancouver, FAX: (604) 873-7963

TECHNICAL REVIEW Request for PSI/DSI Review (excluding site 3351) Request for Approval in Principle (road and lane ways)

November 21, 2001

Regional File No.: 26250-20/0075 SITE No.:1017

1 BACKGROUND

1.1 Application Details

Soil and groundwater contamination was identified at the Esso service station at 452 E. Broadway following a fuel spill there in 1985. Hydrocarbon impacts were also identified at 418 E. Broadway (SITE 3351) prior to redevelopment of that site. As a result of the contamination identified at 418 E. Broadway, Imperial Oil Limited (IOL) was ordered to complete a Detailed Site Investigation (DSI). The ministry subsequently required IOL obtain an approval in principle (AiP) pursuant to *Waste Management Act* (WMA) section 28(3) for the municipal lands impacted by the service station. On June 11, 1999 Phil de Leeuw from IOL, applied for an approval in principle for the remediation plan addressing "off-site" contamination originating from the Esso service station. Review fees were paid on November 22, 1999. Initiation of review was delayed due to the switching of queue positions with an AiP request for SITE 1500. Further review was delayed pending completion of additional groundwater monitoring in support of monitored natural attenuation, the proposed remediation strategy for the roadways on city property.

1.2 Site Details

Civic Address:	452 E. Broadway, adjacent portions of East Broadway, Guelph Street, and the back lane way, and the western property boundary of 490 E. Broadway in Vancouver, B.C.
Registered Owner:	Imperial Oil Ltd., City of Vancouver, and Teamsters Building Limited respectively
Legal Description:	IOL lands legally described as Lots 1, 2 and 3, Except the South 2 Feet Now Lane, Block 124 District Lot 264A Plans 1355 and 1771; City lands - East Broadway, Guelph Street and the lane way backing onto the IOL property; and The western edge of the Teamsters' property legally described as Lot A Block 124 District Lot 264A Plan 14708
PID:	IOL property – 014-828-120, 014-828-138 and 014-828-162 Teamsters' property – 007-754-523
Approximate centroid	of the site - using NAD (North American Datum) 1983 convention.

Latitude: 49° 15' 44.05"

Page 2 Regional File: 26250-20/0075 SITE No.: 1017

Longitude: 123° 5' 40.03"

1.3 Reason for Investigations and Request

Historic petroleum hydrocarbon releases from the former service station have resulted in soil and groundwater contamination above applicable land use and groundwater quality standards for the IOL property and adjacent lands to the north-west and east. A site investigation order (OS-15133) was issued to IOL on July 22, 1997 requiring IOL to complete a detailed site investigation for the site and to notify all potentially affected parties. IOL submitted the DSI report, prepared by O'Connor Associates Environmental Inc., dated February 27, 1998, to meet the order requirements. Following compliance by IOL with the order (no associated technical report was completed by the ministry), the ministry required IOL obtain an AiP for a remediation plan to address "off-site" contamination originating from the Esso service station pursuant to WMA section 28(3).

1.4 Applicable Legislation and Guidance Documents

The *Waste Management Act* (WMA), Contaminated Sites Regulation (CSR), Special Waste Regulation (SWR) and associated protocols, procedures and guidance documents apply. Section 1 of the CSR specifies that roads and highways are industrial land uses. Therefore, industrial land use standards (IL) as specified in the Contaminated Sites Regulation, are appropriate for the roadway portions of the site (the service station and adjacent Teamsters' property are understood to be zoned for commercial land use). Site specific factors respecting the use of CSR matrix numerical soil standards were considered to be intake of contaminated soil and toxicity to soil invertebrates and plants.

The nearest surface water body is False Creek located 1.2 km north-west of the site. Municipal water supply is provided to residences and businesses in the area and no other water uses were identified in the vicinity of the site. Therefore, no schedule 6 water use standards apply to groundwater at the site.

SWR standards apply to soil and groundwater (subject to provisions of CSR s.13 and Protocol 7). Mandatory groundwater standards also apply.

1.5 Documents Reviewed

The ministry has reviewed the following reports, prepared by O'Connor Associates Environmental Inc., and submitted in support of the subject request:

- <u>Remediation Plan, 452 East Broadway, Vancouver, British Columbia, Location No.</u> <u>990252</u>, dated May 31, 1999
- <u>Kingsgate Esso Service, 452 East Broadway, Vancouver, British Columbia, Location No.</u> <u>990252</u>, dated February 27, 1998

Page 3 Regional File: 26250-20/0075 SITE No.: 1017

All reports have been entered on SITE.

2 SITE DESCRIPTION

2.1 Site Location and General Description

The recently shut down Esso service station is located at the south-east corner of East Broadway and Guelph in Vancouver. The site is within a commercial area of East Broadway and bounded to the east by the Teamsters' Union building and to the south by residential properties.

2.2 Topography and Stratigraphy

The site is level and is underlain by sand and/or silt to at least 10 metres depth, the maximum depth drilled. Occasional clay seams were also encountered.

Regional geological maps of the area indicate that surficial soils generally consist of glacial drift deposits of stony silt, sand and/or gravel.

2.3 Surface Water and Groundwater

Surface water on-site drains to catch basins on the IOL property or adjacent city streets. Prior to construction of a commercial/residential building across Guelph Street (418 E. Broadway; SITE 3351), the average depth to groundwater varied from about 2 to 4 metres below ground surface and the groundwater flowed to the south-east. During redevelopment of SITE 3351, an interception trench was constructed along the eastern property boundary at 418 E. Broadway to prevent further migration of contamination onto that property. As a result of the interception trench, groundwater within the roadway was reported to flow westward. Groundwater flow directions on the eastern portion of the service station site continue to flow to the south-east.

3 SITE INVESTIGATIONS

3.1 Investigation History

A gasoline spill occurred on the IOL property in 1985, which also impacted adjacent lands to the east and west. Contamination from leaking USTs on the IOL property further impacted adjacent properties. Site investigation reports were provided to the ministry in 1991 in conjunction with a facility upgrade (UST replacement). At that time, IOL also notified the ministry of on-site remediation and off-site disposal of contaminated soil, including special waste. The migration of contamination off-site was later identified during investigation work carried out in preparation for redevelopment of SITE 3351 located at 418 E. Broadway. A certificate of compliance was issued for SITE 3351 in September 1998.

3.2 Preliminary Site Investigations (PSI) - Stage 1

O'Connor Associates Environmental Inc. (O'Connor) completed the Stage 1 PSI as part of the requirement of site investigation order OS-15133. O'Connor reviewed land title records, aerial photographs, municipal directories, and carried out site reconnaissance to determine industrial and commercial activities on-site and on adjacent properties. A service station operated on the

Page 5 Regional File: 26250-20/0075 SITE No.: 1017

IOL property from 1955 until decommissioning in June 2001. O'Connor identified the following land uses with potential to contribute to site contamination and the associated potential contaminants of concern for each:

• On-site service station including a gasoline spill that occurred on-site in 1985 (BTEX, VPH, LEPH, HEPH and PAHs);

No potential off-site sources of contamination were identified. A Stage 1 PSI prepared by Integrated Resource Consultants Inc. (IRC) for SITE 3351 generally confirms this assessment.

3.3 Preliminary Site Investigation (PSI) - Stage 2

Seven boreholes were drilled on the IOL property in 1990, prior to UST replacement, to assess the degree of soil and groundwater contamination on-site. BTEX and VPH concentrations in the soil samples collected generally exceeded CSR CL. Monitoring wells were installed in the seven boreholes. Groundwater samples collected from each hole were analysed for petroleum hydrocarbons. LNAPL was identified in monitoring wells on the IOL property but details were not provided. Vapour readings collected from monitoring wells on-site identified a vapour band greater than 100% LEL extending from the south-east corner to the north-west corner of the site. Soil and groundwater contamination was not delineated at that time.

3.4 Adequacy of Preliminary Site Investigation (PSI)

The Stage 1 PSI carried out by O'Connor and IRC clearly identified the potential sources of contamination on and adjacent to the Esso service station. However, the investigations carried out during the late 1980s and early 1990s, did not meet the requirements of CSR section 58 and applicable guidance documents (i.e. Stage 2 PSI components). However, they did scope out the extent of contamination on the IOL property and provided a basis for additional work.

3.5 Detailed Site Investigations (DSI)

418 East Broadway

12 boreholes were drilled on SITE 3351 in 1996 to determine the impacts of petroleum hydrocarbon migration from the IOL property. IRC delineated the western extent of contamination on SITE 3351 and estimated that about 16% of the soil to be removed during redevelopment would be above CSR RL (<CSR CL) and require disposal at a permitted facility. IRC received a C of C for their site in September 1998 and the site has since been redeveloped. The certificate issued to IRC required installation of a barrier system along the eastern property boundary of SITE 3351 to ensure that contamination originating from the service station did not re-contaminate the site. IOL also installed a groundwater collection and vapour extraction trench along the western, northern and southern property boundaries of the service station property to prevent further contaminant migration from their land. The collection system operated until decommissioning of the service station in June 2001.

452 East Broadway

Site investigation order OS-15133 was issued to IOL on July 22, 1997. The order required IOL to submit a work plan for a DSI, submit a DSI report to the ministry, and notify potentially affected parties of contamination originating from the Esso service station. IOL complied with the order on April 22, 1998.

Roadway investigations

Between December 1996 and October 1997, O'Connor drilled 47 boreholes on SITE 3351, the Teamster's property (490 East Broadway), East Broadway, Guelph Street, and the lane way south of the IOL property (see attached figure 1.2). Soil samples were collected using split spoons, where possible, or directly from the augers. Soil samples generally exhibiting the highest headspace readings and/or staining were analysed for BTEX, VPH, LEPH, HEPH and or metals. Only two soil samples, collected from the middle of the intersection of Guelph Street and East Broadway and south of the IOL property within the lane way, contained xylenes and/or VPH above CSR IL. No special waste soil was identified. The contaminated soil was identified at depths ranging from about 1.2 to 1.8 metres. However, no contour diagrams or volume estimates of contaminated soil were provided.

Groundwater monitors were installed in all but one of the boreholes drilled off the IOL property. The wells have been sampled for vapour readings and LNAPL levels on a regular basis since installation. Historically, measurable amounts of LNAPL were detected in wells on-site, to the north-west, and immediately south and east of the IOL property and on SITE 3351. Groundwater sampling carried out in 1998 and 1999 identified LNAPL or VHw₆₋₁₀ above 15,000 ug/L in the following "off-site" wells: PGL-1 on the Teamster's property and in BH 19, BH 28 and BH 34 within the road and lane ways. During that period, LNAPL levels in the off-site wells ranged from 0 to 1 mm. LNAPL was also present on the IOL property.

O'Connor did not provide a plan or cross sections showing the extent of groundwater contamination at the site.

3.6 Adequacy of Detailed Site Investigation

The DSI does not provide an interpretation and evaluation of the data in a manner that clearly shows the specific areas, depths and degree of contamination including migration that may have occurred onto adjoining properties (CSR 59(3)(ii)). Therefore, the DSI is considered deficient and must be supplemented and resubmitted.

4 CONTAMINATION

4.1 Soil

Soil contaminated with xylenes and/or VPH above CSR IL was identified at the centre of the East Broadway/Guelph Street intersection and immediately south of the IOL property within the

Page 6 Regional File: 26250-20/0075 SITE No.: 1017

Page 7 Regional File: 26250-20/0075 SITE No.: 1017

lane way. A large portion of the IOL property also contains contamination above applicable standards.

4.2 Groundwater

 VHw_{6-10} and/or EHw_{10-19} above no water use standards, and/or LNAPL and/or BTE above SWLQS were identified on the service station property and immediately to the north-west, south, and north-east.

4.3 Soil Gas

During the earlier stages of site investigation, soil vapours above 100% LEL were identified on the IOL property extending from the north-west to the south-east.

5 PROPOSED SITE REMEDIATION PLAN

5.1 Historic Site Remediation

452 East Broadway

The IOL property was up-graded in 1990 at which time the USTs were replaced and about 300 m³ of soil contaminated above commercial land use standards, but below special waste, were remediated in a biocell on-site. The treated soil was later disposed of off-site. An additional 800 m³ of contaminated soil was excavated in conjunction with installation of the groundwater and vapour interception trench noted above. 450 m³ of special waste was sent to Sumas Soil Recycling in Abbotsford, 200 m³ above CSR CL and below SW was shipped to the Remedicon facility in Delta and the remaining soil, about 150 m³ < CSR CL, was disposed of at a site reportedly authorised to take this material.

