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VAPOR INTRUSION MITIGATION WORK PLAN

OLYMPIC MEDICAL FACILITY

CAPITAL INDUSTRIES, INC.
5801 THIRD AVENUE SOUTH
SEATTLE, WASHINGTON

AGREED ORDER NO. DE 5348

Submitted by:
Farallon Consulting, L.L.C.
975 5th Avenue Northwest
Issaquah, Washington 98027

Farallon PN: 457-004

For:
Mr. Ron Taylor
Capital Industries, Inc.
5801 Third Avenue South
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March 9, 2009

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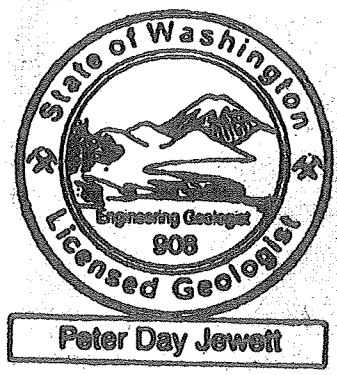

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ACRONYMS AND ABBREVIATIONS

ABP	Art Brass Plating
Agreed Order	Agreed Order No. DE 5348 between the Washington State Department of Ecology and Capital Industries, Inc.
ASTM	American Society for Testing Materials
Blaser	Blaser Die Casting
Capital	Capital Industries, Inc.
CEF	cancer exceedance factor
COPCs	contaminants of potential concern
Ecology	Washington State Department of Ecology
Farallon	Farallon Consulting, L.L.C.
IPIM	Inhalation Pathway Interim Measures
IPIMAL	Inhalation Pathway Interim Measures Action Level
MTCA	Washington State Model Toxics Control Act Cleanup Regulation
NCEF	non-cancer exceedance factor
O&M	operation and maintenance
Olympic Facility	Olympic Medical Building
PSC	Philip Services Corporation
PTC	Pioneer Technologies Corporation
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI Work Plan	Remedial Investigation Work Plan
SSDS	sub-slab depressurization system
TCE	trichloroethene
EPA	U.S. Environmental Protection Agency
VIA Work Plan	Vapor Intrusion Assessment Work Plan
VIMDP	Vapor Intrusion Mitigation Design Plan
VIM Work Plan	Vapor Intrusion Mitigation Work Plan
VOC	volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Vapor Intrusion Mitigation Work Plan (VIM Work Plan) on behalf of Capital Industries, Inc. (Capital) to provide the procedures to design, install, implement, and operate a vapor intrusion mitigation system at the Olympic Medical Building located at 5900 1st Avenue South in Seattle, Washington (Olympic Facility), southwest of the Capital property (Figure 1). Mitigation of vapor intrusion from volatile contaminants of potential concern (COPCs) has been determined to be necessary at the Olympic Facility by the Washington State Department of Ecology (Ecology) in accordance with Exhibits B and D of Agreed Order No. DE 5348 entered into by Capital and Ecology on January 24, 2008 (Agreed Order). The need for mitigation of vapor intrusion was determined based on the evaluation of analytical results of ambient air samples collected from previous vapor intrusion investigations. The evaluation was conducted in accordance with the Vapor Intrusion Assessment Work Plan (VIA Work Plan) (Farallon 2008b).

1.1 VIM WORK PLAN OBJECTIVE

The objective of the VIM Work Plan is to describe the procedures that will be used to mitigate the intrusion of volatile COPCs that migrate from groundwater in the Water Table Zone, as defined in the Remedial Investigation Work Plan (RI Work Plan) (Farallon 2008a), to indoor ambient air within the Olympic Facility. The mitigation measures will be consistent with the Inhalation Pathway Interim Measures (IPIM) Work Plan prepared by Philip Services Corporation (PSC) (2002) and the Draft Interim Vapor Intrusion Plan prepared by Arrow et al. (2007), which is attached as Exhibit D of the Agreed Order.

