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MEMORANDUM

TO:	Deborah Castles	**DATE:**	June 29, 2007
FROM:	Danielle Ketchum and Robert Cheung	**PROJ. NO.:**	13310.000
CC:		**PROJ. NAME:**	McGrath Properties

SUBJECT: Screening-Level Risk Evaluation
1001 42nd Street
Oakland, California

1.0 INTRODUCTION

Geomatrix Consultants, Inc. has prepared this memorandum on behalf of McGrath Properties to evaluate the potential migration of total petroleum hydrocarbons quantified as mineral spirits (TPHms) and volatile organic compounds (VOCs) in the subsurface to indoor air of enclosed structures (i.e., vapor intrusion pathway). For this screening-level risk evaluation, risk-based screening levels (RBSLs) for indoor air and soil gas were developed for TPHms and VOCs. RBSLs were calculated using the methodologies outlined by the California Environmental Protection Agency (Cal-EPA), Office of Environmental Health Hazard Assessment (OEHHA). Based on the data collected to date and the results of this screening-level risk evaluation, there is no apparent unacceptable health risk posed by the vapor intrusion pathway at the site, and further characterization of the vapor intrusion pathway is not recommended at this time.

The following sections summarize the selection of COPCs in indoor air and soil gas, the calculation of RBSLs, and the results of the risk evaluation. A separate discussion is included to outline the methodologies used to determine the physicochemical properties, toxicity criteria, and risk-based screening level for mineral spirits.

2.0 EXPOSURE ASSESSMENT

The exposure scenarios evaluated in this screening-level risk assessment include current commercial industrial workers and future residents. The exposure assessment is based on a reasonable maximum exposure (RME) scenario, which is defined by the U.S. EPA as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site (U.S. EPA, 1989). Default exposure assumptions for commercial/industrial worker were used including an exposure frequency of 250 days per year for the duration of 25 years. Default exposure assumptions for a resident include an exposure frequency of 350 days per year for the duration of 30 years (OEHHA, 2005).

3.0 CHEMICALS OF POTENTIAL CONCERN

Five indoor air samples were collected in July 2006 (IA-1 through IA-5) by Environmental Resources Management (ERM) and are considered representative of current conditions. Indoor air samples collected in 1999 and 2000 are not considered representative of current conditions because these samples were collected under different operating conditions and when the building was used by previous tenants. As presented on Table 6 of the ERM report (ERM, 2007), all VOCs detected in at least one indoor air sample were identified as COPCs.

Four soil gas samples were collected on-site in March 2007 (SVP-2 through SVP-5) by ERM. As presented on Table 4 of the ERM report (ERM, 2007), all VOCs detected in at least one soil gas sample were identified as COPCs.

4.0 RISK-BASED SCREENING LEVEL CALCULATIONS

The methodologies used to calculate risk-based screening levels in indoor air and soil gas are presented below. RBSLs derived for all COPCs are presented in Table 1.

4.1 INDOOR AIR

Inhabitants of buildings constructed could be exposed to VOCs that may infiltrate the indoor environment from subsurface soil and/or the shallow groundwater. The indoor air RBSLs were developed for a commercial/industrial worker and resident using the methodologies prescribed for the California Human Health Screening Levels (CHHSLs) for vapor intrusion concerns published by OEHHA.

Target indoor air concentrations were developed for noncarcinogenic adverse health effects (1) and carcinogenic risks using the following equations (2):

$$RBSL_{ia-nc} = \frac{THQ \times ATnc}{EF \times ED \times 1/RfC} \quad (1)$$

Where:

$RBSL_{ia-nc}$	=	indoor air risk-based screening level for noncancer hazards ($\mu g/m^3$)
THQ	=	target hazard quotient (1)
ATnc	=	averaging time for noncarcinogenic compounds (days)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
RfC	=	reference concentration ($\mu g/m^3$)

$$RBSLia-c = \frac{TR \times ATc}{EF \times ED \times URF} \quad (2)$$

Where:

