ITRC Technology Information Sheet

Vapor Intrusion Mitigation Team | December 2020

Institutional Controls (ICs)
Applicability as a method of vapor intrusion mitigation

This ITRC Technology Information Sheet provides the general description of institutional controls (ICs), the various types of ICs, and the unique application of ICs to the vapor intrusion (VI) pathway. In many states, ICs may be used as the sole site remedy or in conjunction with other remedies, such as engineered controls (ECs). ICs are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and protect the integrity of the remedy.

Overview

Institutional controls (ICs) are a form of land use controls (LUCs) that provide protection from exposure to contaminants on a site. While ICs consist of administrative or legal restrictions on a site, LUCs can also use physical measures, which are called engineering controls or ECs (e.g., typical mitigation measures, physical barriers). In contrast to ECs, ICs include government controls, proprietary controls, enforcement or permit mechanisms, and informational devices. Planning that protects human health and the environment and uses all aspects of an IC life cycle (ITRC, 2016) is essential for long-term success (e.g., a long-term stewardship plan). As it relates to the vapor intrusion (VI) pathway, ICs can be applied as a stand-alone remedy (for undeveloped lands or restricted use on developed land), as part of an overall remedy selection, or as a permit that requires ongoing monitoring and maintenance of the mitigation system.

ICs often work best if "layered" with other ICs, particularly if required for a long period of time. This provides some redundancy and increased levels of oversight (more eyes on the process) and may increase long-term robustness of the overall IC program.

Types of ICs

ICs are divided into four categories:

- **Government controls**
  Governmental controls rely on the regulatory powers of federal, state, or local government and include ordinances, building and development rules, environmental restrictions, and other restrictions on land or resource use. Common examples include zoning ordinances (which limit or condition the type of land use that can occur in defined zones), groundwater use or well drilling limitations via restrictive covenants, and restrictions on reuse of contaminated soils generated from IC areas, and land development regulations (e.g., requiring all new construction to have VI mitigation). Government controls can be enforced by the jurisdiction that enacted the control.

- **Proprietary controls**
  Proprietary controls usually affect a single parcel of property and are considered proprietary or private because they are established by a private agreement between the landowner and an outside party. Proprietary controls are created under the authority of state real property law; thus, these agreements constitute a property right. These controls are attractive because they "run with the land"—meaning they endure as the affected property is sold to new owners. Proprietary controls are sometimes called "deed restrictions," which is a general term used to describe property rights that restrict the use of the property. For example, when indoor air concentrations are acceptable for commercial/industrial use but unacceptable for residential use, deed restrictions are put in place to ensure protection of human health by limiting the current and future use of the building to non-residential activities only.

- **Enforcement or permit mechanisms**
  Enforcement and permit mechanisms include government agency–issued permits, administrative orders, and enforcement agreements (such as consent decrees) that are enforceable by state or federal agencies. These tools can include requirements that restrict future land use. Rather than being a property right (as with proprietary controls), most enforcement and permit mechanisms are binding only to the signatories of the agreement (or the party named in the permit or order), and therefore, the property restrictions do not bind subsequent owners (they do not "run with the land"). Environmental agency permits often include long-term stewardship requirements for periodic monitoring and maintenance inspections of VI mitigation systems. Records of Decision and Five-Year Reviews under CERCLA are examples of these mechanisms.

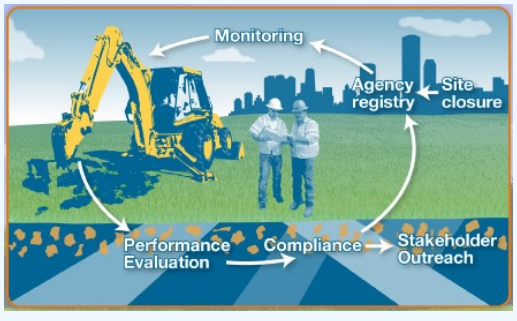
- **Informational devices**
  Informational devices provide information about risks from contamination. These devices are meant to inform and are generally not legally enforceable, although some states require real estate agents to report this information (e.g., VI mitigation systems) to potential buyers. Common examples include the following:
  - **Deed notices**—documents filed in public land records with the property deed.
  - **State registries** (hazardous waste sites)—contain information about contaminated properties.
  - **Advisories—**warn the public of potential risks associated with using contaminated land, surface water, or groundwater, and are usually issued by public health agencies.
  - **On-site notifications**—signs placed at the site providing notification of the activities or actions taken to address a contaminated condition.
  - **Community participation requirements**—Community Involvement Plans (also referred to as community engagement plans) and Restoration Advisory Boards under CERCLA