1.2 VIM WORK PLAN ORGANIZATION

The VIM Work Plan is organized as follows:

- Section 1 presents the objective of the VIM Work Plan;
- Section 2 provides descriptions of and background information on the Capital Site and Olympic Facility;
- Section 3 describes the scope of work for the vapor intrusion mitigation;
- Section 4 discusses the report that will be prepared describing the vapor intrusion mitigation; and
- Section 5 provides a list of documents used in preparation of the VIM Work Plan.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 SITE DESCRIPTION

The Olympic Facility is assumed to be located within the Capital Site. The limits of the Capital Site will be determined by the information collected by the Capital Remedial Investigation (RI), which is being conducted concurrently with vapor intrusion mitigation at the Olympic Facility. The details of the RI are presented in the RI Work Plan (Farallon 2008a). The Capital Property, Site, and Area of Investigation have been defined separately for the purposes of the RI, and are presented below, with a description of their relationship to the Olympic Facility.

2.1.1 Capital Site, Property, and Area of Investigation

The Capital Site is defined by the Agreed Order as the extent of concentrations of COPCs that exceed the applicable cleanup levels caused by the release of COPCs from the Capital Property. The Capital Site will be defined by the information collected by the RI.

The Capital Property is defined as the property located at 5801 3rd Avenue South, between South Mead Street on the north and South Fidalgo Street on the south, and between 4th Avenue South on the east and 1st Avenue South on the west in Section 39, Township 24 South, Range 4 East in Seattle, King County, Washington (Figures 1 and 2). The Capital Property consists of four contiguous King County Assessor Parcels: Nos. 1722802255 (5801 3rd Avenue South), 1722801620 (5801 3rd Avenue South), 1722802245 (5820 1st Avenue South), and 1722801530 (5801 3rd Avenue South), together totaling 182,468 square feet. Parcel Nos. 1722802255, 1722801620, and 1722802245 are developed with five adjoining tilt-up, slab-on-grade buildings designated as Plants 1 through 5. Parcel No. 1722801530 is located north of Plant 4 and has been used for storage of finished products, which include containers and dumpsters.

The Capital Area of Investigation is defined as the area south of South Mead Street, east of 1st Avenue South, north of South Front Street, and west of 4th Avenue South, and includes the property on the northwest corner of 4th Avenue South and South Mead Street (Figure 2). The Capital Area of Investigation is located within the Seattle city limits in King County, Washington (Figure 1) and is zoned as industrial light manufacturing (King County, Washington 2007). Properties located within the Capital Area of Investigation include a mixture of light industrial, commercial, and residential properties.

2.1.2 Olympic Facility

The Olympic Facility is located within the Capital Area of Investigation, and is down-gradient and southwest of Capital Plant 2 at 5900 1st Avenue South, in Seattle Washington (Figure 1). The King County Tax Assessor website identifies the Olympic Facility as Parcel No. 2024049050, which is developed with a two-story, tilt-up, elevated slab-on-grade building. The Olympic Facility building is divided into three areas for office, manufacturing, and warehouse uses (Figure 2). The building was constructed in 1957 and currently is occupied by Olympic Medical, a manufacturer of professional medical equipment and supplies.

2.2 BACKGROUND

Corrective action under Resource Conservation and Recovery Act (RCRA) Facility Operation Permits and Chapter 173-340 of the Washington State Model Toxics Control Act (MTCA) Regulation (WAC-173-340) required PSC to assess and mitigate vapor intrusion of volatile organic compounds (VOCs) associated with releases at the former waste management facility at 734 South Lucile Street. PSC developed and began implementing an IPIM approach (PSC 2002a) that integrates the analytical results of groundwater and indoor air samples to assess the need for further investigation or mitigation by way of an interim measure. The IPIM approach is defined or summarized in the following documents:

- *Revised Inhalation Pathway Interim Measures Work Plan* (PSC 2002);
- *Summary of Inhalation Pathway Interim Measure Approach* (PTC 2006);
- Exhibit D of the Agreed Order; *Draft Interim Vapor Intrusion Plan* (Arrow Environmental [Arrow] et al. 2007); and
- *Vapor Intrusion Assessment Work Plan, Capital Industries, Inc.* (Farallon 2008b).

