



Background Information on the Intrusion Screening Values

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The Minnesota Pollution Control Agency's (MPCA) Environmental Outcomes and Analysis Division (Outcomes Division) staff in cooperation with the Minnesota Department of Health (MDH) have developed compound-specific inhalation risk screening values, known as Intrusion Screening Values (ISVs), for volatile compounds commonly evaluated during vapor investigations. The MPCA's Outcomes Division is responsible for maintaining the list of ISVs and providing technical support, while the MDH will provide technical support as requested by MPCA.

Application of the ISVs

The ISVs were developed to support the MPCA's Remediation Division risk-based guidance for evaluating the vapor intrusion pathway and are meant to be applied as screening values to evaluate potential risks utilizing the MPCA's Remediation Division program's guidance for this pathway. The values are designed to be used for screening for inhalation risks to indoor air. The MPCA's Remediation Division also uses multiples of the ISVs (i.e., 10 and 100 times the ISVs) as screening values for both subsurface soil gas and for sub-slab vapor results. The rationale for the soil gas and sub-slab screening values are described in the MPCA's Remediation Division guidance documents.

The compounds for which ISVs have been developed were chosen, at the request of the MPCA's Remediation Division, to provide inhalation risk screening values for as many compounds as possible that are

typically reported from the analyses of vapor samples using the laboratory analytical method, U.S. Environmental Protection Agency (USEPA) Method TO-15. This is the most commonly used analytical method for vapor sampling during vapor intrusion site investigations.

Toxicity Source Hierarchy

The sources of toxicity values used for development of the ISVs, in order of preference are: MDH, EPA Integrated Risk Information System (IRIS), USEPA's National Center for Environmental Assessment (NCEA) Provisional Peer Reviewed Toxicity Values (PPRTVs), California Environmental Protection Agency, Agency for Toxic Substances and Disease Registry (ATSDR), and other USEPA guidance. This hierarchy of preference was used for the majority of the compounds; for a number of contaminants there is only one toxicity value available. This hierarchy is similar to the hierarchy used for the MPCA's air risk assessment program with the exception that the ISVs use the USEPA's PPRTVs as a data source.

The MDH promulgated Health Risk Values (HRVs) in 2002. The HRVs are concentrations of chemicals in the air that are unlikely to pose a significant risk. In most cases, if there is a HRV available for a contaminant, the value is used as the ISV. If there is newer toxicity information available on a contaminant, the use of professional judgment in cooperation with MDH may result in an ISV that is different than a HRV. The PPRTVs are developed by request for the USEPA's Superfund

Program, and the USEPA supports their use for applications at remediation sites, especially in the absence of updated IRIS values. The toxicity values on which the ISVs are based have undergone various peer-review processes depending on their source.

Exceptions to the stated hierarchy of toxicity sources is minimal and is based on professional judgment in order to utilize the highest quality toxicity data that is currently available. Examples of exceptions to the hierarchy include the use of more recent data, choosing not to use route-to-route extrapolated data, and based on concerns that may exist regarding data quality or confidence associated with specific toxicity studies. MDH was consulted for compounds for which the hierarchy was not used. For chemicals that are risk drivers, it may be appropriate to request further consideration of toxicity values.

For non-carcinogens, the ISVs are simply the Reference Concentrations (RfCs) from toxicological studies. MDH defines RfCs in the HRV rule as "...an estimate, with uncertainty spanning perhaps an order of magnitude, of a continuous inhalation exposure to the human population, including sensitive subgroups, that is likely to be without appreciable risks or deleterious effects during a lifetime." For carcinogens, the ISVs are the cancer risk level (1×10^{-5}) divided by the unit risk factor – the upper bound excess cancer risk from a continuous lifetime exposure to a chemical.

Additional Considerations

Additivity of cancer and non-cancer risks may need to be considered at sites that have multiple compounds of concern, especially for evaluating risks posed by indoor air sampling results. This evaluation, if conducted, should be coordinated closely with the MPCA's Outcomes Division Risk Assessor.

The Occupational Safety and Health Administration's (OSHA) Permissible Exposure Limits (PELs) are standards developed to protect workers against the health effects of exposure to hazardous substances. However, they are neither intended nor recommended for protecting the general population. They are calculated to be protective of a healthy working male population that is exposed to chemicals on a five-work day per week basis. Many of the PELs have not been updated at OSHA since the 1970s. At industrial facilities that manufacture or use the potential chemicals of concern for the vapor intrusion pathway, the ISVs will not replace the applicable OSHA occupational exposure concentrations. At other receptor locations, however, the ISVs and the other media-specific screening values will be used to evaluate risks posed by vapor intrusion.

The ISVs will be updated on the MPCA's Web site as new toxicity values are generated from the hierarchy of sources as appropriate at:

<http://www.pca.state.mn.us/cleanup/riskbasedoc.html>.