Advantages

There are some advantages of using ICs for VI mitigation:

- They can be used during any stage of the cleanup process to accomplish various short- and long-term cleanup-related objectives.
- ICs help ensure the protectiveness of the remedy.
- They can include vital elements of response alternatives because they simultaneously influence and supplement the physical component of the remedy.
- ICs can be a suitable alternative when there is no funding sufficient for complete remediation of contamination.

For further information on the various types of ICs, refer to ITRC's Long-term Contaminant Management Using Institutional Controls (ITRC 2016).



Limitations

There are also some limitations when using ICs for VI mitigation:

- ICs can be difficult to implement and enforce over time.
- Some states or parties may not have adequate statutory authority to implement ICs.
- An IC may not be immediately apparent and may be difficult to identify, especially for those that establish building type, occupancy, or even prohibited activities on all or even a portion of the property.
- ICs may limit or prevent future development activities, possibly reducing property values.
- An IC may require a financial assurance component.
- Under some circumstances, ICs may not be able to be removed, only amended, so the record will always be there.

Cost Considerations

The initial implementation/recording costs associated with ICs can range from as low as $100 to $50,000 or more, depending on the size of the site, the complexity of the requirements, the role of consultants/lawyers, and other issues. Likewise, many factors will affect the annual costs, including the type/frequency of inspections and related reporting requirements stipulated in the ICs. The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) has developed an IC costing tool designed to assist state agencies with the process of estimating the full scale of long-term IC stewardship costs (see Resources below). Also included in the Resources section is a similar planning tool from the U.S. Environmental Protection Agency (USEPA) as it pertains to brownfield sites.

Occupant, Community, and Stakeholder Considerations

Carefully designed public outreach is an essential part of any aspect of the VI response. This includes ICs, informational devices, and remedial actions. ICs may be established to ensure the occupants, owners, and managers are informed and involved as partners in the long-term management of mitigation systems and, if necessary, monitoring of the affected building. See ITRC's ***Public Outreach During Vapor Intrusion Mitigation Fact Sheet*** for more information.

Resources

- ITRC (Interstate Technology & Regulatory Council). 2016. *Long-Term Contaminant Management Using Institutional Controls*. IC-1. Washington, D.C.: Interstate Technology & Regulatory Council, Long-Term Contaminant Management Using Institutional Controls Team. https://institutionalcontrols.itrcweb.org/
- USEPA. 2012. *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites*. OSWER 9355.0-89(EPA-540-R-09-001): 40.
- ASTSWMO.2012. "A Long-Term Stewardship State Conceptual Framework to Estimate Associated Cost" http://astswmo.org/files/policies/CERCLA_and_Brownfields/2012-05-LTS_State_Conceptual_Framework_to_Estimate_Associated_Cost.pdf
- USEPA. 2010. Local Government Planning Tool to Calculate Institutional and Engineering Control Costs for Brownfield Properties. EPA 560-F-10-230.

Related Links:

For more information and useful links about VI pathways and mitigation technologies, go to http://www.itrcweb.org .

ECOS

ITRC is affiliated with the Environmental Council of the States

Contacts
Kelly Johnson, North Carolina Dept. of Environmental Quality
kelly.johnson@ncdenr.gov, 919-707-8279
Matthew Williams, Michigan Dept. of Environment, Great Lakes, and Energy
williamsm13@michigan.gov, 517-881-8641

Click here to view a PDF version of this Tech Sheet.