As part of the IPIM approach, PSC conducted groundwater investigations in the Georgetown neighborhood west of 4th Avenue South (W4 Investigation Area). These investigations identified Capital as the source of COPCs released into the subsurface. Capital became the lead business for interim vapor intrusion measures for properties located down-gradient of their property.

PSC investigations in the W4 Investigation Area also identified VOC source areas at Art Brass Plating (ABP) located at 5516 3rd Avenue South and Blaser Die Casting (Blaser) located at 5700 3rd Avenue South. ABP and Blaser are the lead businesses for interim VI in the W4 Investigation Area. In order to establish a consistent interim process to assess and mitigate potential VI threats in the W4 Investigation Area, an Interim VI Plan was prepared on behalf of PSC, ABP, Blaser, and Capital (Arrow et al. 2007) at the request of Ecology. The Interim VI Plan listed the buildings identified by Ecology as assigned to each lead business, and proposed an interim VI approach with methodologies from the PSC IPIM approach as approved by Ecology for consistent implementation by each lead business.

Capital is identified as the lead business for the Olympic Facility located down-gradient and south of Capital Plant 2 (Figure 1). Elevated concentrations of trichloroethene (TCE) were detected in reconnaissance groundwater samples collected from direct-push borings and groundwater samples collected from monitoring wells located proximate to the Olympic Facility (Pioneer Technologies Corporation [PTC] 2006). The cancer exceedance factor (CEF) and non-cancer exceedance factor (NCEF) were calculated using the cancer and non-cancer groundwater Inhalation Pathway Interim Measures Action Levels (IPIMALs) based on the IPIM approach (PTC 2006). The CEF exceeded the benchmark of 10 as determined by Ecology, which required that Tier 3 ambient air samples be collected for analysis under the IPIM approach at the Olympic Facility.

A Tier 3 assessment of the vapor intrusion was conducted at the Olympic Facility by PSC (2005) by sampling ambient indoor and outdoor air to determine whether commercial ambient air CEFs

and NCEFs exceeded the benchmarks of 10 as determined by Ecology. Commercial indoor air CEFs calculated from concentrations of TCE detected in indoor ambient air samples collected at Olympic exceeded this benchmark (PTC 2006) (Figure 3; Table 1). Based on the concentrations of TCE detected in indoor ambient air, a mitigation system was proposed by PSC for the warehouse area located on the eastern side of the Olympic Facility.

Subsequent indoor air sampling conducted by GeoEngineers Inc. (GeoEngineers 2006) on behalf of Olympic Medical detected concentrations of TCE that exceeded the CEF and NCEF in ambient air in both the warehouse and manufacturing portions of the Olympic Facility (2006) (Figure 3; Table 1). A mitigation system was determined to be unnecessary in the office area based on the corrected commercial ambient air CEFs and NCEFs calculated for the office area. The corrected commercial ambient air CEFs and NCEFs were calculated by subtracting the outdoor CEFs and NCEFs from the indoor values. Ambient air analytical data and calculated CEFs, NCEFs, and corrected indoor CEFs from previous investigations are presented in Table 1.

3.0 VAPOR INTRUSION MITIGATION SCOPE OF WORK

This section presents the procedures for the design of the vapor mitigation system to be installed at the Olympic Facility. The procedures have been developed to achieve the objectives of the VIM Work Plan and in accordance with the IPIM approach (PSC 2002) and Arrow et al. (2007). The work elements include design, installation, and operation of the vapor mitigation system in the Olympic Facility.

Mitigation via installation of a subslab depressurization system (SSDS) is approved under the IPIM (PSC 2002) approach as an adequate system to depressurize the soil beneath the floor slab to prevent volatile COPCs in groundwater in the Water Table Zone from entering the interior of the building. The general SSDS design has been reviewed and approved by Ecology for effectively mitigating vapor intrusion at slab-on-grade commercial facilities. The SSDS is designed to be consistent with the American Society for Testing Materials (ASTM) E2121-03 Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings (ASTM 2003) and U.S. Environmental Protection Agency (EPA) radon mitigation standards (EPA 1993; EPA 1994).

The SSDS is designed to depressurize the ground immediately below the slab by using exhaust fan(s) designed to generate sufficient negative pressure to prevent the flux of air from the soil, through the slab, and into the building. This type of system has been designed for a wide variety of VOCs that migrate through soil, largely through diffusion.