418 East Broadway

During development of SITE 3351 in 1998, approximately 2,300 m³ of soil above CSR RL was excavated and disposed of off-site. Of this total about 200 m³ exceeded CSR CL but was below special waste. All soil excavated from this site was disposed of off-site.

5.2 Proposed Site Remediation Plan (East Broadway, Guelph Street and back lane way)

O'Connor briefly evaluated several options for remediation of the off-site including:

- Excavation and off-site disposal;
- In-situ vapour extraction;
- Groundwater recovery and treatment;
- Vacuum enhanced recovery;
- Monitored Natural attenuation (MNA);
- Bioventing;
- Air injection;
- Manual bailing; and

• Long term management.

Based on their assessment, IOL concluded that monitored natural attenuation in conjunction with recovery of liquid hydrocarbons on and off-site would cause the least disruption to the roadway and provide the most appropriate remediation strategy for off-site contamination.

In assessing the appropriateness of natural attenuation at the subject site, I referenced the US EPA Directive 9200.4-17P entitled <u>Use of Monitored Natural Attenuation at Superfund, RCRA</u> <u>Corrective Action, and Underground Storage Tank Sites</u>, dated April 1999. This document indicates that ... "the most important considerations regarding the suitability of MNA as a remedy include:

- 1. Removal of source;
- 2. Whether the contaminants are likely to be effectively addressed by natural attenuation processes;
- 3. The stability of the groundwater contaminant plume and its potential for migration; and
- 4. The potential for unacceptable risks to human health or environmental resources by the contamination."

"Therefore, sites where the contaminant source has been removed and plumes are no longer increasing in extent, or are shrinking, would be the most appropriate candidates for MNA remedies."

The off-site contamination appears to satisfy conditions 2 through 4 as follows:

- 2. Off-site contamination consists of gasoline associated with a former spill and leaking USTs on the IOL property. As noted in the above referenced EPA document, gasoline naturally degrades in-situ in a timely manner under the right conditions (i.e. natural attenuation has a high success rate).
- 3. The source of contamination has effectively been removed with the installation of an interception trench along the western portions of the Esso service station. Groundwater quality data from the off-site monitoring wells indicates that contaminant concentrations have reduced since the installation of the interception trench.
- 4. Impacts on human health and the environment are considered minimal due to the distance from an aquatic receptor (greater that 1 km) and the fact that the contaminated area is paved. Also, with the installation of the interception trench along the eastern boundary of SITE 3351, groundwater west and north-west of the service station is reported to be collected by the interception trench and treated on the Esso property.

However, with respect to item 1, further evidence that LNAPL is no longer present in the roadway is required. If LNAPL is still present, other remediation options may be needed. If not present, IOL must still show that natural attenuation will work within the roadway. O'Connor

Page 9 Regional File: 26250-20/0075 SITE No.: 1017

appears to have obtained the appropriate geochemical data but must still assess that data within a framework that will evaluate the applicability of MNA at this site.

In June 2001 the service station was decommissioned and a notice of commencement of independent remediation update was provided to the ministry on September 13, 2001. It is understood that the remediation strategy for the IOL property and impacted Teamsters' property to the east (490 East Broadway) is to excavate contamination for disposal off-site. Site remediation was to be completed by the end of October 2001 and IOL eventually plans to obtain a C of C for these lands.

5.3 Adequacy of Proposed Site Remediation Plan

In view of the deficiencies identified in the DSI and remedial plan and recent remediation work at the source site, I recommend that the ministry suspend review for the purposes of issuing an AiP for the roadways. I also recommend that IOL submit a schedule indicating submission dates for supplementary data for the IOL property and impacted lands.

Also, the ministry requires assurance that all contaminant collection systems are working and that remaining contamination within the roadway can be successfully remediated through MNA. (I.E. the applicant must identify an acceptable protocol for assessing MNA and demonstrate how MNA will work at the site.) Also, the MNA will have to be supported by a risk assessment to ensure that during remediation, potential receptors are not exposed to unacceptable risks.

6 RECOMMENDATION

Forward the attached letter advising IOL that the DSI and remediation plan are deficient and require supplementing and resubmission. The letter will include the following requirements:

- Confirmation that all barrier systems continue to prevent contamination within the roadway from migrating onto 418 East Broadway;
- Confirmation that subsurface conditions present within the roadway will be conducive to MNA. Therefore, the applicant must identify an acceptable protocol for assessing MNA and demonstrate that MNA will work at the site; and
- Confirmation in the form of a risk assessment that potential receptors are not exposed to unacceptable risks during remediation;
- Submission of a schedule to (1) complete remediation of the service station and adjacent Teamsters' property and to (2) submit a revised report in support of the roadway AiP. The schedule shall be submitted to the ministry within three weeks of the date of the letter.

This technical review is based on the most recent information provided to the ministry regarding the indicated site. The ministry, however, makes no representation or warranty as to its accuracy or completeness. The ministry expressly reserves the right to change or substitute different requirements where circumstances warrant.

Page 10 Regional File: 26250-20/0075 SITE No.: 1017

Prepared by:

Vincent C. Hanemayer, M.Eng., P.Eng. Pollution Prevention Officer Reviewed by:

Coleen Hackinen, M.Sc., P.Ag. Senior Pollution Prevention Officer

Concur:

Alan W. McCammon, M.Sc., P.Geo. Assistant Regional Waste Manager Lower Mainland Region

TECHNICAL REVIEW Request for Approval in Principle

2007-02-23

Regional File No.: 26250-20/0075 SITE No.:1017

1. BACKGROUND

1.1 Application Details

An application for the review of a Remediation report, including risk assessment and monitored natural attenuation report, in order to meet the MoE requirements to obtain an Approval in Principal was received from O'Connor Associates Environmental Inc (O'Connor) on July 14, 2004. The application was made on behalf of Imperial Oil Limited.

1.2 Site Details

Civic Addre	SS:	452 East Bro	adway	
Registered	Owner:	Imperial Oil L	imited	
Legal Desc	ription:	Lots 1, 2 and	3, Except the South 2 Feet Now Lane, Block 124	
-	-	District Lot 20	64A Plans 1355 and 1771;	
PID/PIN:		014-828-120, 014-828-138 and 014-828-162		
Latitude:	49° 15' 44.05"	Longitude:	123° 05' 40.03"	

1.3 Applicable Legislation and Guidance Documents

The applicable soil standards for the IOL property and adjacent property to the east are the CSR standards for commercial land use (CL). Future use of the land is anticipated to remain commercial. Applicable soil standards for roadways are the CSR standards for industrial land use (IL). Additionally, HWR standards apply at all locations. Mandatory site specific factors include *toxicity to soil invertebrates and plants* and *intake of contaminated soil*.

The nearest surface water body is False Creek located 1.2 km north-west of the Site. Municipal water supply is provided to residences and businesses in the area and no other water uses were identified in the vicinity of the Site. Therefore, no schedule 6 water use standards apply to groundwater at the Site. For the purposes of delineation, marine AW standards were utilized. HWR leachate quality standards apply to groundwater and mandatory groundwater standards also apply.

1.4 Documents Reviewed

The Ministry has reviewed the following reports, prepared by O'Connor Associates, and submitted in support of the subject request:

Page 2 Regional File: 26250-20/0075 SITE No.: 1017

- Remediation Completion Report for 452 East Broadway, Vancouver British Columbia, Project No. R02502, Volumes I and II. O'Connor Associates Environmental Inc., May 19, 2004.
- Risk Assessment, Former Service Station, 452 East Broadway, Vancouver, British Columbia, Project No. 10-1839.22. O'Connor Associates Environmental Inc., May 19, 2004.
- Letter dated June 7, 2004 to Ms. Eastcott of Imperial Oil from O'Connor Associates Environmental Ltd. *Re: Kingsgate Esso, 452 East Broadway Street, Vancouver, British Columbia, Location No. 990252 (SAP No. R02502.*

This review has also considered additional information provided in previous technical reports and the following reports submitted to the Ministry:

• 452 East Broadway, Vancouver, BC, Site Investigation Order, BC Environment File No. OS-15133, O'Connor Associates Environmental Inc., February 27, 1998.

2. SITE DESCRIPTION

2.1 Site Location and General Description

The former Esso service station is located at the south-east corner of East Broadway and Guelph in Vancouver. The site is within a commercial area of East Broadway and bounded to the east by the Teamsters' Union building and to the south by residential properties. The site encompasses an area of approximately 1800 m² (0.18 ha) and is square in shape.

2.2 Topography and Stratigraphy

Site grade is fairly level with a gentle slope to the north and northeast.

The general stratigraphy of the site (based on a review of borehole logs) is as follows:

SAND FILL or CLAY– approximately 0 to 2.5 m depth SILT– approximately 2.5 to 5 m depth SAND – approximately 2.5 to 10m depth

Generally, sand is encountered at boreholes drilled to greatest depths (> 6 m).

Regional geological maps of the area indicate that surficial soils generally consist of glacial drift deposits of stony silt, sand and/or gravel.

TECHNICAL REVIEW Request for AiP

2.3 Surface Water and Groundwater

Groundwater monitoring events conducted between 1997 and 2001 indicate that groundwater levels ranged from 0.8 to 3.9 m below grade. During redevelopment of SITE 3351 (418 E. Broadway located west of the subject property) in 1998, an interception trench with a pump and treat system was constructed along the property boundary adjacent the former service station to prevent further migration of contamination onto that property. Groundwater contour diagrams are provided for a fall 2003 event (post excavation), groundwater within the roadways is reported to flow toward the inceptor trench. Groundwater flow directions on the eastern portion of the service station site flow to the south-east.

Surface water on-site drains to catch basins on the IOL property or adjacent city streets.

3. SITE INVESTIGATIONS

3.1 Investigation History

Historic petroleum hydrocarbon releases from the former service station have resulted in soil and groundwater contamination above applicable land use and groundwater quality standards for the IOL property and adjacent lands to the north-west and east. A site investigation order (OS-15133) was issued to IOL on July 22, 1997 requiring IOL to complete a detailed site investigation for the site and to notify all potentially affected parties. IOL submitted the DSI report, prepared by O'Connor Associates Environmental Inc., dated February 27, 1998, to meet the order requirements. Following compliance by IOL with the order (no associated technical report was completed by the ministry), the ministry required IOL to obtain an AiP for a remediation plan to address "off-site" contamination originating from the Esso service station pursuant to WMA section 28(3) (in act at the time). In 1999, IOL submitted a remediation plan for the off-site contamination that involved Monitored Natural Attenuation (MNA). Following review of the remediation plan in 2001, the Ministry recommended that the DSI and Remediation Plan be resubmitted with the following recommendations:

- Confirmation that all barrier systems continue to prevent contamination within the roadway from migrating onto 418 East Broadway;
- Confirmation that subsurface conditions present within the roadway will be conducive to MNA. Therefore, the applicant must identify an acceptable protocol for assessing MNA and demonstrate that MNA will work at the site;
- Confirmation in the form of a risk assessment that potential receptors are not exposed to unacceptable risks during remediation; and
- Submission of a schedule to (1) complete remediation of the service station and adjacent Teamsters' property (to the east) and to (2) submit a revised report in support of the roadway AiP. The schedule shall be submitted to the ministry within three weeks of the date of the letter.

In response, IOL provided a fax update (November 30, 2001) indicating that site remediation had been completed and that the DSI will be updated with new information. Also a risk

assessment report and an evaluation of MNA for the site will be prepared and submitted to the Ministry at a later date.

3.2 Preliminary Site Investigations (PSI) - Stage 1 and Stage 2

The key report deliverables for a Stage 1 and 2 PSI are provided in the recently submitted remediation completion report. O'Connor also refers to a PSI written for the site dated 1998-02-27 and reviewed by the Ministry in 2001 (summarized below).

The following was taken from a technical review for the IOL Service Station Site, prepared by V. Hanemeyer on November 21, 2001.

"O'Connor Associates Environmental Inc. (O'Connor) completed the Stage 1 PSI as part of the requirement of site investigation order OS-15133. O'Connor reviewed land title records, aerial photographs, municipal directories, and carried out site reconnaissance to determine industrial and commercial activities on-site and on adjacent properties. A service station operated on the IOL property from 1955 until decommissioning in June 2001. O'Connor identified the following land uses with potential to contribute to site contamination and the associated potential contaminants of concern for each:

 On-site service station including a gasoline spill that occurred on-site in 1985 (BTEX, VPH, LEPH, HEPH and PAHs);

No potential off-site sources of contamination were identified. A Stage 1 PSI prepared by Integrated Resource Consultants Inc. (IRC) for SITE 3351 (418 E Broadway – CoC issued) generally confirms this assessment."