$RBSL_{ia-c}$	=	indoor air risk-based screening level for cancer risks ($\mu g/m^3$)
TR	=	target risk ($1x10^{-6}$)
ATca	=	averaging time for carcinogenic compounds (days)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
URF	=	unit risk factor [$(\mu g/m^3)^{-1}$]

4.2 SOIL GAS

Soil gas RBSLs also were developed for a commercial/industrial worker and resident using the same methodologies prescribed for the CHHSLs for vapor intrusion concerns. Soil gas RBSLs were estimated from the calculated target indoor air concentration and chemical-specific or default attenuation factors using the following equation:

$$RBSLsg = RBSLia / \alpha \quad (3)$$

Where:

$RBSL_{sg}$	=	risk-based screening level for soil gas ($\mu g/m^3$)
Cia	=	target indoor air concentration ($\mu g/m^3$)
α	=	chemical-specific attenuation factor (unitless)

5.0 EVALUATION OF MINERAL SPIRITS

Mineral spirits is a heterogeneous mixture of aliphatic and aromatic carbon chains. It is comprised of numerous compounds with variable physicochemical properties and toxicities. Methods presented by the Total Petroleum Hydrocarbon (TPH) Criteria Working Group (TPHCGW, 1997) and the Department of Toxic Substances Control were used to identify the chemical-specific properties and toxicity criteria that best represent the entire mixture. Then, the methodologies outlined by the OEHHA (OEHHA, 2005) were utilized to calculate the RBSL.

5.1 PHYSICOCHEMICAL PROPERTIES

The physicochemical properties selected to best represent mineral spirits were calculated from an assortment of individual chemicals that could be present in the mixture. Mineral spirits are defined as a petroleum distillate mixture composed of C7-C12 hydrocarbons from three groups: linear and branched alkanes or paraffins (30-50%), cycloalkanes (30-40%), and aromatic hydrocarbons (10-20%), (ATSDR, 2000). The composition-based averaging method presented in Volume 3 of the TPH Criteria Working Group Series was utilized in this evaluation

(TPHCWG, 1997). Physicochemical properties from about 150 chemicals between 7 and 12 carbons in length that belong to the three hydrocarbon groups listed above were compiled. An equivalent carbon chain length (EC) of 9.5 was used to calculated weighted averages for paraffins, cycloalkanes and aromatics. The final value for each chemical property was calculated using the empirical data for each hydrocarbon group and the following equation:

Mineral Spirits = (0.45 x Paraffins) + (0.4 x Cylcoalkanes) + (0.15 x Aromatics) (4)

The physicochemical properties calculated for mineral spirits are presented on Table 2.

5.2 TOXICITY CRITERIA

DTSC recommended toxicity criteria for aliphatics and aromatics within specific carbon ranges were used. Specifically, DTSC recommends noncarcinogenic reference concentrations (RfC) of 0.3 milligrams per cubic meter (mg/m^3) for C9-C18 aliphatics and 0.05 mg/m^3 for C9-C18 aromatics. Because mineral spirits are comprised of about 85 percent aliphatic and 15 percent aromatic hydrocarbons, a composition-based weighted average RfC of 0.26 mg/m^3 was developed from the following equation:

$$RfC = (0.85 \times RfC_{C9\text{-}C18\ aliphatics}) + (0.15 \times RfC_{C9\text{-}C18\ aromatics}) \quad (5)$$

5.3 JOHNSON AND ETTINGER MODELING

The Johnson and Ettinger (J&E, 1991) model was used to calculate chemical-specific soil-gas-to-indoor air attenuation factors. The attenuation factors provided by the J&E model relate vapor concentrations in indoor air to vapor concentrations at the chemical source by accounting for the one-dimensional convective and diffusive mechanisms of vapor transport from the subsurface source into indoor air located directly above or in close proximity to the source. As outlined by OEHHA, the advanced Johnson and Ettinger model spreadsheets for subsurface vapor intrusion from soil parameterized by U.S. EPA were used to calculate the attenuation factor. Inputs to the advanced model spreadsheets include chemical properties, and saturated and unsaturated zone

soil properties. Building structural properties were consistent with the current commercial/industrial building (without engineered fill) scenario and a future residential home (with engineered fill), (OEHHA, 2005). The same values used in the development of the CHHSLs were input into the model.

