314358

Burns & McDonnell
SINCE 1898

July 8, 2002

Jennifer M. Seul
Environmental Protection Specialist
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62794-9276

Rogers Park Sub-Shop Main Parcel *Remediation Objectives Report/Remedial Action Plan/Remedial Action Completion Report (ROR/RAP/RACR)*

Dear Ms.Seul:

As discussed in our telephone conversation on July 2, 2002, Burns & McDonnell has calculated estimates to demonstrate that off site migration of trichloroethene will not occur, based on the direction of groundwater flow and the closest downgradient property boundary.

One low concentration of trichloroethene (3.09 mg/kg) in one soil sample collected as part of site investigation activities exceeded the soil migration to groundwater value presented in Tiered Approach to Corrective Action Objectives (TACO). The trichloroethene is the result of former operations conducted by others on the property located north of the Rogers Park site.

A soil concentration of 3.09 mg/kg results in a leaching factor of 0.273 and a groundwater concentration at the source of 0.844mg/L. The X distance to the nearest downgradient property boundary is 14,630.4 centimeters, so the maximum theoretical concentration of trichloroethene at the property boundary is zero. Calculations and a site diagram used as the basis for the calculations are attached.

Also attached is a Remediation Boundary Plan to be included as part of the No Further Remediation (NFR) letter.

It is our understanding that the attached calculations and maps address your comment, re issuance of the entire ROR/RAP/RACR will not be required, and the ROR/RAP/RACR can now be approved.

If you have any questions, please contact me at (630) 990-0302, xt. 282, or contact Alison Millerick at Peoples Gas, (312) 240-4832.

Sincerely,

Margaret Kelley

Margaret H. Kelley
Senior Environmental Engineer

CC: Alison Millerick – Peoples Gas

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LEACHING FACTOR (R14)

Trichloroethene

$$LF_{sw}\left(\frac{mg / L_{water}}{mg / kg_{soil}}\right) = \frac{P_s}{\left[\theta_{ws} + K_s * P_s + H * \theta_{as}\right] * \left(1 + \frac{U_{gw} * \delta_{gw}}{I * W}\right)}$$

PARAMETER	SYMBOL	UNIT	VALUE	SOURCE
Leaching Factor	LF_{sw}	(mg/L)/ (kg/L)	**0.273**	Calculated Value (R14)
Soil Bulk Density	P_s	g/cm^3	1.7	Default Value – Clay RBCA
Volumetric Water Content in Vadose Zone Soils	θ_{ws}	cm^3/cm^3	0.17	Default Value – Clay Appendix C Table D
Volumetric Air Content in Vadose Zone Soils	θ_{as}	cm^3/cm^3	0.17	Default Value – Clay Appendix C Table D
Soil-Water Sorption Coefficient	k_s	cm^3/g	3.519	Calculated Value (R20)
Organic Carbon Partition Coefficient	K_{oc}	cm^3/g or L/kg	166	Chemical Specific Appendix C, Table E
Organic Carbon Content of Soil	f_{oc}	g/g	0.0212	Site Specific Averaged Value Table 5 (Burns & McDonnell 2001)
Henry's Law Constant	H	cm^3/cm^3	0.422	Chemical Specific Appendix C, Table E
Hydraulic Gradient	i	cm/cm	0.018	Site Specific (Burns & McDonnell 2001)
Aquifer Hydraulic Conductivity	K	cm/yr	0.0946	Site Specific (Burns & McDonnell 2001)
Groundwater Darcy Velocity (Ki)	U_{gw}	cm/yr	0.0017	Calculated Value (R24)
Groundwater Mixing Zone Thickness	δ_{gw}	cm	200	Default Value - RBCA
Infiltration Rate of Water Through Soil	I	cm/yr	30	Default Value - RBCA
Width of Source Area Parallel to Groundwater Flow	W	cm	2438 cm (80 ft)	Site Specific

REFERENCE:

1. Burns & McDonnell, 2001. *Rogers Park Sub-Shop Main Parcel Site Investigation Report*. Chicago, Illinois. October.

MAXIMUM THEORETICAL GROUNDWATER CONCENTRATION AT THE PROPERTY BOUNDARY (R26)