A search of the Provincial Site Registry database, conducted on 2002-12-16 identified 27 sites within a 0.5 Km radius of the IOL property. Of the 25 sites, six sites were listed as active/under remediation. These sites are located over 100 m away from the subject property. A Certificate of Compliance was issued for the property to the east (418 E Broadway). A pump and treat system is currently operating along this property's boundaries to mitigate potential recontamination of the site from subsurface contamination located in adjacent roadways and the IOL property. The pump and treat system is currently being maintained by IOL.

The former service station that operated from 1955 to 1995 is considered the Area of Environmental Concern (APEC) that stored on site gasoline, used oil, fuel oil and lubricants and solvents. Potential Contaminants of Concern (PCOC) include: BTEX, VPH, LEPH, HEPH, PAHs, VOCs, metals, MTBE and glycols.

3.3 Adequacy of Preliminary Site Investigation (PSI) and Outstanding Issues

The following was taken from a technical review of the Stage 1 and 2 PSI documents completed in 2001:

"The Stage 1 PSI carried out by O'Connor and IRC clearly identified the potential sources of contamination on and adjacent to the Esso service station. However, the investigations carried out during the late 1980s and early 1990s, did not meet the requirements of CSR section 58 and applicable guidance documents (i.e. Stage 2 PSI components). However, they did scope out the extent of contamination on the IOL property and provided a basis for additional work."

3.4 Detailed Site Investigation

Investigations on and off-site to delineate subsurface contamination were completed in a staged approach from 1990 through to 2001. The following table (Table 1) provides a summary of the investigations:

Date	Description	
1990	Seven boreholes drilled and completed as monitoring wells on the subject property.	
1991	Three boreholes drilled and completed as monitoring wells on the subject property	
1996	18 boreholes were drilled and completed as monitoring wells on off-site properties to the east.	
April 1997	14 boreholes were drilled and completed as monitoring wells on adjacent roadways	
Jul-Oct 1997	15 boreholes were drilled and completed as monitoring wells on adjacent roadways	
	pre-classification prior to remediation.	
Aug-Sep 1997	Remedial excavations were carried out on the adjacent property to the west. A Certificate of Compliance has been issued for this property. A groundwater and vapour recovery system was installed along the north, west and south boundaries of the adjacent property to the west. The recovery unit has been in operation since 1998.	
1999	Six boreholes were advanced and completed as monitoring wells on the adjacent property to the east.	
May-Jun 2001	Five USTs and three oil/water separators onsite were removed. 19 boreholes were drilled (10 completed as monitoring wells).	
Sep-Nov 2001	A remedial excavation was completed on site and on the adjacent property to the east.	
Dec 2001	Five monitoring wells were installed in the excavation backfill, four on the subject property and one on the adjacent property to the east.	

Table 1. Subsu	urface Investig	gation History
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Investigation activities indicated that the area of environmental concern (AEC) identified was the former service station located on site. The contaminants of concern (CoCs) identified were:

TECHNICAL REVIEW Request for AiP

BTEX, VPH, LEPH, HEPH and metals. It is noted that PAHs, VOCs, glycols and MTBE were not investigated in soil and were only investigated in groundwater from wells screened in the excavation backfill after completion of the remedial excavation in 2001.

O'Connor's drawing 5.13 summarizes soil chemical results for petroleum hydrocarbon parameters from the intrusive investigations. Prior to site remediation, subsurface soil contamination was generally delineated for the following CoCs: BTEX, VPH, LEPH and HEPH, with the exception of an area near the north east property boundary where vertical delineation is limited. Off-site soil contamination was observed at the roadway intersection of E. Broadway and Guelph. Additionally, several soil samples exceeded applicable standards for BTEX, VPH, LEPH/HEPH located immediately adjacent property boundaries to the north, south and west.

Soil samples collected from boreholes and analyzed for metal parameters are observed to have been completed at off site locations only. However, upon review of the samples collected from excavation walls and floors for site decommissioning and confirmatory samples collected from the remedial excavation, it is noted that on-site metal concentrations in soil are below applicable standards.

Groundwater contamination was delineated to no water use standards (O'Connor Drawing number 5.14). Groundwater contamination was generally concentrated on site near the former tank nest. However, three off site wells located at the intersection of E. Broadway and Guelph and in the lane south of the site were currently observed to exceed applicable standards. These wells include BH34, BH19 and BH20. The extent of the groundwater plume following remediation is observed to the northeast, northwest, and west below East Broadway and Guelph roadways.

Further discussion regarding subsurface contamination is provided in Section 4.

3.5 Adequacy of Detailed Site Investigation and Outstanding Issues

In general, the DSI adequately delineated petroleum hydrocarbon parameters in both soil and groundwater and provided a basis for implementation of the remediation plan. However, the DSI is deemed to be inadequate relative to the CSR section 59 and applicable guidance documents for the following reason:

• Not all PCOC were investigated at the site. MTBE, glycols, VOCs and PAH parameters were not analyzed in any soil samples collected from the site. Reference to four post remediation groundwater samples, screened within the excavation backfill provides inadequate data to support the negligible presence of these PCOC.

In addition, the following deficiency was noted:

• The presence of a water main running along Guelph Street and transecting the contaminant plume dictates additional investigation or documented evidence regarding the potential presence of COC within this utility corridor. An investigation or documented

evidence regarding the potential presence of COC in the utility corridor located in the back lane south of the site is also warranted.

4. CONTAMINATION

4.1 Soil

The contaminants of concern, degree and approximate extent of contaminated soils prior to the remedial excavation at the former service station are summarized in table 2, below.

TABLE 2: COC, degree and estimated extent of contaminated soils (prior remedial excavation)

Source	COC ^(A)	Maximum Conc. (µg/g)	Aerial Extent of Contamination ^(B) (m ²)	Depth Range of Contamination ^(C) (m)	Degree of Contamination
Former	LEPH	2,512	On Site: ~1800	0.3 to 3.7	>CL
IOL	HEPH	8,397			>CL
service	VPH	4,976			>CL
station	Toluene	314	Off Site: ~1000		>CL >HW
	Ethylbenzene	280			>CL >HW
	Xylene	1553			>CL >HW

^ANot all PCOCs were investigated, specifically PAHs, VOCs, glycols and MTBE ^B Approximate extent estimated from Drawing No. 5.13 of O'Connor's May 19, 2004 *Remediation Completion Report.*

^c Depth range indicated is meters below ground surface, as indicated by confirmatory sample depths (Drawing No. 6.5 of O'Connor's May 19, 2004 *Remediation Completion Report.*).

Maximum concentrations in soil following remedial excavation are summarized in Table 3.

Table 3. COC, degree and estimated extent of contaminated soils (post remedial excavation)

COC	Maximum Concentration (µg/g)	Depth Range of Contamination (m)	Degree of Contamination
VPH	2369	0.6	>IL/CL
LEPH	2309	1.8	
Ethylbenzene	94	1.8	
Toluene	83	1.8	
Xylene	459	1.8	

4.2 Groundwater

Several groundwater wells on site were observed to contain measurable product or exceeded the NAPL indicator standards (15 mg/L VHw 6-10 and 5 mg/L EHw 10-19). Wells observed to

TECHNICAL REVIEW Request for AiP

Page 8 Regional File: 26250-20/0075 SITE No.: 1017

exceed, generally were located on site in the location of the former UST nest. However, two monitoring wells located at the intersection of Guelph and E. Broadway (northwest of the site) and on Guelph (west of the site) were observed to exceed the no water use standards. NAPL in monitoring wells was observed to range from trace amounts to 318 mm. VHw was observed to range from 15 mg/L to 92.8 mg/L and EHw ranged from 5.7 mg/L to 32 mg/L. In addition, groundwater samples from monitoring wells BH20 and BH34 exceeded HWR Leachate Quality Standards for benzene and ethylbenzene. In October 2003, BH 20 contained concentrations of benzene at 2.9 mg/L and ethylbenzene at 0.34 mg/L and BH34 contained concentrations of benzene at 34 mg/L and ethylbenzene at 0.7 mg/L.

Concentrations of metals were monitored in several wells, however only three of those wells were located on site. For comparison purposes, metal concentrations were compared to marine AW standards. Zinc concentrations were observed to exceed marine AW standards for several wells in 2000 and a few in 2002 with concentrations ranging from 0.12 mg/L to 0.307 mg/L. In addition copper was observed to exceed marine AW standards in 2001 for one well (BH31) ranging from 0.02 mg/L to 0.05 mg/L. However, more recent sampling indicates that all current groundwater samples are below CSR AW marine standards.

4.3 Surface water

Surface water collected in catch basins, both on and off site, was not investigated. The site is paved and thus, the probability of contaminated soil influencing surface water concentrations is low.

4.4 Soil gas

Vapours were monitored in several on site wells using a GasTech Detector. Several wells around the tank nest were observed to exceed 100% of the lower explosive limit (LEL) as well as monitoring wells located in Guelph and East Broadway streets.

5. SITE REMEDIATION

5.1 Site Remediation Plan

The remedial activities completed on the site include:

- Bailing of NAPL from wells on a weekly basis from August 1998 to December 1998 and from April 1999 to June 1999.
- Removal of four 22 700 L USTs and a 2270 L UST, two pump islands, two oil/water separators and a three bay service garage and car wash facilities. Select soil samples from the excavation walls and floors were collected for analyses of BTEX, VPH, LEPH/HEPH (without correction for PAH) and metals.
- Excavation of an approximate 1800 m² area (the entire area of the site) and 50 m² off site area located on the adjacent property to the east. The excavation depth ranged from 2.7 to 4.5 m depth. Select soil samples for confirmatory analyses (sampled based on an

approximate 3 m by 3 m grid) were analyzed for BTEX, VPH, LEPH/ HEPH (without correction for PAH) and metals. Additional soil samples were collected from the imported backfill and analyzed for potential contaminants of concern.

- Removal, treatment and disposal by permit of groundwater entering the excavation.
- Installation of a liner along the north, west and south property boundaries to prevent recontamination of backfill.
- Post remedial groundwater monitoring.

Confirmatory sampling indicates soil contaminated with toluene, ethylbenzene, xylene, VPH and LEPH exceeding IL standards remain along the excavation walls at north, south and western property boundary. Highest concentrations observed are as follows: 83 μ g/g toluene, 94 μ g/g ethylbenzene, 459 μ g/g xylene, 2369 μ g/g VPH and 2309 μ g/g LEPH (no correction). Post remedial sampling from four wells located on site indicates that groundwater on site is below the CSR no water use standards. The remaining off-site soil and groundwater contamination is proposed to be remediated using monitored natural attenuation (MNA) processes and risk management.

5.2 Monitored Natural Attenuation Plan

The City of Vancouver and IOL have yet to come to an agreement regarding active remedial measures for the remaining contamination below the roadways. As a result, IOL is proposing MNA as a remedial alternative for the interim. The original MNA plan was proposed in a remediation plan completed in 1999. Supplemental information to this plan is provided as a response to the Ministry's request that IOL provide confirmation that subsurface conditions present within the roadways are conducive to MNA.

Supplemental information given in the recent submission indicates that, in general, BTEX, LEPHw and VHw concentrations in groundwater from off site wells are decreasing with time. Variability in contaminant concentration is noted in the most contaminated off-site well BH34, thereby increasing the difficulty in trend analyses for this well. Calculated assimilative capacities are observed to be low in the core of the plume. Dissolved oxygen concentrations remain low, despite the presence of a nearby pump and treat system operated by IOL on the property west of the site. However, the contaminant plume appears to be stable and decreasing trends are noted. Based on assimilative capacities provided in the appendix, it is estimated that the contaminant plume will take decades to remediate. As the no water use standard is anticipated to be applicable for current and future site and off site use, the length of remediation time is not an essential consideration. Enhancement of biodegradation rates via the introduction of oxygen in the aquifer (e.g. addition of hydrogen peroxide or performing air sparging) are to be considered subject to approval by the City of Vancouver.

Page 10 Regional File: 26250-20/0075 SITE No.: 1017

A screening level risk assessment (see section 5.3) indicated that the only active pathway to human or ecological receptors would exist for construction workers during off site redevelopment (need RA review).