5.4 MINERAL SPIRITS RISK-BASED SCREENING LEVELS

The RBSLs for TPHms were determined for a commercial/industrial worker exposure to indoor air and vapor intrusion from soil gas. The RBSLs are 380 µg/m^3 and 325,000 µg/m^3 for indoor air and soil gas, respectively. The RBSL for future residential exposure in soil gas via vapor intrusion is 250,000 µg/m^3.

6.0 SCREENING-LEVEL RISK EVALUATION RESULTS

The maximum detected concentrations of all COPCs in indoor air and soil gas were compared to their respective RBSLs. The results of the screening-level risk evaluation are presented on Tables 3 and 4 for commercial/industrial workers and residents respectively. A summary of the results is presented below.

6.1 CURRENT COMMERCIAL/INDUSTRIAL WORKER

Twelve COPCs were identified in indoor air of commercial/industrial buildings located on-site. Except for benzene, chloroform, and tetrachloroethene (PCE), the maximum concentrations of the COPCs did not exceed their respective RBSLs. Chloroform and PCE were not detected in soil gas suggesting that the presence of these two constituents are likely related to building materials and/or ambient air.

As presented on Table 6 of the ERM report (ERM, 2007), benzene was not detected in ambient air at the site. However, the results reported as detections are consistent with the ambient air reporting limits suggesting that the presence of benzene in indoor air is likely related to outdoor ambient air rather than from subsurface migration.

No COPCs in soil gas exceeded the RBSLs.

6.2 FUTURE RESIDENTIAL SCENARIO

Because the indoor air sampling results represent conditions for the current existing building, the results are not applicable to future residents.

Seventeen COPCs were identified in subsurface soil gas on-site. No chemicals exceeded either of the carcinogenic and noncarcinogenic RBSLs. This indicates that exposure to COPCs in indoor air of future residential buildings should not result in unacceptable noncarcinogenic health effects or carcinogenic risks under the conditions evaluated.

6.3 MINERAL SPIRITS

TPHms was not detected in indoor air or soil gas at the site. Although the laboratory reporting limit of 3,000 µg/m^3 for indoor air samples is higher than the commercial indoor air RBSL of 380 µg/m^3, there is no indication that TPHms is a potential concern because TPHms was not detected (laboratory reporting limit of 2,600 µg/m^3) in soil vapor compared to the commercial RBSL of 320,000 µg/m^3. Similarly, TPHms was not detected in soil vapor above the residential RBSL of 250,000 µg/m^3.

7.0 CONCLUSIONS

In summary, there is no apparent unacceptable risk posed by vapor intrusion given recent VOC concentrations in soil gas and current use of the property. In addition, under a hypothetical residential land use scenario, the concentrations of chemicals in soil gas are below their respective RBSLs indicating that the chemicals do not pose human health concerns under the conditions evaluated.

8.0 LIMITATIONS

Within the limitations of the agreed-upon scope of work, this evaluation has been undertaken and performed in a professional manner in accordance with generally accepted practices, using the degree of skill and care ordinarily exercised by environmental consultants under similar circumstances. The conclusions presented herein are professional opinions based solely upon the analytical data described in this report. The results reported herein are applicable to the time the sampling occurred. They are intended exclusively for the purpose outlined herein and the site location and project indicated.

