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| **Environmental Enlightenment #148**By Ami Adini - Reissued September 12, 2016

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| This is a SHORT, LIGHT and SIMPLE newsletter. Its purpose is to rekindle in the initiated terminology they have once learned, and enlighten the uninitiated on terms they may have heard but never knew the meaning of. |
| **Evaluation of Contaminated Properties**OEHHA is short for the [Office of Environmental Health Hazard Assessment](http://oehha.ca.gov/).http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image001.jpgOEHHA is one of six agencies under the umbrella of [California Environmental Protection Agency (CalEPA)](http://calepa.ca.gov/)http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image002.jpgThe mission of OEHHA is to “protect and enhance public health and the environment by scientific evaluation of risks posed by hazardous substances, succinctly stated on its web page as "Science for a Healthy California."http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image003.jpgOEHHA develops and provides risk managers in state and local government agencies with toxicological and medical information relevant to decisions involving public health.Toxicology and medicine are not exact fields to the degree that physics or chemistry are; hence, there are no numbers that are “cut and dry” as to what constitutes a health hazard.Thus, toxicologists deal with “acceptable risks.”http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image004.jpgOne yardstick to acceptable risk is that it is okay for a lifetime exposure to a substance to increase the chance of developing cancer for one person in a million or less. Take for example a place that manufactures a dry cleaning solvent called perchloroethylene (PCE) which will cause cancer if too much of it absorbs into a body. We measure the PCE vapor in the air and find it to be X millionths of a gram (micrograms) for every cubic meter. The toxicologist will then tell us that that X number is okay as long as lifetime exposure to it will cause cancer in no more than one person in a million.http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image005.jpgIf a person lives in a home that is situated on a land that emits toxic gas, and if the gas enters the home and we find that there are 4 millionths of gram of that gas in every cubic meter of space, then this person is exposed to that much toxic gas. This is his *exposure*.http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image006.jpg<https://www.epa.gov/vaporintrusion/what-vapor-intrusion>4 millionths of a gram per cubic meter = 4 micrograms/cubic meter = 4µg/m3We use the Greek letter **µ** (pronounced mu) to denote “micro” which means one millionth.A quotient is a result obtained by dividing one quantity by another; it's the number of times one quantity is contained in another. Thus, if we divide 10 by 2, the quotient is 5 (10:2 = 5), and if we divide 10 by 4, the quotient is 2.5 (10:4 = 2.5)http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image007.jpgA Hazard Quotient (HQ) is the ratio between the potential exposure to a substance and the level at which no adverse effects are expected.           Potential Exposure (micrograms/cubic meter)HQ = ----------------------------------------------------                     Level of no adverse effect (micrograms/cubic meter)Example: The measured level of the toxicant is 80,000µ/m3 and the highest concentration of the toxicant known not to cause harm is 20,000µg/m3:

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|       80,000µg/m3   HQ = ---------------- = 4      20,000µg/m3 |   | http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image008.jpg |
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| This may portend trouble. |   |

 Intuitively, we'd like to see HQs of 1, because it would then mean that the level of exposure equals the level at which no adverse effects are expected, right?Right!If the Hazard Quotient is calculated to be less than 1, then no adverse health effects are expected as a result of exposure

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| HQ greater than 1.0 requires attention. | http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image009.jpg |

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| HQ less than 1.0 is generally not toxic. | http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image010.jpg |

[California Human Health Screening Levels (CHHSLs)](http://oehha.ca.gov/risk-assessment/california-human-health-screening-levels-chhsls) were developed by OEHHA on behalf of the California Environmental Protection Agency.The CHHSLs are concentrations of chemicals in soil or soil-gas below threshold levels of concern for risks to human health.

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| **CHSSLs** |   | http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image011.jpg |

In CHSSLs, there are two threshold levels of concern:1. An excess lifetime cancer risk not exceeding one-in-a-million (10-6), and
2. A hazard quotient (HQ) of 1.0 for non-cancer health effects.

Example, lead and lead compounds in soil:http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image012.jpg© University of Minnesota Extension (<http://www.extension.umn.edu/garden/yard-garden/soils/lead-in-home-garden/>)* In residential scenarios, the CHSSL is 80 milligrams in 1 kilogram of soil (mg/kg).
* In commercial or industrial scenarios, this number is 320 mg/kg.

Example, vapors of tetrachloroethylene (also known as PCE OR PERC, a carcinogenic dry cleaning solvent) in soil below buildings constructed without engineered fill:http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image013.jpg* In residential scenarios, the CHSSL is 0.18 micrograms in 1 liter of soil vapor (0.18µg/l).
* In commercial or industrial scenarios, this number is 0.60µg/l.

Under most circumstances, the presence of a chemical in soil, soil gas or indoor air at concentrations below the corresponding CHHSLs can be assumed to not pose a significant health risk to people who may live (residential CHHSLs) or work (commercial/industrial CHHSLs) at the site.The presence of a chemical at concentrations in excess of a CHHSL does not indicate that adverse impacts to human health are occurring or will occur but suggests that further evaluation of potential human health concerns is warranted.The CHHSLs are NOT regulatory "cleanup standards". Use of the CHHSLs is voluntary on the part of those who choose to use them.At sites where cleanup of contaminated soils to levels at or below the CHHSLs would be costly, the time and effort to develop more site-specific cleanup may be desired.http://amiadini.com/NewsletterArchive/160912-NL148/envEnl-148_clip_image014.jpgAt sites where the extent of contaminated soil is limited or the timeframe available to carry out cleanup actions is very short, use of the CHHSLs as final soil cleanup standards may be cost-beneficial.  |
| You can find past issues of our "Environmental Enlightenment" at [amiadini.com](http://www.amiadini.com/) Wealth of information about environmental site assessments in the real estate transactions and issues concerning assessment and cleanup of contamination in the subsurface soil and groundwater. |

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| Call me if you have any questions. There are **no obligations.**Ami Adini Environmental Services, Inc.Environmental Consultants & General Engineering ContractorsCalifornia Lic. #1009513 A B HAZ ASB**818-824-8102**; **mail@amiadini.com**[www.amiadini.com](http://amiadini.com/)Ami Adini is a veteran environmental practitioner with over 40 years of experience. He carries a Bachelor of Science degree (B.Sc.) in Mechanical Engineering including academic credits in Nuclear and Chemical Engineering and postgraduate education in these fields. His career includes design and construction of nuclear plant facilities, chemical processing plants and hazardous wastewater treatment systems. He is a former California Registered Environmental Assessor Levels I & II in the 1988-2012 registry that certified environmental professionals in the assessment and remediation of environmentally impacted land, and a Registered Environmental Professional (REP) since 1989 with the National Registry of Environmental Professionals (NREP). He is a California Business & Professions Code Qualifying Responsible Managing Officer (RMO) in the General Engineering Contractor classification with Hazardous Substance Removal and Asbestos certifications, and president of AMI ADINI ENVIRONMENTAL SERVICES, INC. (AAES), a general engineering contractor and consulting firm specializing in environmental site assessments, rehabilitation of contaminated sites and removal of environmental risks from real-estate transactions. (Contact Ami for a complete resume.) **AAES provides practical solutions to environmental concerns using the highest standards of ethics and integrity while providing its clients with maximum return on their investments.** |

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