The SSDS decreases the pressure below the building slab so that pressure inside the building is higher, forcing any flow of air and any VOCs between the building and slab downward, out of the building, and into the slab. A fan pulls the air and VOCs from the subsurface and vents them to the ambient air via an exhaust stack located on the roof of the building.

Prior to installation, diagnostic testing is performed to determine the size of the depressurization system (i.e., how many fans and associated exhaust systems) required for the building. Once complete, a building-specific design is developed to adequately mitigate vapor intrusion to levels that are below IPIMALs.

The design, installation, and operation work elements needed to mitigate vapor intrusion at the Olympic Facility are described below. The specific design for SSDS at the Olympic Facility will be submitted to Ecology for approval.

3.1 DESIGN

The design of the SSDS consists of collection of design data, preparation of a design plan, and permit application.

3.1.1 Collection of Design Data

Data will be collected at the Olympic Facility to provide parameters for the design of the SSDS. The data will be used to select the location and size of the fans and vents installed as part of the SSDS. Data collection includes:

- Identifying, locating, and sealing all major cracks in the concrete floor with construction-grade urethane caulk, if necessary;
- Coring 5-inch-diameter borings and multiple 3/8-inch-diameter borings surrounding each 5-inch-diameter boring in the concrete slab;
- Removing 10 to 20 gallons of soil from beneath the slab at each 5-inch-diameter boring to create a sump;
- Placing an diagnostic exhaust fan over the 5-inch-diameter boring;
- Measuring the negative soil vapor pressure at each of the 3/8-inch-diameter borings at a constant vacuum pressure using a micromanometer; and
- Measuring the exhaust volume reading at each 5-inch-diameter boring while multiple static vacuum pressures are applied.

The static pressure/exhaust volume reading taken at the exhaust fan and the negative soil vapor pressure taken at the 3/8-inch diameter borings will be used to design the SSDS.

3.1.2 Preparation of a Design Plan

Based on the design data, a Vapor Intrusion Mitigation Design Plan (VIMDP) will be prepared specific to the Olympic Facility SSDS. The VIMDP will include the number and locations of the SSDSs and the design specifications for the proposed SSDS. The VIMDP will be submitted to Capital for review prior to submittal to Ecology for concurrence on system selection and performance.

3.1.3 Permit Application

A permit application will be submitted to the City of Seattle to obtain a Mechanical Expedited (Full) Permit. The permit application will include:

- Completed Mechanical Plan cover sheet;
- Year of code with which the permit complies;
- Vicinity map;
- Site plan, to scale, showing adjacent zoning;
- Legal description of the property;
- Assessor's parcel number; and
- Any related building permit numbers.

Installation of SSDS will begin upon receiving permit approval from the City of Seattle and Ecology.

3.2 INSTALLATION

The information collected during the design phase of the scope of work will be used to determine the extent and construction of the vapor intrusion mitigation system to be installed.

3.2.1 Installation of Sub-Slab Depressurization System

The SSDS will be constructed of 3-inch- and 4-inch-diameter Schedule 40 polyvinyl chloride or 3043 polyvinyl chloride heavy wall pipe that will extend from below the concrete slab through the roof of the building. The vent pipe will be connected to form a network and attached to an appropriately sized exhaust fan(s). The exhaust fan(s) will operate continuously, pulling vapors from the sumps and venting to the ambient air above the roof of the building via an exhaust stack located on the roof. A dedicated gauge will be used to measure the pressure differential (in inches of water column) between the fan inlet and outlet, thereby providing a simple, reliable means of confirming that the fan is generating a pressure head. The system will generate sufficient negative pressure beneath the building slab to prevent vapors from entering the Olympic Facility.

3.3 OPERATION

Operation of the SSDS will be monitored closely following installation and will include air sampling and routine inspection, monitoring, and maintenance. Routine inspection, monitoring, and maintenance will be presented in greater detail in the Vapor Intrusion Inspection, Monitoring, and Maintenance Work Plan (VIIMM Work Plan) (Farallon 2008 pending). Protocols for system shutdown are included in this section and also will be discussed in the VIIMM Work Plan.