A re-evaluation of potential human health risks may be required if site use or conditions change. It is possible that currently unrecognized subsurface issues may be present. However, this screening-level risk evaluation has been prepared in a manner consistent with that generally used in agency guidance at the time it was prepared. It is likely that risk assessment methods and data identifying and quantifying the toxicity of chemicals will improve with time. Should site use, conditions, or toxicity criteria change, the information and conclusions in this report may no longer apply.

9.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR), 2000, Stoddard Solvent Toxicity, U.S. Department of Health and Human Services, October.

Johnson, P.C., and R. A. Ettinger (J&E), 1991, Heuristic Model for Predicting the Intrusion of Contaminant Vapors into Buildings, Environmental Science and Technology, v. 25, n. 8, p. 1445 – 1452.

Office of Environmental Health Hazard Assessment (OEHHA), 2005, Human-Exposed-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil,), Updated, January.

Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG), 1997, Selection of Representative TPH Fractions Based on Fate and Transport Considerations, Volume 3, July.

U.S. EPA, 1989, Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part A, Interim Final, Office of Emergency and Remedial Response, Washington, D.C.

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TABLE 1

RISK-BASED SCREENING LEVELS FOR INDOOR AIR AND SOIL GAS[1]

McGrath Properties
1001 42nd Street
Oakland, California

Compound	Inhalation Toxicity Criteria		Commercial Worker						Resident					
			RBSL --Noncancer			RBSL -- Cancer			RBSL --Noncancer			RBSL -- Cancer		
	Non-carcingonic	Carcinogenic	Indoor Air	alpha[2] (α)	Soil Gas	Indoor Air	alpha[2] (α)	Soil Gas	Indoor Air	alpha[2] (α)	Soil Gas	Indoor Air	alpha[2] (α)	Soil Gas
	(µg/m^3)	(µg/m^3)$^{-1}$	(µg/m^3)	(unitless)	(µg/m^3)	(µg/m^3)	(unitless)	(µg/m^3)	(µg/m^3)	(unitless)	(µg/m^3)	(µg/m^3)	(unitless)	(µg/m^3)
Mineral Spirits	260	na	3.8E+02	**1.2E-03**	3.2E+05	--	**1.2E-03**	--	2.7E+02	**1.1E-03**	2.5E+05	--	**1.1E-03**	--
Acetone	3150	NC	4.6E+03	1.0E-03	4.6E+06	--	1.0E-03	--	3.3E+03	9.0E-04	3.7E+06	--	9.0E-04	--
Benzene	60	2.9E-05	8.8E+01	**1.2E-03**	7.6E+04	1.4E-01	**1.2E-03**	1.2E+02	6.3E+01	**9.9E-04**	6.3E+04	8.4E-02	**9.9E-04**	8.4E+01
1,3-Butadiene	20	1.7E-04	2.9E+01	1.0E-03	2.9E+04	2.4E-02	1.0E-03	2.4E+01	2.1E+01	9.0E-04	2.3E+04	1.4E-02	9.0E-04	1.6E+01
Carbon disulfide	800	na	1.2E+03	1.0E-03	1.2E+06	--	1.0E-03	--	8.3E+02	9.0E-04	9.3E+05	--	9.0E-04	--
Chloroform	300	5.3E-06	4.4E+02	1.0E-03	4.4E+05	7.7E-01	1.0E-03	7.7E+02	3.1E+02	9.0E-04	3.5E+05	4.6E-01	9.0E-04	5.1E+02