Semi annual on-going monitoring and sample analyses in select groundwater wells are proposed. The proposed frequency of MNA performance assessment is once every 10 years. However, no specific details are provided.

5.3 Risk Management

Did not investigate vapour concentrations??- Send to Colm for review

5.4 Adequacy of Site Remediation Confirmation and Outstanding Issues

The Remediation Confirmation report was deemed inadequate based on the following noted deficiencies:

• Not all PCOC were investigated in the PSI and DSI at the site, specifically, PAH parameters, VOCs, glycol and MTBE. As such, select confirmatory samples should have been analyzed for these PCOC to rule out the possible existence in remaining soils on site.

6. Human Health and Ecological Risk Assessment

6.1 Overview

Hydrocarbon contamination from the former service station have leached under adjacent city property (roadways). A screening level ecological and human health risk assessment (SLHHERA) was conducted by O'Connor Associates in response to the BCMWLAP letter dated Nov. 23, 2001; and was received July 14, 2004.

6.1.1 Document Reviewed

The following document was reviewed for the HHERA:

• Risk Assessment Former Service Station 452 East Broadway. Vancouver, British Columbia. O'Connor Associates Environmental Inc., May 19, 2004.

6.1.2 Site Setting

The management areas included in the HHERA are immediately adjacent to the IOL property, and are generally paved. These include: the lane south of the site, Guelph Street to the west, East Broadway to the north, and the Teamsters property (commercial) to the east. Several

unpaved areas and landscape portals covered with grass, shrubs and trees are located on the sidewalk immediately north, and west of the IOL property.

6.1.3 Contamination

6.1.3.1 Soil

At the completion of remedial excavation activities, there were petroleum hydrocarbon concentrations in soil exceeding the IL standards beneath East Broadway, Guelph Street, and the north side of the lane on the south side of the IOL property at depths of 0.3 to 3.7m below grade. Additionally, exceedances of IL standards for xylenes, VPH, and LHc10 were observed underneath the intersection of Guelph St. and East Broadway (BH34) at a depth of 1.2m.

6.1.3.2 Groundwater

Two monitoring wells, (BH34 Northwest of the site, and BH19 West of the site) exhibited exceedances of the no water use standards. At BH19, NAPL ranged from 1 - 318mm in thickness, and VHw₆₋₁₀ ranged from 3.2 - 93 mg/L. At BH34 VHw₆₋₁₀ ranged from <20 to <90 between 1997 and 2003.

6.2 Human Health Risk Assessment

6.2.1 Problem Formulation

<u>COPCs</u> Soil

- toluene, ethylbenzene, xylenes, VPH, LEPH, HEPH
- Groundwater VHw₆₋₁₀, EHw₁₀₋₁₉
- Vapour None identified

Note: in previous site assessment documents PAHs were included as PCOCs. The HHERA does not contain a rational for not carrying PAHs forward in the risk assessment process.

<u>ROPCs</u>

Potential receptors of concern were identified as residents living in residential buildings with basements located south, southeast, and southwest of the site.

Residents	In buildings with basements located south, southeast, and southwest of the site.
Workers	In commercial establishments to the east, west (across Guelph St.) and north (across East Broadway).

Exposure Pathways

No exposure pathways were considered for the HHRA for two reasons.

- Existing contamination in soil and groundwater is located beneath paved roadways, hence exposure pathways such as vapour inhalation, uptake by consumption of garden produce and direct contact are not applicable.
- Potable water is provided from a distant municipal supply, exposure from groundwater ingestion were considered not applicable.

Note: In section 3.13, O'Connor Associates states that vapour concentrations in boreholes have either remained stable at 1% of the lower explosive limit (LEL) or decreased to less than 1% LEL; however this is not reflected by the data provided for subsurface vapour concentrations (tables 1.4 and 1.5), where a significant proportion of boreholes exhibit >100% LEL in their most recent samples (April, 2004).

6.2.2 Exposure Assessment

An exposure assessment was deemed unnecessary as all exposure pathways were considered inactive for human receptors.

6.3 Ecological Risk Assessment

No unacceptable risks to ecological receptors were identified due to their absence (this is an urban area) and lack of a pathway (contaminated soil and groundwater is largely covered by asphalt). A memorandum by Arbortech Consulting Ltd. (included) determined that the rooting depth of trees in vegetated areas is likely 0.4m at most, while the (contaminated) groundwater table ranged from a depth of 1.3 - 6.3m below grade.

Three supplemental soil test holes were sampled in vegetated areas to the northeast, and west of the IOL site. BTEX, VPH, LEPH, and HEPH concentrations were all lower than detection limits.

No unacceptable risks to ecological receptors were identified as all soil and groundwater pathways were deemed inoperable.

Depending upon the nature and extent of residual contamination, the recommendations of the risk assessment will include a range of risk management requirements. These could include a reassessment of the risk assessment assumptions prior to any future development, additional monitoring, registration of a restrictive covenant or financial security.

7. RECOMMENDATION

Option 1: Issuance of AiP not Recommended

Issue a letter to the applicant indicating that the DSI and Remediation Plan were deficient and the following outstanding issues should be identified:

• Evidence is required that the following potential contaminants of concern in soil are not considered contaminants of concern both on and off site: MTBE, PAH, glycols and VOCs.

Page 13 Regional File: 26250-20/0075 SITE No.: 1017

- Due to the presence of a water main transecting the contaminant plume, further evidence is required regarding the potential presence of contaminants of concern along the Guelph Street utility corridor is required. Evidence regarding the potential presence of contaminants of concern in the utility corridor located in the back lane of the site is also warranted.
- Specific details regarding select groundwater wells and chemical analyses for the ongoing monitoring program are required.

The letter shall state that these issues must be addressed before the screening level risk assessment will be reviewed and approval in principal issued.

Once the deficiencies have been addressed, issue approval in principle. In addition to the standard terms and conditions in schedule "B" to the approval in principle, the following shall be included:

- MNA re-assessment (proposed after 10 years of groundwater monitoring) must be submitted to the ministry for review.
- Any changes in land or groundwater use in the future must be reported to the ministry.
- Any significant increase in COC concentrations in groundwater wells located near the source or outside of the original plume boundary must be reported to the ministry.
- The pump and treat system located to the neighbouring property significantly affects groundwater levels and potentially affects contaminant degradation rates. Quarterly sampling and monitoring is required two years after system termination. At which point re-evaluation of natural attenuation processes and degradation rates will be required.
- PPE provision for construction workers who may need to excavate in the street? RA

This technical review is based on the most recent information provided to the ministry regarding the indicated site. The ministry, however, makes no representation or warranty as to its accuracy or completeness. The ministry expressly reserves the right to change or substitute different requirements where circumstances warrant.

Prepared by:

Lavinia Zanini, M.Sc., P.Geo. Senior Contaminated Sites Officer TECHNICAL REVIEW Request for AiP Page 14 Regional File: 26250-20/0075 SITE No.: 1017

Prepared by:

Reviewed by:

TECHNICAL REVIEW Request for a Certificate of Compliance

March 20, 2007

Victoria File No.: 26250-20/0075 SITE No.: 1017

1. BACKGROUND

1.1 Application Details

An application for the review of a Detailed Site Investigation (DSI) and Confirmation of Remediation report in order to obtain a Certificate of Compliance was received from O'Connor Associates Environmental Inc (O'Connor) on July 14, 2004. The application was made on behalf of Imperial Oil Limited.

1.2 Site Details

Civic Address:	490 East Broadway, Vancouver, BC
Registered Owner:	Teamsters Building Limited
Legal Description:	Part of Lot A, Blk 124, Plan 14708, District Lot 264A, New Westminster Land District
PID/PIN:	007-754-523

Latitude: 49° 15' 48.8" Longitude: 123° 05' 40"

1.3 Applicable Legislation

The applicable statute is the *Environmental Management Act* (EMA). Applicable regulations are the Contaminated Site Regulation (CSR) and the Hazardous Waste Regulation (HWR).

1.3.1 Applicable Standards/Criteria

The applicable soil standards for the Teamsters property are the CSR standards for commercial land use (CL). Applicable soil standards for roadways are the CSR standards for industrial land use (IL). Additionally, HWR standards apply at all locations. Mandatory site specific factors include *toxicity to soil invertebrates and plants* and *intake of contaminated soil*.

The nearest surface water body is False Creek located 1.2 km north-west of the Site. Municipal water supply is provided to residences and businesses in the area and no other water uses were identified in the vicinity of the Site. Therefore, no schedule 6 water use standards apply to groundwater at the Site. HWR leachate quality standards apply to groundwater and mandatory groundwater standards also apply.

Page 2 Victoria File No.: 26250-20/0075 SITE No.: 1017

1.4 Documents Reviewed

The following report was provided with the application, and reviewed in support of the subject request:

• Detailed Site Investigation and Remediation Completion Report for 490 East Broadway Located Adjacent to Former Imperial Oil Service Station at 452 East Broadway in Vancouver, British Columbia, Project Number R02502, O'Connor Associates Environmental Inc, May 19, 2004.

This review has also considered additional information provided in previous technical reports and the following reports submitted to the Ministry:

- 452 East Broadway, Vancouver, BC, Site Investigation Order, BC Environment File No. OS-15133, O'Connor Associates Environmental Inc., February 27, 1998.
- Remediation Completion Report, for 452 East Broadway Vancouver, British Columbia, Project Number R0252, O'Connor Associates Environmental Inc., May 19, 2004.

2. SITE DESCRIPTION

2.1 Site Location and General Description

The Site comprises an approximate 2700 m^2 (0.27 ha) area, located on the southwest corner of East Broadway and St. George Street in Vancouver BC. It is rectangular in shape, with overall dimensions of approximately 35 m by 77 m.

The existing building on Site is a three story, above grade development containing commercial offices. An open above ground parkade exists on the ground floor in the western portion of the building.

The adjacent land use is commercial to the north and west, residential and commercial to the east and residential to the south. The site is located east of the Imperial Oil Limited property (the applicants) that operated a service station from 1955 to 1995.

2.2 Topography and Stratigraphy

The Site grade is fairly level with a gentle slope to the north and northeast. Precipitation is currently collected by onsite and offsite catch basins, as the entire area of the Site is either paved or occupied by the building.

Page 3 Victoria File No.: 26250-20/0075 SITE No.: 1017

The following generally describes Site stratigraphy:

SAND FILL – approximately 0 m to 0.5 m, contains some gravel SILT – approximately 0 m to 2 m, contains ~50% sand SAND – approximately 2 m to 5 m, contains ~20% silt SILT – greater than 5 m depth, trace organics

No testing was completed to determine the hydraulic conductivity of the hydrostratigraphic units.

2.3 Surface Water and Groundwater

The nearest surface water body is False Creek, located approximately 1.2 km located northwest of the Site.

Groundwater levels were measured in wells across the Site, in monitoring events between January 1991 and September 2001. During these events, groundwater was encountered at depths ranging from approximately 0.8 m to 2.5 m below grade. These water levels indicate that shallow groundwater is present within the native silt and sand units. Based on water levels measured (September 2001) the groundwater flow direction was to the southeast. Based on topography, the regional groundwater flow is inferred to be to the northwest toward False Creek.

Groundwater velocities were not provided.

3. SITE INVESTIGATIONS

3.1 Investigation History

Previous investigations at the Site included the drilling of one borehole completed as a monitoring well located in the northwest corner of the property. The presence of NAPL was noted in this well. It was inferred that NAPL originated from the adjacent IOL service station. Additional investigations were conducted to delineate any groundwater and soil contamination in the vicinity of this well and along the property boundary with the former service station.

3.2 Stage 1 Preliminary Site Investigation (PSI)

The current DSI includes the key report deliverables for a Stage 1 and 2 PSI and is summarized in section 3.3. O'Connor also refers to a PSI written for the adjacent IOL property dated 1998-02-27 (summarized below).

Page 4 Victoria File No.: 26250-20/0075 SITE No.: 1017

The following was taken from a technical review for the Imperial Oil Service Station Site located adjacent the Teamsters building site (also listed under Site# 1017), prepared by V. Hanemeyer on November 21, 2001.

"O'Connor Associates Environmental Inc. (O'Connor) completed the Stage 1 PSI as part of the requirement of site investigation order OS-15133. O'Connor reviewed land title records, aerial photographs, municipal directories, and carried out site reconnaissance to determine industrial and commercial activities on-site and on adjacent properties. A service station operated on the IOL property from 1955 until decommissioning in June 2001. O'Connor identified the following land uses with potential to contribute to site contamination and the associated potential contaminants of concern for each:

 On-site service station including a gasoline spill that occurred on-site in 1985 (BTEX, VPH, LEPH, HEPH and PAHs);

No potential off-site sources of contamination were identified. A Stage 1 PSI prepared by Integrated Resource Consultants Inc. (IRC) for SITE 3351 (418 E Broadway – CoC issued) generally confirms this assessment."