3.3.1 Air Sampling

An initial operation assessment will be conducted by collecting indoor and outdoor ambient air samples before and after installation of the SSDS. Air samples will be analyzed for HVOCs using 6-liter Summa canisters equipped with particulate filters and 8-hour flow controllers at the approximate sampling locations used during previous investigations. Comparison of indoor and outdoor ambient air analytical results and analytical results from before and after installation of the SSDS will be used to assess the effectiveness of the SSDS. Samples will be analyzed for TCE using EPA Method TO-15 SIM.

3.3.2 Inspection, Monitoring, and Maintenance of Sub-Slab Depressurization System

Operation and maintenance (O&M) of the SSDS includes inspections of the SSDS to confirm that the system is working effectively. The criteria for determining whether modification of the SSDS is needed will be evaluated in accordance with the *Summary of Inhalation Pathway Interim Measures Approach* (PTC 2006). A regressive approach to the monitoring will be implemented to assess the O&M of the SSDS during the initial start-up. Inspection, monitoring,

and maintenance will continue throughout the operation of the SSDS to confirm the system is working effectively. Initial and continuing monitoring will occur as follows:

- One inspection per week during the first month of operation;
- One inspection per month during the first quarter of operation;
- Quarterly inspections during the first year of operation; and
- Annual inspections during the remainder of SSDS operation.

During operation of the SSDS, modifications may be required to ensure optimal operation of the system. The criteria for determining whether the SSDS requires modification will be discussed in the VIIMM Work Plan and will include the following:

- Structural changes in the Olympic Facility;
- An increase in concentrations of TCE and/or other VOCs in groundwater that would result in a 10-fold increase in the commercial groundwater CEFs or NCEFs in the vicinity of the Site as indicated by periodic groundwater sampling events;
- A change in the SSDS system from baseline conditions; and
- Problems associated with SSDS O&M.

3.3.3 System Shutdown

The VI Assessment Work Plan discusses how periodic groundwater monitoring results are evaluated to determine whether mitigation needs to be considered for buildings that do not currently have operating VI mitigation systems. This type of evaluation will also be conducted to determine whether the SSDS at the Olympic Facility is a candidate for shutdown from groundwater analytical data collected during the RI.

Groundwater samples from monitoring wells in the vicinity of the Olympic Facility may be collected periodically for analysis for the RI, and results will be used to reevaluate the CEFs and NCEFs based on IPIMAL values and will be compared to the benchmark of 10 determined by Ecology. If the CEF and NCEF are below 10, the vapor intrusion mitigation system at the Olympic Facility will be evaluated for shutdown. If the system is identified for shutdown, Capital will submit a letter to Ecology proposing shutdown procedures and post-shutdown monitoring.

4.0 REPORTING

A draft post-installation Vapor Intrusion Mitigation Report describing the data collection, design, and installation of the SSDS at the Olympic Facility will be prepared by Farallon and submitted to Capital for review within 45 days of receipt of post-installation ambient air analytical data. Following review and approval by Capital, the report will be provided to Ecology for review and comment. The report will include:

- A summary of the results of the data collection used for the design of the SSDS;
- The design of the SSDS;
- A brief narrative of the scope of work and procedures followed for the installation of the SSDS;
- A summary of the field activities;
- Final design and operation parameters for the SSDS; and
- Figures depicting the as-built drawings, including the number, location, and configuration of SSDS components.

Data collected during inspections, monitoring, and maintenance will be presented as discussed in the Vapor Intrusion Inspection Maintenance and Monitoring Work Plan.

5.0 BIBLIOGRAPHY

American Society for Testing and Materials (ASTM). 2003. *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings.* Practice E2121-03.

Arrow Environmental; Aspect Consulting; Farallon Consulting, L.L.C.; and Pacific Groundwater Group (Arrow et al.). 2007. *Draft Interim Vapor Intrusion Plan.* Prepared for the Washington State Department of Ecology. May 1.