Chloromethane	90	NC	1.3E+02	1.0E-03	1.3E+05	--	1.0E-03	--	9.4E+01	9.0E-04	1.0E+05	--	9.0E-04	--
Cyclohexane	5950	na	8.7E+03	1.0E-03	8.7E+06	--	1.0E-03	--	6.2E+03	9.0E-04	6.9E+06	--	9.0E-04	--
trans-1,2-Dichloroethene	70	na	1.0E+02	**1.2E-03**	8.9E+04	--	**1.2E-03**	--	7.3E+01	**8.7E-04**	8.4E+04	--	**8.7E-04**	--
Ethanol[3]	1750	na	2.6E+03	1.0E-03	2.6E+06	--	1.0E-03	--	1.8E+03	9.0E-04	2.0E+06	--	9.0E-04	--
Ethylbenzene	2,000	NC	2.9E+03	1.0E-03	2.9E+06	--	1.0E-03	--	2.1E+03	9.0E-04	2.3E+06	--	9.0E-04	--
4-Ethyltoluene[4]	700	na	1.0E+03	1.0E-03	1.0E+06	--	1.0E-03	--	7.3E+02	9.0E-04	8.1E+05	--	9.0E-04	--
Freon 11	300	na	4.4E+02	1.0E-03	4.4E+05	--	1.0E-03	--	3.1E+02	9.0E-04	3.5E+05	--	9.0E-04	--
Freon 12	200	na	2.9E+02	1.0E-03	2.9E+05	--	1.0E-03	--	2.1E+02	9.0E-04	2.3E+05	--	9.0E-04	--
Heptane[5]	200	NC	2.9E+02	1.0E-03	2.9E+05	--	1.0E-03	--	2.1E+02	9.0E-04	2.3E+05	--	9.0E-04	--
Hexane	200	na	2.9E+02	1.0E-03	2.9E+05	--	1.0E-03	--	2.1E+02	9.0E-04	2.3E+05	--	9.0E-04	--
Methyl ethyl ketone	5000	na	7.3E+03	1.0E-03	7.3E+06	--	1.0E-03	--	5.2E+03	9.0E-04	5.8E+06	--	9.0E-04	--
Tetrachloroethene	35	5.9E-06	5.1E+01	**1.2E-03**	4.4E+04	6.9E-01	**1.2E-03**	6.0E+02	3.7E+01	**8.8E-04**	4.2E+04	4.1E-01	**8.8E-04**	4.7E+02
Tetrahydrofuran	300	1.9E-06	4.4E+02	1.0E-03	4.4E+05	2.1E+00	1.0E-03	2.1E+03	3.1E+02	9.0E-04	3.5E+05	1.3E+00	9.0E-04	1.4E+03
Toluene	300	NC	4.4E+02	**1.2E-03**	3.8E+05	--	**1.2E-03**	--	3.1E+02	**9.9E-04**	3.2E+05	--	**9.9E-04**	--
1,1,1-Trichloroethane	2200	NC	3.2E+03	**1.2E-03**	2.8E+06	--	**1.2E-03**	--	2.3E+03	9.2E-04	2.5E+06	--	9.2E-04	--
1,2,4-Trimethylbenzene	6.0	NC	8.7E+00	1.0E-03	8.69E+03	--	1.0E-03	--	6.2E+00	9.0E-04	6.9E+03	--	9.0E-04	--
o-Xylene	700	NC	1.02E+03	**1.2E-03**	8.81E+05	--	**1.2E-03**	--	7.3E+02	**9.9E-04**	7.4E+05	--	**9.9E-04**	--
m/p-Xylene	700	NC	1.0E+03	**1.2E-03**	8.89E+05	--	**1.2E-03**	--	7.3E+02	**9.2E-04**	8.0E+05	--	**9.2E-04**	--

Notes:

1. Risk-based screening levels (RBSL) calculated using the methodology outlined by OEHHA's Human-Exposed-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, January 2005.
2. Chemical-specific alphas calculated for mineral spirits using the Johnson and Ettinger Model and default parameters for existing commercial/industrial and future residential buildings as outlined by OEHHA. Bold values are published alphas (OEHHA, 2005). All other alphas are default values for existing commercial building and future residential buildings (DTSC, 2005)
3. Toxicity criteria from surrogate chemical methanol.
4. Toxicity criteria from the surrogate chemical o-xylene.
5. Toxicity criteria from surrogate chemical hexane.