3.3 Stage 2 and Detailed Site Investigations

The potential area of environmental concern (APEC) identified in the DSI and Remediation Completion Report is the location of a former gasoline service station adjacent the subject site that operated from 1955 to 2001. The PCOCs for the service station include: BTEX, VPH, LEPH, HEPH, PAHs, VOCs, metals, glycols and MTBE. APECs were not identified with respect to operations on the Teamsters Property.

A search of the Provincial Site Registry database, conducted on 2002-12-16 identified 27 sites within a 0.5 Km radius of the IOL property (located next to the Teamsters Property). Of the 25 sites, the closest currently active site to the teamsters property is the IOL former service station. The remaining active sites were located over 100 m away from the subject property.

Soil and groundwater conditions on the Site were evaluated during intrusive and remedial investigations. These intrusive investigations were completed by O'Connor, between 1997 and 2001 and included:

- drilling of boreholes, all of which were completed as monitoring wells;
- soil sampling and analyses;
- groundwater monitoring, sampling and analyses; and

Page 5 Victoria File No.: 26250-20/0075 SITE No.: 1017

providing field QA/QC procedures

In general, the sampling locations completed are considered to be adequate to evaluate the presence of several relevant PCOCs at the sole APEC. However, analyses were not completed for soil and groundwater on Site for the following PCOCs: MTBE, VOCs, PAHs and glycols. O'Connor states that "confirmatory analyses conducted on IOL property (see DSI and the report for the IOL property dated 2004-04-21) indicated that other PCOCs such as VOCs, PAH, MTBE and glycols met the investigative standards and were not further pursued." Upon review of the report, it is noted that PAH, VOC, MTBE and glycol analyses were completed post excavation (2003) for groundwater samples at four wells located on the IOL neighbouring property. These wells are screened within the excavation backfill. No soil samples on and off site were analyzed for these PCOCs.

The analytical results from these investigations, and the remediation program, indicated that there was one Area of Environmental Concern (AEC) related to the presence of the former service station immediately adjacent (west) of the Site. The AECs are shown on O'Connors Drawing no. 2.2.

Investigations to date indicated the presence of NAPL in monitoring well PGL-1 ranging from 0 mm to 48 mm measured between 1996 to 2002. None of the soil samples collected from delineation boreholes exceeded CSR CL standards for BTEX, VPH, LEPH /HEPH (uncorrected) and metals. None of the groundwater samples collected exceeded the no water use standard for BTEX, VPH, LEPH/HEPH (uncorrected) and metals. A discussion on subsurface contamination is provided in Section 4.

3.4 Adequacy of the PSI / DSI

The intrusive investigations were deemed to be <u>inadequate</u> to address the requirements of a Stage 1 and 2 PSI and DSI, as outlined in Sections 58 and 59 of the CSR and applicable guidance documents. Specifically, not all PCOCs were sufficiently characterized. MTBE, glycols, VOCs and PAH parameters were not analyzed in soil samples on Site. Reference to four post remediation groundwater samples, screened within the excavation backfill and located on the adjacent property provides inadequate data to support the negligible presence of these PCOCs on the Site.

4. CONTAMINATION

4.1 Soil

Based on the results of the investigations, one AEC was identified. The contaminants of concern, degree and approximate extent of contaminated soils at this AEC are summarized in table 1, below.

TABLE 1: AEC, COC's, degree and estimated extent of contaminated soils

AEC	Source of Contamination	Contaminants of Concern ^(A)	Aerial Extent of Contamination ^(B) (m ²)	Depth Range of Contamination ^(C) (m)	Degree of Contamination
1	Former Adjacent IOL service station	Ethylbenzene Xylene VPH	48	2.1	> CL < HW

^ANot all PCOCs were investigated, specifically PAHs, VOCs, glycols and MTBE ^B Approximate extents estimated from Drawing No. 5.4 of O'Connor's May 19, 2004 *Detailed Site Investigation and Remediation Completion Report.*

^c Depth range indicated is metres below ground surface, as indicated by confirmatory sample depths (Drawing No. 6.2 of O'Connor's May 19, 2004 *Detailed Site Investigation and Remediation Completion Report*).

4.2 Groundwater

Investigations to date indicated the presence of NAPL in monitoring well PGL-1 ranging from 0 mm to 48 mm measured between the years 1996 to 2002. However, since 1999 0 mm to trace amounts of NAPL were noted in this location. None of the groundwater samples collected exceeded the no water use standard for BTEX, VPH, LEPH/HEPH and metals. For comparison purposes, benzene and VPHw, and LEPHw were historically noted at concentrations greater than the marine AW standard at three monitoring well locations. However, in most recent sampling events, the groundwater quality met the marine AW standards at all locations.

5. SITE REMEDIATION

5.1 Overview

Page 7 Victoria File No.: 26250-20/0075 SITE No.: 1017

Site remediation objectives included the following:

- Excavation of contaminated soil;
- Placement of a 10 mil Arctic Liner along the north edge of the property;
- Removal of groundwater entering the excavation; and
- Collection and analyses of confirmatory samples to adequately assess the effectiveness of remediation.

5.2 Physical Removal of Contamination (Remediation to Numerical Standards)

Contaminated soils in the vicinity of monitoring well PG-1 were excavated, and taken offsite for disposal at appropriately permitted facilities. Approximately 170 m³ of contaminated soil was removed. The excavation coincided with the removal of contaminated soils on the neighbouring IOL property and extended to a maximum of 3.5 m depth. The limit of the excavation extended along the property boundary to the north. With the exception of soil samples collected from the north face of the excavation, all confirmatory samples suggest that there are no residual contaminated soils on Site. Ethylbenzene, xylenes and VPH remain along the north property excavation limit at concentrations greater than CL standards at the following concentrations: 21 µg/g - 29 $\mu g/g$ (ethylbenzene), 152 $\mu g/g$ - 238 $\mu g/g$ (xylene) and 245 $\mu g/g$ - 393 $\mu g/g$ (VPH). None of the confirmatory samples were analyzed for PAH parameters. Following the excavation, an Arctic liner (10 mil) was installed along the north property line and extended approximately 2 m along the eastern excavation limits. The liner was installed to prevent potential recontamination of the excavated area by soil impacts present beneath the sidewalk of East Broadway. Small quantities of groundwater entering the excavation were treated and discharged by permit. Imported fill was analyzed and met regulatory standards for BTEX, VPH, LEPH/HEPH (uncorrected) and metals.

The extent of the remedial excavation and locations of confirmatory samples are shown in Drawing No. 6.2 of O'Connor's DSI and Remediation Completion Report.

5.3 Post Remedial Groundwater Monitoring

Post remedial activities on the Site included the drilling of one borehole, completed as a monitoring well, in the excavation backfill. Post remediation groundwater quality indicates that BTEX, VPH and LEPH/HEPH were below detection limits.

5.4 Adequacy of the Remedial Plan

The remedial plan was deemed to be <u>inadequate</u> to confirm that all contaminated soils have been removed from the Site. The following specific deficiency is noted:

Page 8 Victoria File No.: 26250-20/0075 SITE No.: 1017

 Insufficient data is provided to confirm that the following PCOCs: PAHs, VOCs, glycols and MTBE, are not considered COCs and that soils potentially containing these PCOCs have been removed or remediated.

6. SUMMARY ASSESSMENT AND RECOMMENDATION

The investigation and confirmation of remediation data appear to be inadequate to characterize subsurface contamination.

Conclusion: <u>Reports are deficient</u>

Based on the report deficiencies, it is recommended that the Ministry issue a letter to the proponent indicating the following, while allowing for a response:

 Data provided is insufficient to support the conclusion that the potential contaminants of concern (specifically PAHs, MTBE, VOCs and glycols) are not considered contaminants of concern in soil. Additional data and/or information are required to adequately confirm that soil remaining on Site is not contaminated with these PCOCs.

7. CLOSURE

This technical review is based on the most recent information provided to the ministry regarding the indicated site. The ministry, however, makes no representation or warranty as to its accuracy or completeness. The ministry expressly reserves the right to change or substitute different requirements where circumstances warrant.

Page 9 Victoria File No.: 26250-20/0075 SITE No.: 1017

Prepared by:

Lavinia Zanini, M.Sc., P.Geo. Senior Contaminated Sites Officer

Approved by:

Glenn Harris, <mark>Ph.D., ???.</mark> RA Manager??



March 22, 2007

Regional File: 26250-20/0075 Site ID: 1017

Imperial Oil Ltd. Products and Chemicals Division Marketing Engineering Services Suite 405, 5945 Kathleen Avenue Burnaby, BC V5H 4J7 Fax: 604-451-1347

Attention: Linda Eastcott

Dear Ms. Eastcott:

Re: Remediation Completion Report for 452 East Broadway in support of an Approval in Principal

The Ministry of Environment has completed an initial review of your submission application¹ for a Certificate of Compliance for the above referenced site.

Please be advised that the following issues were identified during the review:

• Evidence is required that the following potential contaminants of concern in soil are not considered contaminants of concern both on and off site: MTBE, PAH, glycols and VOCs.

¹ Remediation Completion Report for 452 East Broadway, Vancouver British Columbia, Project No. R02502, Volumes I and II. O'Connor Associates Environmental Inc., May 19, 2004.

Letter dated June 7, 2004 to Ms. Eastcott of Imperial Oil from O'Connor Associates Environmental Ltd. Re: Kingsgate Esso, 452 East Broadway Street, Vancouver, British Columbia, Location No. 990252 (SAP No. R02502.

- Due to the presence of a water main transecting the contaminant plume, further evidence is required regarding the potential presence of contaminants of concern along the Guelph Street utility corridor is required. Evidence regarding the potential presence of contaminants of concern in the utility corridor located in the back lane of the site is also warranted.
- Specific details regarding reporting timelines, select groundwater wells and chemical analyses for the on-going monitoring program are required.

Resolution of these issues is required before the risk assessment can be reviewed and an Approval in Principal issued for the site.

Please provide supplemental information to address the above issue so that it may be considered as part of the final review.

If you have any questions regarding this letter, please do not hesitate to contact the undersigned at (604) 582-5348.

Sincerely,

Lavinia Zanini, M. Sc., P.Geo. Senior Contaminated Sites Officer

cc: Vijay Kallur, O'Connor Associates Environmental Inc. *Fax: 604.513.1140* Glenn Harris, MoE Victoria



May 26, 2014

Regional File: 26250-20/0075 Site ID: 1017

Imperial Oil Ltd. Products and Chemicals Division Marketing Engineering Services Suite 405, 5945 Kathleen Avenue Burnaby, BC V5H 4J7 Fax: 604-451-1347

Attention: Linda Eastcott

Dear Ms. Eastcott:

Re: Detailed Site Investigation and Remediation Completion Report for 490 East Broadway in support of a Certificate of Compliance

The Ministry of Environment has completed an initial review of your submission application¹ for a Certificate of Compliance for the above referenced site.

Please be advised that the following issue was identified during the review:

• Data provided is insufficient to support the conclusion that the potential contaminants of concern (specifically PAHs, MTBE, VOCs and glycols) are not considered contaminants of concern in soil. Additional data and/or information are required to adequately confirm that soil remaining on site is not contaminated with these potential contaminants of concern.

Resolution of this issue is required before a Certificate of Compliance can be issued for the site.

¹ Detailed Site Investigation and Remediation Completion Report for 490 East Broadway Located Adjacent to Former Imperial Oil Service Station at 452 East Broadway in Vancouver, British Columbia, Project Number R02502, O'Connor Associates Environmental Inc, May 19, 2004.

Please provide supplemental information to address the above issue so that it may be considered as part of the final review.

If you have any questions regarding this letter, please do not hesitate to contact the undersigned at (604) 582-5348.