Farallon Consulting, L.L.C. (Farallon). 2008a. *Remedial Investigation Work Plan, Capital Industries, 5801 Third Avenue South, Seattle, Washington.* Prepared for Capital Industries, Inc., Seattle, Washington. September.

———. 2008b. *Vapor Intrusion Assessment Work Plan, Capital Industries, 5801 Third Avenue South, Seattle, Washington.* Prepared for Capital Industries, Inc., Seattle, Washington. September.

———. Pending. *Vapor Intrusion Inspection, Monitoring, and Maintenance Work Plan, Capital Industries, 5801 Third Avenue South, Seattle, Washington.* Prepared for Capital Industries, Inc., Seattle, Washington.

GeoEngineers Inc. (GeoEngineers). 2006. Air Sampling Results (Partial). March.

Philip Services Corporation (PSC). 2002. *Revised Inhalation Pathway Interim Measures Work Plan.* Prepared for the Washington State Department of Ecology. August.

_____. 2003. *Supplemental Inhalation Pathway Interim Measures Work Plan.* Prepared for the Washington State Department of Ecology. May.

Pioneer Technologies Corporation (PTC). 2006. *Summary of the Inhalation Pathway Interim Measure Approach.* Prepared for Philip Services Corporation, Kent, Washington. October.

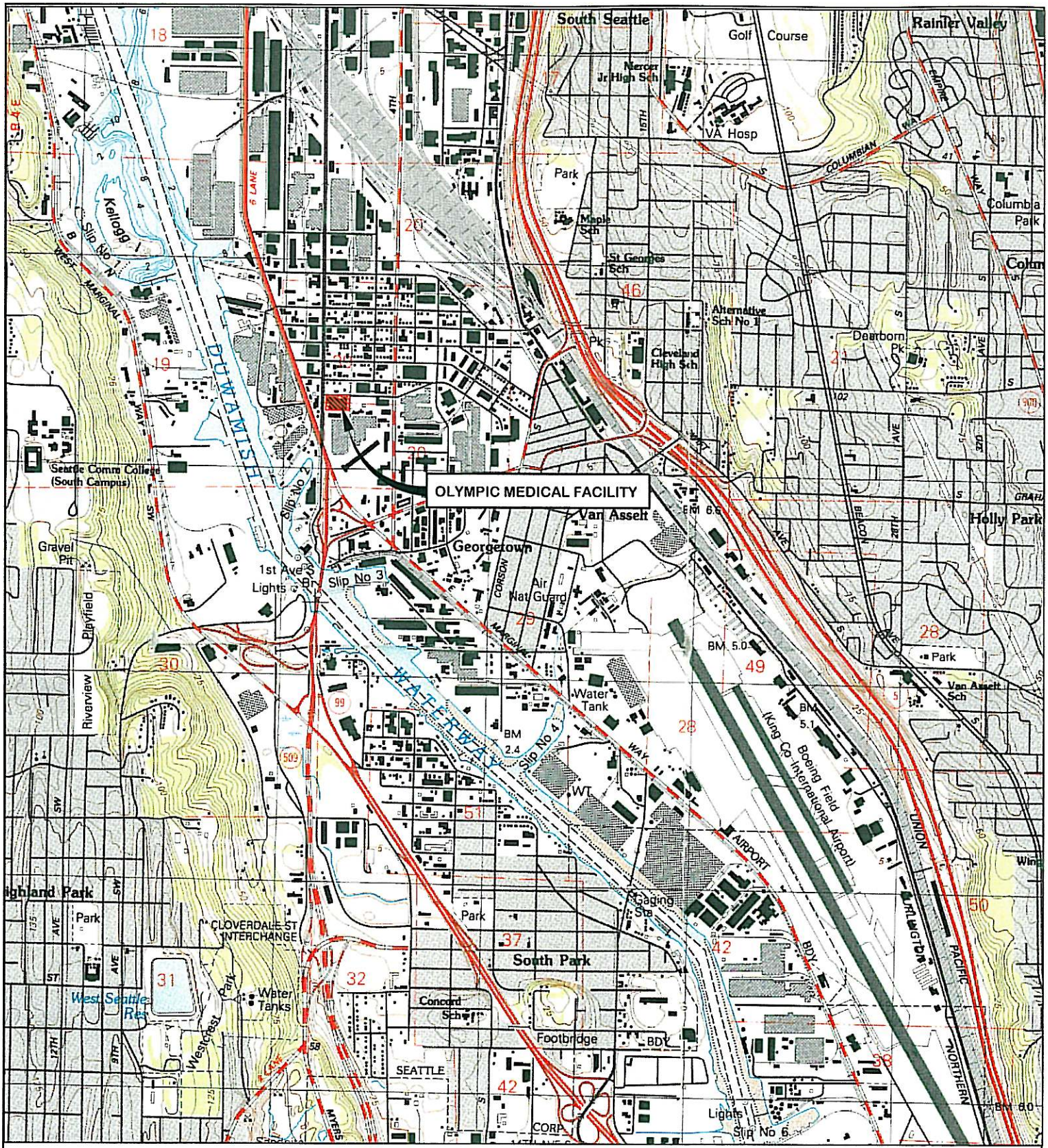
U.S. Environmental Protection Agency (EPA). 1993. *Radon Reduction Techniques for Existing Detached Houses. Technical Guidance (Third Edition) for active Soil Depressurization Systems.* EPA/625/R-93/-011. October.

