



# Excavation as a Cleanup Method

---

## *A TOSCO Fact Sheet*

### **What is excavation?**

Excavation is the removal of contaminated material from a hazardous waste site using heavy construction equipment. This equipment is the same type of equipment that might be seen at road building projects, including backhoes, bulldozers, and front loaders. On certain sites, custom-designed equipment may be used to prevent the spread of contaminated soils and to protect the health of workers and nearby residents.

### **How is a site excavated?**

The first step in excavation involves the sampling of the contaminated area. Drilling equipment is used to obtain samples of the soil and groundwater at each location. Samples are taken at several different depths in the same location so that a vertical, as well as horizontal, map of the contamination can be made. Special sensing equipment can be used to identify the location of metal drums or tanks that may be present. Historical records such as photographs, eye witness accounts from past employees, and the contamination's effects on vegetation can also be used to pinpoint the area to be excavated.

Once the extent of contamination is fully mapped, the actual removal of material can begin. Excavation is accomplished by digging up the contaminated soils and/or tanks or drums and loading them onto trucks for hauling. Proper safety precautions are employed during excavation and hauling, including, but not limited to, the use of

covered dump trucks, construction equipment with closed cabs, dust reduction procedures and air quantity monitoring. If on-site remediation is used, the excavated waste may be taken to a staging area for treatment (such as soil washing). "Just-in-time" materials management techniques can be used to minimize stock piles. All stockpiled soils should be placed on and covered with polyethylene sheeting to prevent the migration of contaminants. Once treated, the soil can be then returned to its original location for use as backfill. If off-site treatment is required, the trucks will be properly covered and marked. The trucks will then haul the soil to an approved treatment, storage and disposal facility.

Soil testing is conducted in the walls and bottom of the excavated area to ensure that all of the contaminated soil has been removed. Excavation proceeds until the cleanup goals are met. The concentration of contaminants in the surrounding soils should no longer represent a threat to human health, wildlife and natural habitats, or groundwater supplies.

In some cases, rainfall may have carried the contaminants vertically downward into an aquifer. To carry out excavation in areas where the contaminants have entered the aquifer, it may be necessary to install a vertical barrier around the excavation site. The water in the site area is then pumped out so that the soil can be more easily removed. The water that is removed from the site will likely need to be treated before it can be returned to the soil or discharged to a

municipal wastewater treatment plant. The vertical barrier will be removed once the site is backfilled, to allow the aquifer to return to its original state.

Excavation of hazardous wastes or contaminated soils and materials must be carefully planned. This planning will include operations to minimize the spread of contamination to clean areas of the site. Additionally, a health and safety plan must be developed and followed to protect the health of workers and community members. Once excavation equipment is in a contaminated area, it must remain there until the work is completed. The equipment must be thoroughly cleaned and decontaminated prior to leaving the site.

#### **Why is excavation used?**

With the proper equipment and control devices, the excavation of hazardous materials and soils can be accomplished with minimal exposure of people adjacent to the site. Wastes can be removed for further treatment or disposal at an approved landfill. Excavation can use common construction equipment and is a widely used and accepted method of dealing with hazardous materials and soils. Finally, excavation is relatively economical compared to many other treatment technologies.

#### **What precautions must be taken during excavation?**

Excavation and removal of hazardous wastes, followed by land disposal or treatment, are common methods often used at remediation sites. There are no absolute limitations on the types of wastes which can be excavated and removed. However, worker health and safety weigh heavily in the decision to excavate explosive, reactive, or highly toxic waste material.

Excavation of sites that contain volatile organic compounds (VOCS) require special

considerations. Water or foam may be sprayed on the area to be excavated to keep such vapors in the soil. This prevents the VOCs from volatilizing (or evaporating) and prevents the exposure of workers and nearby individuals to the contaminated air. Other methods of vapor suppression involve the use of tarps or construction of enclosures around the site.

Grading and spreading of uncontaminated soils must be carried out once the excavation operations are complete. If the contaminated soils were treated on-site, the clean excavated soil can be returned to its original location. Sites where the contaminated soil has been taken to an approved landfill for disposal may be backfilled using clean soil from another site. Once the backfill operation is complete, the site must be graded and seeded to prevent erosion and to restore the site for future use.

#### **What is the purpose of surface grading and revegetation?**

Surface grading, when properly designed and performed, can be an economical method of controlling erosion and diverting rainwater run-off. The surface over the excavation site is constructed in such a way as to allow rain to quickly flow off the site rather than soaking into the soils. This prevents the erosion of the backfilled material. This grading is very important to the stability of the site and promotes the establishment of vegetation.

Revegetation stabilizes the surface of the site and decreases both wind and rain erosion of the backfill material. It also contributes to the development of a naturally fertile and stable surface environment. Plants and cover crops can be used to upgrade the appearance of former hazardous waste sites that are being considered for various re-use options.