Sincerely,

Lavinia Zanini, M. Sc., P.Geo. Senior Contaminated Sites Officer

cc: Vijay Kallur, O'Connor Associates Environmental Inc. *Fax: 604.513.1140* Glenn Harris, MoE Victoria From:Kickham, Peter ENV:EXSent:Tuesday, May 27, 2008 4:52 PMTo:'greg-sutherland@oconnor-associates.com'; 'jerry-naus@oconnor-associates.com'Subject:452 East BroadwayHi Greg and Jerry,

I spoke with Doug and Colm Condon regarding the analytes that should be included in any vapour assessment at 452 East Broadway and they referred me to section 6.1 of the Interim Guidance for Site Vapour Assessment as follows:

6.1 Sites where the concentration of any volatile or semi-volatile substance in soil or groundwater exceeds CSR numerical standards:

- If you have an approved remediation plan that addresses the vapour pathway, you should follow that plan or this interim guidance.
- If you do not have an approved remediation plan that addresses the vapour pathway, you should conduct your vapour assessment in accordance with this interim guidance.

The Interim Guidance document is located at: http://www.env.gov.bc.ca/epd/remediation/guidance/interim/site_vapour.pdf

As IOL does not currently have an approved remediation plan that addresses the vapour pathway at this site, the vapour assessment would have to be conducted in accordance with today's guidance, and not the industry standard for the time (2004).

Incidentally, I also spoke with John Ward regarding the long-term liability of sites that have been issued a conditional certificate. He is aware of the issue, and has in fact been speaking with regulators from other levels of government, and other jurisdictions to see if and how the issue has been handled. The relevant section of the EMA is section 46(1m).

He also pointed out the Land Remediation Contact page with a list of who to contact for specific contaminated sites questions. The list can be accessed through the following link: http://www.env.gov.bc.ca/epd/remediation/contact.htm

Don't hesitate to contact me if you have any questions, however Colm Condon will likely be a better contact for specific questions pertaining to the interim vapour guidance.

Regards,

Peter Kickham

Risk Assessment Officer Land Remediation Section BC Ministry of Environment 200 - 10470 - 152 Street Surrey, BC, V3R1E1 P: 604.582.5308 peter.kickham@gov.bc.ca

ENVIRONMENTAL	MANAGEMENT
BRAN	CH



OCT 1 1 2012 SITE RISK CLASSIFICATION REPORT Environment RECEIVED

Land Remediation Section PO Box 9342 Stn Prov Govt Victoria B.C. V8W 9M1 Telephone: (250) 387-4441 Fax: (250) 387-8897 E-mail: site@gov.bc.ca

Instructions

You must complete and sign the following Site Risk Classification Report form and send it to the Ministry of Environment when required under Protocol 12, "Site Risk Classification, Reclassification and Reporting." That document appears on our website at: <u>http://www.env.gov.bc.ca/epd/remediation/policy_procedure_protocol/protocols/pdf/protocol12-final.pdf</u>.

Where to send Site Risk Classification Reports for source parcels

Notifications of Independent Remediation and Offsite Migration

Site Risk Classification Reports which are required to be submitted with a Notification of Independent Remediation initiation or Notification of Likely or Actual Offsite Migration must be sent at the time those forms are submitted, to:

Director of Waste Management c/o Site Information Advisor Ministry of Environment PO Box 9342 Stn Prov Govt Victoria, B.C. V8W 9M1

Fax (250) 387-8897 E-mail: <u>Advisor.SiteInformation@gov.bc.ca</u>

Required or ordered site investigations¹

Site Risk Classification Reports which are required to be submitted in response to a requirement or order for a site investigation report by the Director must be sent at the time the site investigation report is submitted, to:

Director of Waste Management c/o Site Profile Administration Ministry of Environment #200 - 10470 - 152nd Street Surrey BC V3R 0Y3

Fax (604) 584-9751 E-mail: <u>siteprofiles@gov.bc.ca</u>

Contaminated Sites Service Applications

Site Risk Classification Reports which are required to be submitted with an application to the Director of Waste Management for a contaminated sites service must be sent with the Contaminated Sites Service Application form to:

Director of Waste Management c/o Client Information Officer Ministry of Environment PO Box 9342 Stn Prov Govt Victoria, B.C. V8W 9M1

Fax (250) 387-8897 E-mail: <u>csp_cio@Victoria1.gov.bc.ca</u>

Site Risk Classification Reports Required by a Director

Site Risk Classification Reports which are required to be submitted directly to a Director of Waste Management must be sent by the time the Director has specified, to:

Director of Waste Management c/o Site Risk Classification Administration Ministry of Environment #200 - 10470 - 152nd Street Surrey BC V3R 0Y3

Fax (604) 584-9751 E-mail: <u>SiteClassification@gov.bc.ca</u>

Where to send Site Risk Classification Reports for neighbouring parcels

Site Risk Classification Reports which are submitted in relation to potential or high risk conditions at a neighbouring parcel or area indicated in the Site Risk Classification Report submitted to the Director of Waste Management for a source parcel must be submitted to the Director to the applicable address, fax number or e-mail address above, with the Site Risk Classification Reports for the source site.

¹ This category includes all site investigations required subsequent to the submission of a site profile (including local government release requests) as well as those site investigations required or ordered by the Director separate from the site profile process.

For further information regarding site risk classification, please refer to Fact Sheet 45, "Site Risk Classification" (available at: <u>http://www.env.gov.bc.ca/epd/remediation/fact_sheets/</u>) or e-mail us at <u>SiteClassification@gov.bc.ca</u>.

Page 44

Version 1.0



SITE RISK CLASSIFICATION REPORT

Land Remediation Section PO Box 9342 Stn Prov Govt Victoria B.C. V8W 9M1 Telephone: (250) 387-4441 Fax: (250) 387-8897 E-mail: site@gov.bc.ca

Submission of this report is required by Protocol 12, "Site Risk Classification, Reclassification and Reporting" under the Environmental Management Act.

Part 1. Land, owner and agent information

Section I Land Description	on and a second s
Site ID Number (if known) 1017
PIC	014-828-120,014-828-138, or PIN
Legal Description	Lot 1-3, Block 124, Plan 1771, District Lot 264A, New Westminster Land District, 5655-2040
Latitude	e Degrees ⁴⁹ Minutes ¹⁵ Seconds 43.90
Longitude	e Degrees -123 Minutes 5 Seconds 40.00
Site Civic Address	s Street 452 East Broadway
	City Vancouver Postal Code V5T 1W9
Section II Property Owner	and/or Operator (if applicable)
Name	Imperial Oil Limited
Address	Street #405 Metrotown Place III, 5945 Kathleen Avenue
	City Burnaby Province/State BC
	Country Canada Postal /Zip Code V5H 4J7
Phone	e 604-451-5517 Fax 604-451-1347
Section III Environmental	Consultant / Contractor / Agent Contact (if applicable)
Name	O'Connor Associates Environmental Inc., a Parsons Company
Address	Street 19890 92A Avenue
	City Langley Province/State BC
	Country Canada Postal /Zip Code V1M 3A9
Phone	604-513-1000 Fax 603-513-1040

Part 2. Site risk classification notification triggers



2. Are upper cap concentrations exceeded?	Soil and Groundwater: No yes Xno Vapour: Not Assessed
If yes, what substances exceed upper cap conce	entrations, in what media?
 Exposure pathways – are the risk criteria for any If yes, which exposure pathways indicate high ris 	exposure pathway exceeded? yes no
Section VII Onsite site risk classification	
high risk not high Note that for sites for which there is insufficie the scheduled dates for completion of site in	risk Pending completion of vapour assessment ent information to determine the site risk classification, information on vestigations must be provided in Part 2 of this report.

Part 4. Independent remediation status

Section VIII Onsite independent remediation			
Has independent remediation been initiated at the site? Will the independent remediation of high risk conditions be cor If independent remediation of high risk site conditions is bein Director must be provided a revised site classification report the 90 th day of independent remediation.	mpleted within 90 days? g carried out and is not cor and an updated completior	yes yes pleted within of remediati	no no N/A n 90 days the ion schedule at
Part 5. Offsite conditions			
Section IX Offsite high risk conditions details			
1. Is mobile NAPL present or likely present offsite?	yes	likely	No

If yes or likely, describe the mobile NAPL substances and their general location.

2. Are upper cap concentra	tions exceeded or likely exceeded	l offsite?	yes	likely	no
If yes or likely, what subs City of Vancouver roadways: VHw6-10 in	stances exceed or are likely to exc groundwater in excess of 15000 ug/L. Vapours no	ceed upper cap conce t yet assessed.	entration	s, and in wha	t media?
· · · · · · · · · · · · · · · · · · ·					
3. Are high risk exposure p	athways present or likely present of	offsite?	yes	likely	XIno
If yes or likely, list the ex Pathway Questionnaire.	posure pathways which impact or	r are likely to impact o	offsite re	ceptors. Attac	h Exposure
	ан на 1999 година и стати и ст				
		······································			
4. Are any offsite parcels cla	ssified as high risk or likely classifie	ed as high risk?		yes	no
If yes, list the following fo	r each offsite parcel	Pending co	mpletic	on of vapou	r assessment
Site ID (if known)	Offsite parcel owner	Civic Add	lress		
I					

Part 6. Signatures

Section X Professional signatures	
J.	aus
I confirm that the investigations referred to above have been co guidance and standard professional practice. I confirm the abov Questionnaire, if attached, to be true, based on current knowled	nducted in accordance with approved procedures and re information and that provided on the Exposure Pathway lige as of the date completed.
I confirm that I have demonstrable experience in conducting invo	estigations of the type reviewed above.
JERRY NAUS	12-10-09
/ Print Name	Date completed (yy-mm-dd)

Send the completed Site Risk Classification Report to the Director of Waste Management at the applicable address, fax number or e-mail address noted on the cover sheet to this Report.

5

BRITISH COLUMBIA	Ministry of	EXPOSURE PA	ENVIRONMENTAL MANAGEMENT BRANCH THWAYTQUESTIONNAIRE	Land Remediation Section PO Box 9342 Stn Prov Govt Victoria B.C. V8W 9M1 Telephone: (250) 387-4441 Fax: (250) 387-8897
The Best Place on Earth	Environment		RECEIVED	E-mail: site@gov.bc.ca

Instructions

You must complete and sign the appended Exposure Pathway Questionnaire and send it to the Ministry of Environment when required under Protocol 12, "Site Risk Classification, Reclassification and Reporting." That document appears on our website at: <u>http://www.env.gov.bc.ca/epd/remediation/policy_procedure_protocol/protocols/pdf/protocol12-final.pdf</u>.

Exposure Pathway Questionnaires are required to be submitted only when upper cap concentrations of substances are exceeded at a site and there is a trigger to submit a Site Risk Classification Report to the Director of Waste Management. Attach your completed Exposure Pathway Questionnaire to the applicable Site Risk Classification Report and send it with the Site Risk Classification Report to the Director as follows:

Where to send Site Risk Classification Reports for source parcels

Notifications of Independent Remediation and Offsite Migration

Director of Waste Management c/o Site Information Advisor Ministry of Environment PO Box 9342 Stn Prov Govt Victoria, B.C. V8W 9M1

Fax (250) 387-8897 E-mail: <u>Advisor.SiteInformation@gov.bc.ca</u>

Required or ordered site investigations¹

Director of Waste Management c/o Site Profile Administration Ministry of Environment #200 - 10470 - 152nd Street Surrey BC V3R 0Y3

Fax (604) 584-9751 E-mail: <u>siteprofiles@gov.bc.ca</u>

Contaminated Sites Service Applications

Director of Waste Management c/o Client Information Officer Ministry of Environment PO Box 9342 Stn Prov Govt Victoria, B.C. V8W 9M1

Fax (250) 387-8897 E-mail: csp_cio@Victoria1.gov.bc.ca

Site Risk Classification Reports Required by a Director

Director of Waste Management c/o Site Risk Classification Administration Ministry of Environment #200 - 10470 - 152nd Street Surrey BC V3R 0Y3

Fax (604) 584-9751 E-mail: <u>SiteClassification@gov.bc.ca</u>

Where to send Exposure Pathway Questionnaires for neighbouring parcels

Send the Exposure Pathway Questionnaire to the Director to the applicable address, fax number or e-mail address above, attached to the Site Risk Classification Report for the source site.

¹ This category includes all site investigations required subsequent to the submission of a site profile (including local government release requests) as well as those site investigations required or ordered by the Director separate from the site profile process.

For further information regarding site risk classification, please refer to Fact Sheet 45, "Site Risk Classification" (available at: <u>http://www.env.gov.bc.ca/epd/remediation/fact_sheets/</u>) or e-mail us at <u>SiteClassification@gov.bc.ca</u>.