_____. 1994. *Radon Mitigation Standards.* EPA 402-R-93-078, Revised April.

FIGURES

VAPOR INTRUSION MITIGATION WORK PLAN
Capital Industries, Inc.
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004



REFERENCE: 7.5 MINUTE USGS QUADRANGLE SOUTH SEATTLE, WASHINGTON. DATED 1983

0 500

APPROXIMATE SCALE IN METERS

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 1

VICINITY MAP
VAPOR INTRUSION INSPECTION MONITORING AND MAINTENANCE WORK PLAN
OLYMPIC MEDICAL FACILITY
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW	Checked By: DC	Date: 10/27/08	Disk Reference: FLOORJIM21

CAPITAL INDUSTRIES

CAPITAL INDUSTRIES

CAPITAL INDUSTRIES

SOUTH FIDALGO STREET

1st AVENUE SOUTH

OFFICE AREA

MANUFACTURING AREA

WAREHOUSE AREA

OLYMPIC MEDICAL FACILITY

MOBILE CRANE

BECKWITH AND KUFFEL BUILDING

LEGEND

PROPERTY LINE

EXTERIOR BUILDING WALL

N

0 50

APPROXIMATE SCALE IN FEET

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

OLYMPIC MEDICAL BUILDING PLAN
VAPOR INTRUSION MITIGATION WORK PLAN
OLYMPIC MEDICAL FACILITY
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW	Checked By: DC	Date 3/10/09	Disk Reference: FLOORJIM21

CAPITAL INDUSTRIES

CAPITAL INDUSTRIES

CAPITAL INDUSTRIES

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	0.44	**22**	0.28	8

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	1.5	**75**	0.94	**61**

SOUTH FIDALGO STREET

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	0.28	**14**	0.18	---

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	1.4	**70**	0.88	---

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	2.6	**130**	1.63	---

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	3.5	**175**	2.19	**45**

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	3.7	**185**	2.31	**55**

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	2.1	**105**	1.31	**91**

1st AVENUE SOUTH

AA001

59001–AA1

59001–IA1

AA005

59001–IA2

59001–9–IA2

AA003

AA004

AA002

R–59001–IA1

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	1.6	**80**	1.00	**66**

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	07/2005	4.4	**220**	2.75	**212.5**

OFFICE AREA

MANUFACTURING AREA

WAREHOUSE AREA

R–59001–AA1

OLYMPIC MEDICAL FACILITY

SAMPLED BY	DATE	TCE (ug/m)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	07/2005	0.15	7.5	0.09	---

BECKWITH AND KUFFEL BUILDING

0 50

APPROXIMATE SCALE IN FEET

MOBILE CRANE

LEGEND

- PROPERTY LINE
- EXTERIOR BUILDING WALL
- AA001 ● AIR SAMPLE (GEOENGINEERS, 03/06)
- R–59001–AA1 ■ AIR SAMPLE (PSC, 07/05)
- 59001–9–IA2 ◆ AIR SAMPLE (PSC, 10/04)

PSC = PHILIP SERVICES CORPORATION

TCE = TRICHLOROETHENE

CEF = CANCER EXCEEDANCE FACTOR

NCEF = NONCANCER EXCEEDANCE FACTOR

-- = DENOTES VALUE IS NOT APPLICABLE

RESULTS IN **BOLD** DENOTE CONCENTRATIONS ABOVE WASHINGTON STATE DEPARTMENT OF ECOLOGY EXCEEDANCE FACTOR BENCHMARK.