Abbreviations:

na = not available
NC = noncarcinogenic
µg/m^3 = micrograms per cubic meter
-- = not applicable

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TABLE 2

PHYSICOCHEMICAL CONSTANTS FOR MINERAL SPIRITS[1]

McGrath Properties
1001 42nd Street
Oakland, California

Group	Fraction	Equivalent Carbon Number[2] (EC) (--)	Boiling Point (^oC)	Vapor Pressure (atm)	Molecular Weight (MW) (g/mole)	Solubility (S) (mg/L)	Dimensionless Henry's Law Constant (H') (--)	Henry's Law Constant (H') (atm-m^3/mole)	Diffusivity in Air (D_i) (cm^2/sec)	Diffusivity in Water (D_w) (cm^2/sec)	Organic Carbon Partition Coefficient (Koc) (mL/g)	Octanol-Water Partition Coefficient (Log Kow) (--)
Paraffins	0.45	9.5	1.3E+02	5.5E-02	1.3E+02	2.2E+00	1.5E+02	3.7E+00	6.9E-02	7.2E-06	9.1E+04	5.5E+00
Cycloparaffins	0.40	9.5	1.4E+02	4.0E-02	1.3E+02	4.8E+00	5.0E+01	1.2E+00	7.5E-02	8.2E-06	2.3E+04	5.2E+00
Aromatics	0.15	9.5	1.8E+02	1.4E-01	1.2E+02	6.4E+01	2.8E-01	6.8E-03	5.8E-02	7.3E-06	5.1E+03	3.7E+00
Composition Based Average			141.9	0.06	127.6	12.6	89.2	2.2	0.1	0.00001	50785.2	5.1

Notes:

1. Calculation of physicochemical properties using the composition-based averaging approach of fraction-specific properties as outlined by the Total Petroleum Hydrocarbon Criteria Working Group, Volume 3 (TPH Criteria Working Group, 1997).
2. The equivalent carbon number is calculated as the average carbon number in the mineral spirits hydrocarbon range.

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TABLE 3

SCREENING LEVEL RISK EVALUATION FOR COMMERCIAL/INDUSTRIAL WORKERS[1]

McGrath Properties
1001 42nd Street
Oakland, California

Concentrations reported in micrograms per cubic meter (µg/m^3)

	Indoor Air						Soil Gas					
Compound	**Maximum Concentration[2]**	**RBSLnc**	**Exceedance?**	**RBSLc**	**Exceedance?**		**Maximum Concentration[2]**	**RBSLnc**	**Exceedance?**	**RBSLc**	**Exceedance?**	
Mineral Spirits	<3000	380	No	--	No		<2600	325,000	No	--	No	
Acetone	23	4600	No	--	No		50	4,599,000	No	--	No	
Benzene	0.53	90	No	0.14	**Yes**	[6]	6	76,000	No	122	No	
1,3-Butadiene	na	30	--	0.02	--		12	29,000	No	24	No	
Carbon disulfide	na	1170	--	--	--		14	1,168,000	No	--	No	
Chloroform	0.92	440	No	0.77	**Yes**	[6]	<5.4	438,000	No	771	No	
Chloromethane	1.4	130	No	--	No		<9.1	131,000	No	--	No	
Cyclohexane	<2.9	8690	No	--	No		12	8,687,000	No	--	No	
trans-1,2-Dichloroethene	<3.4	100	No	--	No		<4.4	89,000	No	--	No	
Ethanol[3]	7.7	2560	No	--	No		47	2,555,000	No	--	No	
Ethylbenzene	<0.74	2920	No	--	No		5	2,920,000	No	--	No	
4-Ethyltoluene[4]	na	1020	--	--	--		5.5	1,022,000	No	--	No	
Freon 11	1.7	440	No	--	No		<6.2	438,000	No	--	No	
Freon 12	2.8	290	No	--	No		<5.4	292,000	No	--	No	
Heptane[5]	<3.5	290	No	--	No		4.7	292,000	No	--	No	
Hexane	<3	290	No	--	No		4.1	291,000	No	--	No	
Methyl ethyl ketone	3.3	7300	No	--	No		25	7,300,000	No	--	No	
Tetrachloroethene	1.6	50	No	0.69	**Yes**	[6]	<7.5	44,000	No	603	No	
Tetrahydrofuran	na	440	--	2.14	--		17	438,000	No	2142	No	
Toluene	3.1	440	No	--	No		20	378,000	No	--	No	
1,1,1-Trichloroethane	<0.93	3210	No	--	No		69	2,793,000	No	--	No	
1,2,4-Trimethylbenzene	0.86	10	No	--	No		6.4	9,000	No	--	No	
o-Xylene	<0.74	1020	No	--	No		5.8	881,000	No	--	No	
m/p-Xylene	1.2	1020	No	--	No		13	889,000	No	--	No	