1



Ministry of Environment

EXPOSURE PATHWAY QUESTIONNAIRE¹

Land Remediation Section PO Box 9342 Stn Prov Govt Victoria B.C. V8W 9M1 Telephone: (250) 387-4441 Fax: (250) 387-8897 E-mail: site@gov.bc.ca

Property Owner Site ID Yes No Notes Human Health Exposure 2, 3, 4 Soil Exposure Do substances in soil exceed upper cap concentrations (UCs) for human intake of soil for the 5, 6 HS-1 applicable land use? 7 HS-2 Are UC-contaminated soils located within 1 m of the soil surface? Does the area of UC contaminated soil exceed 50 m² on urban park, agricultural or residential 8 HS-3 lands or 125 m² on commercial or industrial lands? Is the site land use urban park, agricultural, residential, commercial or industrial (i.e. not HS-4 wildlands)? If the site land use is wildlands, are humans present on the site for greater than 2 hours/day, 1 HS-5 9 dav/week? Soil Vapour Exposure Vapours not vet assessed Do substances in air or soil vapour exceed UC concentrations for human inhalation for the 5, 6, HV-1 applicable land use? 7, 10 Is the site land use urban park, agricultural, residential, commercial or industrial (i.e. not HV-2 wildlands)? If the site land use is wildlands, are humans present on the site for greater than 2 hours/day, 1 9 HV-3 day/week? Water Exposure Does drinking water use apply to groundwater or surface water at the site? HW-1 11, 12 Do substances in groundwater exceed 10 times UC concentrations for drinking water within 10 HW-2 6. m of a drinking water well or exceed UC concentrations within the well? Do substances in surface water exceed 10 times UC concentrations for drinking water within 6 HW-3 100 m upstream of a drinking water intake or exceed UC concentrations at the intake? Environmental Health Exposure 2.3.4 Terrestrial Soil Exposure Do substances in soil exceed UC concentrations for toxicity to invertebrates and plants for the 5, 6 TS-1 applicable land use? 7 Are UC contaminated soils within 1 m of the soil surface? TS-2 TS-3 Is the soil surface above UC contaminated undeveloped land? Is the area identified in TS-3 terrestrial habitat? TS-4 Does the area of UC contaminated soil exceed 100 m² on urban park, agricultural or residential TS-5 8,16 lands or 250 m² on commercial or industrial lands or 500 m² on wildlands? Aquatic Life Water Exposure AW-1 Does aquatic life water use apply to groundwater or surface water at the site? 11 Do substances in groundwater within 10 m of the high water mark of an aguatic habitat exceed 13 AW-2 the UC concentrations for aquatic life water use? Do substances in surface water or unauthorized discharges to surface water exceed UC 14 AW-3 concentrations for aquatic life water use? Aquatic Life Sediment Exposure Do substances in the upper 1 m of sediment exceed the UC concentrations for the applicable 6,15 AS-1 site sensitivity? Does the area of UC-contaminated sediment exceed 50 m²? 8 AS-2

Livesto	ock and Irrigation Water Exposure	
LIW-1	Do livestock or irrigation water uses apply to groundwater or surface water at the site?	9, 10
LIW-2	Do substances in groundwater exceed 10 times applicable UC concentrations within 10 m of the water supply well or exceed applicable UC concentrations in the well?	4, 11
LIW-3	Do substances in surface water exceed 10 times applicable UC concentrations within 100 m upstream of a drinking water intake or exceed applicable UC concentrations at the intake?	

Notes

1. Pathways leading to classification of high risk (where yes answer is given for sequential risk criteria, except where indicated otherwise):

 $HS-1 \Rightarrow HS-2 \Rightarrow HS-3 \Rightarrow HS-4 = HR$ $HS-1 \Rightarrow HS-2 \Rightarrow HS-3 \Rightarrow HS-4 (No) \Rightarrow HS-5 = HR$ $HV-1 \Rightarrow HV-2 = HR$ $HV-1 \Rightarrow HV-2 (No) \Rightarrow HV-3 = HR$ $HW-1 \Rightarrow HW-2 = HR$ $HW-1 \Rightarrow HW-3 = HR$ $TS-1 \Rightarrow TS-2 \Rightarrow TS-3 \Rightarrow TS-4 \Rightarrow TS-5 = HR$ $AW-1 \Rightarrow AW-2 = HR$ $AW-1 \Rightarrow AW-2 = HR$ $AW-1 \Rightarrow AW-2 = HR$ $LIW-1 \Rightarrow LIW-2 = HR$ $LIW-1 \Rightarrow LIW-3 = HR$

- Environmental site investigations must be carried out in accordance with ministry procedures and guidance and standard professional practice.
- 3. The assessment of exposure pathways pertains to contamination arising from the site or sites under investigation. Where contamination originating from the site under investigation has migrated offsite the evaluation of exposure pathways pertains to contamination originating from the site under investigation. Co-contamination of offsite lands that preclude the evaluation of exposure pathways associated with the source site must be identified in supporting technical reports.
- 4. Terms in italics are listed in section 1.0 (definitions) of this protocol.
- 5. Applicable land uses are as defined in the Contaminated Sites Regulation (agricultural, urban park, residential, commercial, industrial and wildlands).
- 6. Ministry's UC concentrations are provided in Protocol 11 "Upper Cap Concentrations for Substances Listed in the Contaminated Sites Regulation".
- 7. Where concentrations occur above UC concentrations, cross-sections are required to support conclusions that UC contamination is located at depths greater than 1 m below soil surface.
- Where concentrations occur above UC concentrations, contour maps are required to support conclusions of the areal extent of UC contamination. "Areal extent" refers to the total combined areal extent of UC contaminated soil at a site, contiguous or non-contiguous.
- 9. Human exposure on wildlands sites during limited periods of the year (i.e. hunting camps) may be compared to the prescribed exposure threshold of 2 hours/day, 1 day/week by averaging total annual exposure over a 12 month period. Actual human exposure must be indicated in supporting technical reports.
- 10. Soil vapour investigations must follow Technical Guidance 4 for Contaminated Sites Soil Vapour Assessment.
- 11. Applicable groundwater use must be determined in accordance with Technical Guidance document 6, "Applying Water Quality Standards to Groundwater and Surface Water" and ministry procedures and guidance.
- 12. Where groundwater concentrations exceed UC concentrations near a groundwater receptor (e.g., drinking water well), contour maps and cross-sections should be provided to support conclusions of UC-contaminated groundwater located outside 10 m of the well.
- 13. Where groundwater concentrations exceeding UC concentrations for aquatic life have not been delineated to within 10 m of the high water mark of an aquatic habitat, groundwater concentrations at wells installed nearest 10 m from the high water mark are considered representative of concentrations at that point.
- 14. Unauthorized discharges are discharges of site surface water (including storm water and drainage ditches) above UC concentrations into an aquatic habitat that are not authorized under the Act.
- 15. Sediment sensitivity must be determined in accordance with Technical Guidance 19, "Assessing and Managing Contaminated Sediments."
- 16. Area threshold assumes site contamination is surrounded by the same land use.



Site Risk Classification Report Exposure Pathway Questionnaire

This report may be sent to the Ministry of Environment by paper mail, fax or courier. It may also be scanned and e-mailed to the ministry.

Mail, Courier, Fax or E-mail:

Notifications of Independent Remediation and Migration

Site Risk Classification Reports which are required to be submitted with a Notification of Independent Remediation initiation or Notification of Likely or Actual Migration must be sent at the time those forms are submitted, to:

Director of Waste Management c/o Site Information Advisor Ministry of Environment PO Box 9342 Stn Prov Govt (By courier send to 2975 Jutland Rd) Victoria, BC V8W 9M1 Fax: (250) 387-8897 E-mail: Advisor.SiteInformation@gov.bc.ca

Required or ordered site investigations¹

Site Risk Classification Reports which are required to be submitted in response to a requirement or order for a site investigation report by the Director must be sent at the time the site investigation report is submitted, to:

Director of Waste Management c/o Site Profile Administration Ministry of Environment #200 - 10470 - 152nd Street Surrey, BC V3R 0Y3 Fax: (604) 584-9751 E-mail: <u>siteprofiles@gov.bc.ca</u>

Contaminated Sites Service Applications

Site Risk Classification Reports which are required to be submitted with an application to the Director of Waste Management for a contaminated sites service must be sent with the Contaminated Sites Service Application form to:

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Site Risk Classification Reports Required by a Director

Site Risk Classification Reports which are required to be submitted directly to a Director of Waste Management must be sent by the time the Director has specified, to:

Director of Waste Management c/o Site Risk Classification Administration Ministry of Environment #200 - 10470 - 152nd Street Surrey, BC V3R 0Y3 Fax: (604) 584-9751 E-mail: <u>SiteClassification@gov.bc.ca</u>

¹ This category includes all site investigations required subsequent to the submission of a site profile (including local government release requests) as well as those site investigations required or ordered by the Director separate from the site profile process.

Where to send Site Risk Classification Reports for neighbouring parcels

Site Risk Classification Reports which are submitted in relation to potential or high risk conditions at a neighbouring parcel or area indicated in the Site Risk Classification Report submitted to the Director of Waste Management for a source parcel must be submitted to the Director to the applicable address, fax number or e-mail address above, with the Site Risk Classification Reports for the source parcel.

Additional Instructions

You must complete and sign the following Site Risk Classification Report form and send it to the Ministry of Environment when required under <u>Protocol 12, "Site Risk Classification, Reclassification and Reporting."</u>

You must complete the Exposure Pathway Questionnaire if you ticked "Yes" to Part 3 Site investigation status, Section 6 Question 3, and/ or Section 9 Question number 3 in the Site Risk Classification report. Exposure Pathway Questionnaires are required to be submitted only when upper cap concentrations of substances are exceeded at a site and there is a trigger to submit a Site Risk Classification Report to the Director of Waste Management.

For further information regarding site risk classification, please refer to Fact Sheet 45, "Site Risk Classification" or e-mail us at <u>SiteClassification@gov.bc.ca</u>.

ENV 007 REV 2012/10/15 PAGE 1 OF 8

Part 1. Land, Owner and Agent Information

Site ID Num	ber, if known		
1017			
PID		PIN	
014-828-120	0, 014-828-138, 014-828-1	62 or	
Legal Descri	ption or metes & bounds (e	e.g., Quarter/LSD Section	Township Range)
Lot 1-3, Bloc	k 124, Plan 1771, District Lo	ot 264A, New Westminste	er Land District, 5655-2040
atitude	Degrees (w) 40	Minutos (vv) 15	
			Seconds (xx.xx) 43.9
ongitude	Degrees (xx) -123	Minutes (xx) 5	Seconds (xx.xx) 40
-			
Site Civic Ade Highway 101	dress (e.g., 1234 Main Stree 13rd Avenue between Firm	et, City, Postal Code, OR, i and Oak Streets or West	f no address, describe location, e.g., 3 km north of Sechelt, BC on 2nd Avenue adjacent to 124 West 2nd Avenue)
ingitivay for	, sid Avenue between En	Tana Oak Streets Of West	210 Avenue adjacent to 124 West 210 Avenue)
		411/0	
452 East Broa	adway, Vancouver, BC, V5T	1W9	
452 East Broa	adway, Vancouver, BC, V5T	1W9	
452 East Broa	adway, Vancouver, BC, V5T	1W9 DPERATOR (if applic	cable)
452 East Broa	adway, Vancouver, BC, V5T TY OWNER AND/OR (1W9 DPERATOR (if applic	cable)
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3. ENVIRONMENTAL CONSULTANT / CONTRACTOR / AGENT CONTACT (if applicable)

Name	
O'Connor Associates Environmental Inc., a Parsons Company	
Address	
19890 92A Avenue	
City	Province/State
Langley	ВС
Country	Postal/Zip Code
Canada	V1M 3A9
Telephone (###) ###-####	Fax (###) ###-####
(604) 513-1000	(604) 513-1040

Part 2. Site risk classification notification triggers

4. APPLICATION TRIGGERS

Check the applicable triggers for the submission of this Site Risk Classification Report to the Director:

- Notification of Independent Remediation initiation
- Site investigation report ordered or required by the Director
- Notification of Offsite Migration
- Ministry service application with the recommendation of an Approved Professional
- Ministry service application without the recommendation of an Approved Professional
- Site Risk Classification Report for a neighbouring parcel under Protocol 12, Site Risk Classification, Reclassification and Reporting
- Site Risk Classification Report otherwise required by a Director

Part 3. Site investigation status

5. ONSITE AND OFFSITE INVESTIGATION STATUS

A. Adequacy of completed site investigations

Is site information appropriate and satisfactory to determine a site risk classification?

