Topic: Development of Remediation Standards Based on Short-term (Acute) Exposure Scenarios for "Hot Spot" Removal

Description of the issue:
Concerns have been raised about unacceptable exposure to contaminants as a result of potential failures of engineering controls. All engineering controls must be monitored and maintained and the Department must have a strong enforcement program against parties that fail to maintain engineering controls. Even with an effective monitoring and maintenance program, there are concerns about unacceptable short-term exposure to contaminants. Commissioner Jackson testified before the Senate Environment committee that, where toxicological information is available, the statutes should require the Department to promulgate short term/acute exposure soil remediation standards. Then, based on these standards, any soil with contamination in excess of short term/acute exposure standards must either be excavated or removed from the site or treated to standards. These amendments would continue to allow for the use of engineering and institutional controls but would prohibit high concentrations of contaminants that could pose a short-term (acute) exposure health risk to be left on site.

DEP's Current Authority:
The Brownfield and Contaminated Site Remediation Act, at N.J.S.A. 58:10B-12d, specifically requires the Department to develop soil remediation standards protective of human health based on long-term or chronic exposure to contaminants. The Brownfield and Contaminated Site Remediation Act is silent on the development of soil remediation standards protective of human health based on short-term or acute exposure to contaminants. In addition, the Act is silent on the concept of "hot spot" treatment/removal.

Background:
The effectiveness of engineering controls and the potential risk of exposure to contaminants resulting from an engineering control failure is a concern of many. The concern is heightened if, a failure and exposure to high concentrations of contaminants occur. The Department does not currently have the statutory authority to require "hot spot" contamination removal, as long as the proposed remedy is "protective". A capping remedy can be deemed protective (depending on the site conditions) once the source and other potential threats/impacts to groundwater is removed; however, a crack or disturbance to the cap may result in an unacceptable exposure to contaminants. One solution is to establish soil remediation standards protective of short-term or acute exposures. Once established, no contaminant concentrations above these standards would be allowed to remain on-site even if the final remedy uses an engineering control. Such standards coupled with timely engineering controls maintenance would minimize, if not eliminate, exposure risk to contaminants. At this time, there is limited toxicological data available to be used for the development of such standards but some data does exist.

As an alternative to short–term exposure soil remediation standards, requirements to excavate/treat high levels of soil contaminants ("Hot spots") could be implemented. (See Remedy Selection, Stakeholder Comments.)

Stakeholder comments:
Other than a recognition that a system(s) needs to be implemented to prevent engineering control failure and exposure to contaminants, there was no consensus among the members of the

stakeholder group regarding specific recommendations for the development of short-term exposure soil remediation standards or for "hot spot" treatment/removal. Stakeholders representing the regulated community agreed that acute (short-term) risks should be addressed by a remedy if an acute risk to human health or the environment truly exists. However, these stakeholders also said that many chemicals do not pose an acute health risk at levels typically found in the environment. In addition, these stakeholders felt that if the Department believes there are acutely hazardous materials or site conditions that require an alternative approach, the Department currently has the authority to use site-specific risk assessment to demonstrate that removal is warranted. Stakeholders representing the environmental community strongly recommended establishing acute exposure/hot spot standards for all contaminants using the best data available, and requiring removal of soil above those standards in all clean ups.

While the development of short-term (acute) exposure remediation standards makes sense scientifically, there would be several problems with its implementation. Currently, there is little to no consensus within the scientific community on many issues including: 1) an appropriate definition for what constitutes a short-term exposure (i.e.; one month, or one week); 2) the selection of appropriate health end points; and 3) scarcity of toxicological studies based on acute exposure to contaminants. Based on currently available information, it is estimated that soil remediation standards, as it relates to acute exposure, could be developed for only about 6 contaminants. There was consensus agreement among all stakeholders that acute exposure remediation standards need to be based on scientific data.

The concept of "hot spot" treatment or removal is not new. One of the problems with implementing this concept is coming to consensus on the description/definition of a "hot spot". One way to define a "hot spot" is to use a multiplier on existing remediation standards. Stakeholders representing the regulated community felt that the development of a definition of "hot spot" and requirement for "hot spot" treatment/removal was not an appropriate way to address acute risks, and did not support this approach. They felt that use of an arbitrary multiplier is based neither on science nor the actual risk to human health and the environment. Stakeholders representing the environmental community felt that the "hot spot" concept was a viable option provided that the best available data are used and that cumulative risk and multiple exposures be considered in evaluating what is a "hot spot".

Also discussed was the "principal threat" waste concept that is used by the USEPA. Stakeholders representing the regulated community felt that this concept was more appropriate than that of "hot spot" removal. According to the USEPA, the "principle threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is a material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered a source material; however, non-aqueous phase liquids (NAPLs) in groundwater may be viewed as source materials. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decisions to treat these wastes are made on a site-specific basis through a detailed analysis of the alternatives. Other source materials considered being highly toxic include liquids and other highly mobile materials such as

solvents, or materials having high concentrations of toxic compounds. No 'threshold level" of toxicity/risk has been established to equate to "principal threat". However, where toxicity and mobility of source material combine to pose a potential risk of 10^{-3} or greater, generally treatment alternatives should be evaluated." (1) The stakeholders representing the regulated community recommended that NJDEP consider USEPA's principle threat waste concept to be protective and give parties performing site remediation the option to perform a site-specific risk assessment that will be reviewed by NJDEP, as currently allowed by N.J.S.A. 58:10B-12f.

Stakeholders representing the regulated community stated that the development of acute risk exposure soil standards in and of itself is clearly inadequate to correct the current deficiencies in the Site Remediation Program. Stakeholders representing the environmental community stated a strong position against use of engineering and institutional controls for residences, playgrounds, schools, and childcare facilities, whether acute exposure standards are created or not.

Other States:
A survey of thirteen state regulatory agencies was conducted by the Interstate Technology and Regulatory Council (ITRC) Risk Assessment Resources Team, which evaluated each state's risk-based remediation screening levels. The thirteen states were Alabama, Arkansas, California, Colorado, Florida, Georgia, Kansas, Kentucky, Michigan, Oklahoma, South Carolina, and Tennessee. Of these states, only Florida and Nevada reported that they have developed acute toxicity soil standards. However, the number of chemicals for which acute standards have been developed is extremely limited. For example, Florida has acute standards for only eight chemicals.