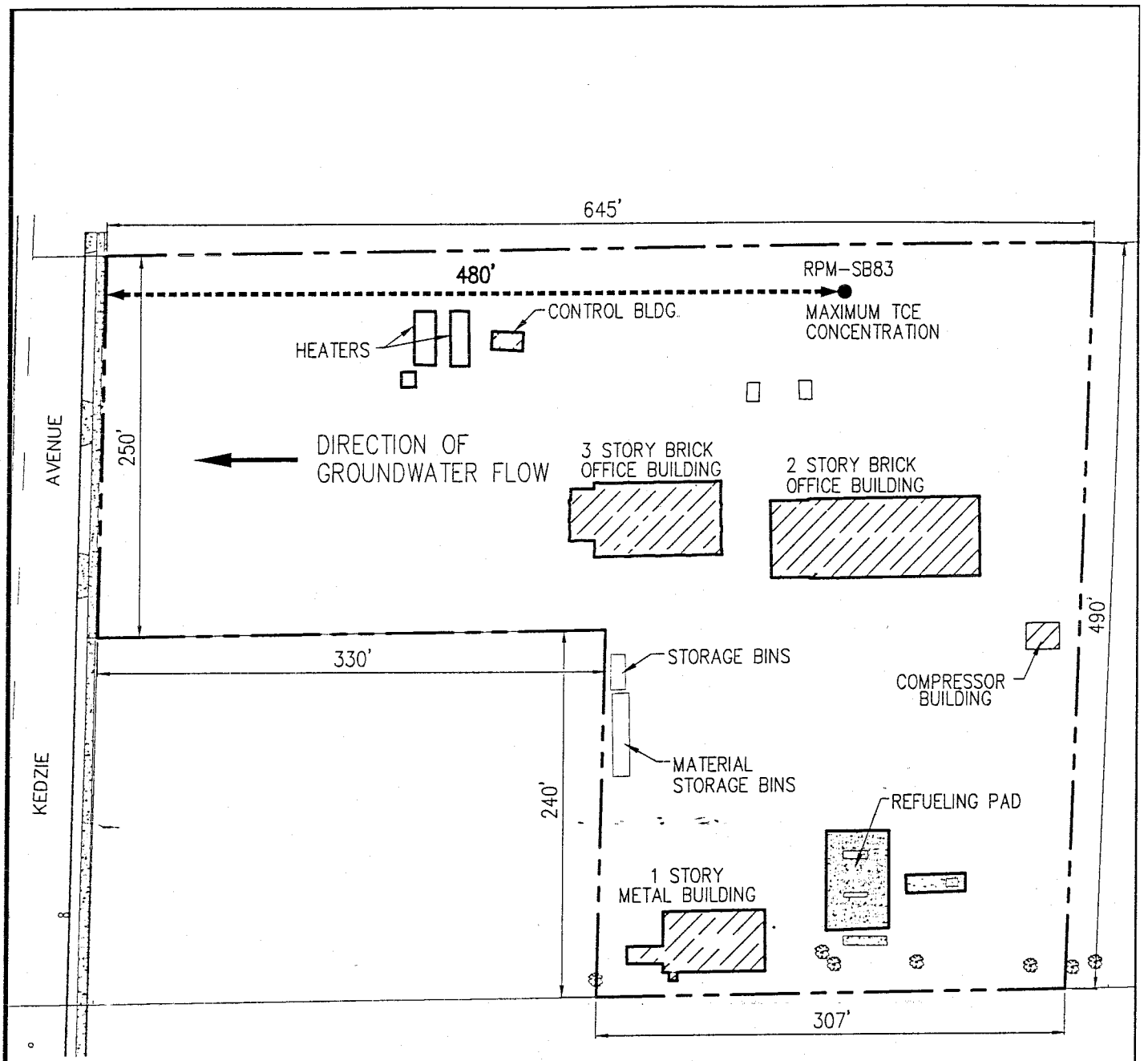
Trichloroethene

$$C_x = C_{source} * \exp\left[\frac{X}{2\alpha_x} * \left(1 - \sqrt{1 + \frac{4\lambda * \alpha_x}{U}}\right)\right] * \left[erf\left(\frac{S_w}{4\sqrt{\alpha_y * X}}\right)\right] * \left[erf\left(\frac{S_d}{2\sqrt{\alpha_z * X}}\right)\right]$$

PARAMETER	SYMBOL	UNIT	VALUE	SOURCE
Concentration at Distance X from the Source	C_x	mg/L	**0**	Calculated Value (R26)
Concentration at the Source	C_{source}	mg/L	**0.844**	Site Specific – Calculated
Distance along Plume Centerline form Source	X	cm	14,630.4	Site Specific
Longitudinal Dispersivity	α_x	cm	1463	Calculated Value (R16)
Transverse Dispersivity	α_y	cm	487	Calculated Value (R17)
Vertical Dispersivity	α_z	cm	73.2	Calculated Value (R18)
First Order Degradation Constant	λ	1/d	0.00042	Chemical Specific Appendix C, Table E
Hydraulic Gradient	i	cm/cm	0.018	Site Specific (Burns & McDonnell 2001)
Aquifer Hydraulic Conductivity	K	cm/d	0.000259	Site Specific (Burns & McDonnell 2001)
Total Soil Porosity	θ_T	cm^3/cm^3_{SOIL}	0.36	Default Value – Clay Appendix C Table D
Specific Discharge	U	cm/d	0.0000129	Calculated Value (R19)
Source Width Perpendicular to Groundwater Flow Direction in Horizontal Plane	S_w	cm	914.4 (30 ft)	Site Specific
Source Width Perpendicular to Groundwater Flow Direction in Vertical Plane	S_d	cm	200	Default Value – Clay Appendix C Table D

REFERENCE:

1. Burns & McDonnell, 2001. *Rogers Park Sub-Shop Main Parcel Site Investigation Report*. Chicago, Illinois. October.



LEGEND

REMEDIATION SITE BOUNDARY

DISTANCE TO PROPERTY BOUNDARY

TCE TRICHLOROETHYLENE

NORTH

100 0 100 200

SCALE IN FEET

Burns & McDonnell SINCE 1898

GROUNDWATER FLOW/R-26 EVALUATION
ROGERS PARK SUB-SHOP – MAIN PARCEL
THE PEOPLES GAS LIGHT AND COKE COMPANY
CHICAGO, ILLINOIS

:\PEOPLES GAS\ROGERS PARK\CAD\BID\MAIN SVY\ROR\GW FLOW