1	Yes	No)

If <u>no</u>, indicate the scheduled completion date of investigations needed to complete classification below.

B. Onsite investigation status

Scheduled completion date (MMM/DD/YY)

1. Stage I preliminary site investigation completed?	✓ Yes	No	
2. Stage II preliminary site investigation completed?	✓ Yes	🗌 No	
3. Detailed site investigations completed?	🖌 Yes	No	
4. Offsite migration of contamination identified?	🗸 Yes	🗌 No	
C. Offsite investigation status			
C. Offsite investigation status 1. Stage I preliminary site investigation completed?	✓ Yes	No	
C. Offsite investigation status1. Stage I preliminary site investigation completed?2. Stage II preliminary site investigation completed?	√ Yes √ Yes	□ No □ No	

6. ONSITE HIGH RISK CONDITIONS DETAILS

1. Is mobile NAPL present onsite?	Yes	√No
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If yes, describe the mobile NAPL substances and their general location.

2. Are upper cap concentrations exceeded?

☐Yes 🖌 No

If yes, what substances exceed upper cap concentrations, in what n	nedia?
--	--------

3. Exposure pathways – are the risk criteria for any exposure pathway exceeded?

☐Yes 🖌 No

If <u>yes</u>, which exposure pathways indicate high risk? Complete Exposure Pathway Questionnaire.

7. ONSITE SITE RISK CLASSIFICATION

High Risk 🖌 Not High Risk

Note that for sites for which there is insufficient information to determine the site risk classification, information on the scheduled dates for completion of site investigations must be provided in Part 2 of this report.

Part 4. Independent remediation status

8. ONSITE INDEPENDENT REMEDIATION			
Has independent remediation been initiated at the site?	√Yes	□No	
Will the independent remediation of high risk conditions be completed within 90 days?	Yes	□No	N/A
If independent remediation of high risk site conditions is being carried out and is not complete revised site classification report and an updated completion of remediation schedule at the 90	d within 90 Oth day of in	days the	Director must be provided a entremediation.

Part 5. Offsite conditions

9. OFFSITE HIGH RISK CONDITIONS DETAILS
1. Is mobile NAPL present or likely present offsite? □Yes ☑No □Likely
If <u>yes</u> or <u>likely</u> , describe the mobile NAPL substances and their general location.
2. Are upper cap concentrations exceeded or likely exceeded offsite? Yes No Likely If yes or likely, what substances exceed or are likely to exceed upper cap concentrations, and in what media?
City of Vancouver roadways: VHw6-10 in groundwater in excess of 15000 ug/L
3. Are high risk exposure pathways present or likely present offsite? Yes No Likely
If yes or likely, list the exposure pathways which impact or are likely to impact offsite receptors. Complete Exposure Pathway

Questionnaire.

4. Are any offsite parcels classified as high risk or likely classified as high risk? 🗌 Yes	√No	Likely
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If yes, list the following for each offsite parcel

Site ID (if known)	Offsite parcel owner	Civic Address	Add	Delete
			+	-

10. EXPOSURE PATHWAY QUESTIONNAIRE

Please complete the Exposure Pathway Questionnaire if applicable or proceed to the Signatures section (11).

Property Ov	vner City of Vancouver roadways Site ID		×			
/////	······	Yes	No	Notes		
Human Heal	h Exposure			2, 3, 4		
Soil Exposure						
HS-1	Do substances in soil exceed upper cap concentrations (UCs) for human intake of soil for the applicable land use?		\checkmark	5, 6		
HS-2	Are UC-contaminated soils located within 1 m of the soil surface?			7		
HS-3	Does the area of UC contaminated soil exceed 50 m ² on urban park, agricultural or residential lands or 125 m ² on commercial or industrial lands?			8		
HS-4	Is the site land use urban park, agricultural, residential, commercial or industrial (i.e. not wildlands)?					
HS-5	If the site land use is wildlands, are humans present on the site for greater than 2 hours/day, 1 day/week?			9		
Soil Vapour E	xposure					
HV-1	Do substances in air or soil vapour exceed UC concentrations for human inhalation for the applicable land use?			5, 6, 7, 10		
HV-2	Is the site land use urban park, agricultural, residential, commercial or industrial (i.e. not wildlands)?					
HV-3	If the site land use is wildlands, are humans present on the site for greater than 2 hours/day, 1 day/week?			9		
Water Expos	ire	•				
HW-1	Does drinking water use apply to groundwater or surface water at the site?			11, 12		
HW-2	Do substances in groundwater exceed 10 times UC concentrations for drinking water within 10 m of a drinking water well or exceed UC concentrations within the well?			6		
HW-3	Do substances in surface water exceed 10 times UC concentrations for drinking water within 100 m upstream of a drinking water intake or exceed UC concentrations at the intake?			6		
Environment	al Health Exposure			2, 3, 4		
Terrestrial So	il Exposure		r			
TS-1	Do substances in soil exceed UC concentrations for toxicity to invertebrates and plants for the applicable land use?		\square	5, 6		
TS-2	Are UC contaminated soils within 1 m of the <i>soil surface</i> ?			7		
TS-3	Is the <i>soil surface</i> above UC contaminated <i>undeveloped land</i> ?					
TS-4	Is the area identified in TS-3 terrestrial habitat?					
TS-5	Does the area of UC contaminated soil exceed 100 m ² on urban park, agricultural or residential lands or 250 m ² on commercial or industrial lands or 500 m ² on wildlands?			8, 16		
Aquatic Life V	Vater Exposure					
AW-1	Does aquatic life water use apply to groundwater or surface water at the site?		\blacksquare	11		
AW-2	Do substances in groundwater within 10 m of the <i>high water mark</i> of an <i>aquatic habitat</i> exceed the UC concentrations for aquatic life water use?			13		
AW-3	Do substances in surface water or unauthorized discharges to surface water exceed UC concentrations for aquatic life water use?			14		
Aquatic Life S	ediment Exposure					
AS-1	Do substances in the upper 1 m of sediment exceed the UC concentrations for the applicable site sensitivity?			6, 15		
AS-2	Does the area of UC-contaminated sediment exceed 50 m ² ?			8		
Livestock and Irrigation Water Exposure						
LIW-1	Do livestock or irrigation water uses apply to groundwater or surface water at the site?			9, 10		
LIW-2	Do substances in groundwater exceed 10 times applicable UC concentrations within 10 m of the water supply well or exceed applicable UC concentrations in the well?			4, 11		
LIW-3	Do substances in surface water exceed 10 times applicable UC concentrations within 100 m upstream of a drinking water intake or exceed applicable UC concentrations at the intake?					

Notes

1. Pathways leading to classification of high risk (where yes answer is given for sequential risk criteria, except where indicated otherwise):

 $HS-1 \Rightarrow HS-2 \Rightarrow HS-3 \Rightarrow HS-4 = HR$ $HS-1 \Rightarrow HS-2 \Rightarrow HS-3 \Rightarrow HS-4 (No) \Rightarrow HS-5 = HR$ $HV-1 \Rightarrow HV-2 = HR$ $HV-1 \Rightarrow HV-2 (No) \Rightarrow HV-3 = HR$ $HW-1 \Rightarrow HW-2 = HR$ $HW-1 \Rightarrow HW-3 = HR$ $TS-1 \Rightarrow TS-2 \Rightarrow TS-3 \Rightarrow TS-4 \Rightarrow TS-5 = HR$ $AW-1 \Rightarrow AW-2 = HR$ $AW-1 \Rightarrow AW-2 = HR$ $AW-1 \Rightarrow AW-2 = HR$ $AW-1 \Rightarrow AW-3 = HR$ $AS-1 \Rightarrow AS-2 = HR$ $LIW-1 \Rightarrow LIW-2 = HR$

- 2. Environmental site investigations must be carried out in accordance with ministry procedures and guidance and standard professional practice.
- 3. The assessment of exposure pathways pertains to contamination arising from the site or sites under investigation. Where contamination originating from the site under investigation has migrated offsite the evaluation of exposure pathways pertains to contamination originating from the site under investigation. Co-contamination of offsite lands that preclude the evaluation of exposure pathways associated with the source site must be identified in supporting technical reports.
- 4. Terms in italics are listed in section 1.0 (definitions) of this protocol.
- 5. Applicable land uses are as defined in the Contaminated Sites Regulation (agricultural, urban park, residential, commercial, industrial and wildlands).
- 6. Ministry's UC concentrations are provided in Protocol 11 "Upper Cap Concentrations for Substances Listed in the Contaminated Sites Regulation".
- 7. Where concentrations occur above UC concentrations, cross-sections are required to support conclusions that UC contamination is located at depths greater than 1 m below soil surface.
- 8. Where concentrations occur above UC concentrations, contour maps are required to support conclusions of the areal extent of UC contamination. "Areal extent" refers to the total combined areal extent of UC contaminated soil at a site, contiguous or non-contiguous.
- 9. Human exposure on wildlands sites during limited periods of the year (i.e. hunting camps) may be compared to the prescribed exposure threshold of 2 hours/day, 1 day/week by averaging total annual exposure over a 12 month period. Actual human exposure must be indicated in supporting technical reports.
- 10. Soil vapour investigations must follow Technical Guidance 4 for Contaminated Sites Soil Vapour Assessment.
- 11. Applicable groundwater use must be determined in accordance with Technical Guidance document 6, "Applying Water Quality Standards to Groundwater and Surface Water" and ministry procedures and guidance.
- 12. Where groundwater concentrations exceed UC concentrations near a groundwater receptor (e.g., drinking water well), contour maps and crosssections should be provided to support conclusions of UC-contaminated groundwater located outside 10 m of the well.
- 13. Where groundwater concentrations exceeding UC concentrations for aquatic life have not been delineated to within 10 m of the high water mark of an aquatic habitat, groundwater concentrations at wells installed nearest 10 m from the high water mark are considered representative of concentrations at that point.
- 14. Unauthorized discharges are discharges of site surface water (including storm water and drainage ditches) above UC concentrations into an aquatic habitat that are not authorized under the Act.
- 15. Sediment sensitivity must be determined in accordance with Technical Guidance 19, "Assessing and Managing Contaminated Sediments."
- 16. Area threshold assumes site contamination is surrounded by the same land use.

Part 7. Signatures

11. PROFESSIONAL SIGNATURES

Confirm that the investigations referred to above have been conducted in accordance with approved procedures and guidance and standard professional practice. I confirm that the above information, including the Exposure Pathway Questionnaire if completed, to be true, based on current knowledge as of the date completed.

Confirm that I have demonstrable experience in conducting investigations of the type reviewed above.

Print/Type Name

JERRY NAUS

Signature

1 Jaus

→ OR: □ By checking this box, I declare that the information contained in this form is complete and accurate information.

Date Signed (MMM/DD/YY)

FIG 13



March 22, 2007

Regional File: 26250-20/0075 Site ID: 1017

Imperial Oil Ltd. Products and Chemicals Division Marketing Engineering Services Suite 405, 5945 Kathleen Avenue Burnaby, BC V5H 4J7 Fax: 604-451-1347

Attention: Linda Eastcott

Dear Ms. Eastcott:

Re: Detailed Site Investigation and Remediation Completion Report for 490 East Broadway in support of a Certificate of Compliance

The Ministry of Environment has completed an initial review of your submission application¹ for a Certificate of Compliance for the above referenced site.

Please be advised that the following issue was identified during the review:

• Data provided is insufficient to support the conclusion that the potential contaminants of concern (specifically PAHs, MTBE, VOCs and glycols) are not considered contaminants of concern in soil. Additional data and/or information are required to adequately confirm that soil remaining on site is not contaminated with these potential contaminants of concern.

Resolution of this issue is required before a Certificate of Compliance can be issued for the site.

¹ Detailed Site Investigation and Remediation Completion Report for 490 East Broadway Located Adjacent to Former Imperial Oil Service Station at 452 East Broadway in Vancouver, British Columbia, Project Number R02502, O'Connor Associates Environmental Inc, May 19, 2004.

Please provide supplemental information to address the above issue so that it may be considered as part of the final review.

If you have any questions regarding this letter, please do not hesitate to contact the undersigned at (604) 582-5348.

Sincerely,

Lavinia Zanini, M. Sc., P.Geo. Senior Contaminated Sites Officer

cc: Vijay Kallur, O'Connor Associates Environmental Inc. *Fax: 604.513.1140* Glenn Harris, MoE Victoria