Notes:

1. Comparison of noncarcinogenic and carcinogenic risk-based screening levels to maximum detected concentrations for indoor air and soil gas.
2. The maximum detected concentration is presented. If the compound was not detected then the maximum reporting limit is presented.
3. Toxicity criteria from surrogate chemical methanol.
4. Toxicity criteria from the surrogate chemical o-xylene.
5. Toxicity criteria from surrogate chemical hexane.
6. Benzene, chloroform, and tetrachloroethene were detected above the commerical indoor air screening level; however these chemicals are likely related to building materials because they were not detected in soil vapor at concentrations of concern.

Abbreviations:

< = compound not detected at or above the laboratory reporting limit
-- = not applicable

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TABLE 4

SCREENING LEVEL RISK EVALUATION
FOR FUTURE RESIDENTIAL SCENARIO[1]

McGrath Properties
1001 42nd Street
Oakland, California

Concentrations reported in micrograms per cubic meter (µg/m^3)

Compound	Soil Gas				
	Maximum Concentration[2]	RBSLnc	Exceedance?	RBSLc	Exceedance?
Mineral Spirits	<2600	253,000	No	--	No
Acetone	50	3,650,000	No	--	No
Benzene	6	63,000	No	84	No
1,3-Butadiene	12	23,000	No	16	No
Carbon disulfide	14	927,000	No	--	No
Chloroform	<5.4	348,000	No	510	No
Chloromethane	<9.1	104,000	No	--	No
Cyclohexane	12	6,894,000	No	--	No
trans-1,2-Dichloroethene	<4.4	84,000	No	--	No
Ethanol[3]	47	2,028,000	No	--	No
Ethylbenzene	5	2,317,000	No	--	No
4-Ethyltoluene[4]	5.5	811,000	No	--	No
Freon 11	<6.2	348,000	No	--	No
Freon 12	<5.4	232,000	No	--	No
Heptane[5]	4.7	232,000	No	--	No
Hexane	4.1	231,000	No	--	No
Methyl ethyl ketone	25	5,794,000	No	--	No
Tetrachloroethene	<7.5	42,000	No	470	No
Tetrahydrofuran	17	348,000	No	1400	No
Toluene	20	317,000	No	--	No
1,1,1-Trichloroethane	69	2,486,000	No	--	No
1,2,4-Trimethylbenzene	6.4	7,000	No	--	No
o-Xylene	5.8	740,000	No	--	No
m/p-Xylene	13	798,000	No	--	No

Notes:

1. Comparison of noncarcinogenic and carcinogenic risk-based screening levels to maximum detected concentrations for soil gas.
2. The maximum detected concentration is presented. If the compound was not detected then the maximum reporting limit is presented.
3. Toxicity criteria from surrogate chemical methanol.
4. Toxicity criteria from the surrogate chemical o-xylene.
5. Toxicity criteria from surrogate chemical hexane.

Abbreviations:

< = compound not detected at or above the laboratory reporting limit
-- = not applicable