ALL SAMPLE LOCATIONS ARE APPROXIMATE

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 3

OLYMPIC MEDICAL BUILDING PLAN
SHOWING AIR ANALYTICAL RESULTS
VAPOR INTRUSION MITIGATION WORK PLAN
OLYMPIC MEDICAL FACILITY
SEATTLE, WASHINGTON

FARALLON PN: 457–004

Drawn By: DEW	Checked By: DC	Date 3/10/09	Disk Reference: FLOORJIM21

TABLE

VAPOR INTRUSION MITIGATION WORK PLAN
Capital Industries, Inc.
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004

Table 1
Olympic Medical Facility TCE Air Analytical Results
Vapor Intrusion Mitigation Work Plan
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Sample Identification	Sampled By	Sample Date	Sample Location	Commercial Air IPIMALs[1]		TCE (µg/m³)[2]	CEF[3]	NCEF[3]	Corrected Indoor CEF[4]
				Cancer (µg/m³)	Noncancer (µg/m³)				
59001-IA1	PSC	10/2004	Office	0.02	1.6	1.4	**70**	0.88	--
59001-IA2	PSC	10/2004	Warehouse	0.02	1.6	3.5	**175**	2.19	**45**
59001-9-IA2	PSC	10/2004	Warehouse	0.02	1.6	3.7	**185**	2.31	**55**
59001-AA1	PSC	10/2004	Outdoor	0.02	1.6	2.6	**130**	1.63	--
R-59001-IA1	PSC	07/2005	Manufacturing	0.02	1.6	4.4	**220**	2.75	**212.5**
R-59001-AA1	PSC	07/2005	Outdoor	0.02	1.6	0.15	7.5	0.09	--
AA001	GeoEngineers	03/2006	Outdoor	0.02	1.6	0.28	**14**	0.18	--
AA002	GeoEngineers	03/2006	Warehouse	0.02	1.6	2.1	**105**	1.31	**91**
AA003	GeoEngineers	03/2006	Manufacturing	0.02	1.6	1.6	**80**	1.00	**66**
AA004	GeoEngineers	03/2006	Manufacturing	0.02	1.6	1.5	**75**	0.94	**61**
AA005	GeoEngineers	03/2006	Office	0.02	1.6	0.44	**22**	0.28	8
Ecology Exceedance Factor Benchmarks[5]							**10**	**10**	**10**

Notes:

Results in **bold** denote concentrations above Ecology Exceedance Factor Benchmark.

-- denotes value not applicable.

[1]Commercial Air IPIMALs for TCE as part of the IPIM Approach, developed by PSC and Ecology.

[2]Analyzed by U.S. Environmental Protection Agency Method TO-15 SIM .

[3]CEFs and NCEFs are calculated by dividing the corrected indoor air concentrations by cancer and noncancer-based indoor air IPIMALs, respectively.

[4]Corrected indoor CEFs are calculated by subtracting the outdoor CEF from the individual indoor CEFs for each sampling location.

[5]A CEF/NCEF of 10 indicates that exposure to indoor air concentrations could potentially lead to a cumulative risk of 1E-05, and further evaluation is recommended to determine if the location should proceed to Tier 4.

Ecology = Washington State Department of Ecology

CEF = cancer exceedance factor

GeoEngineers = GeoEngineers, Inc.

IPIM = Inhalation Pathway Interim Measure

IPIMAL = Inhalation Pathway Interim Measure Action Level

µg/m³ = micrograms per cubic meter

NCEF = noncancer exceedance factor

PSC = Philip Services Corporation

TCE = trichloroethene