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Discussions and Replies Session 11

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DISCUSSIONS AND REPLIES
SESSION XI

Discussion by Karen Brakefield
B.S. in Geological Engineering

on
Remediation of Contaminated Sites - Case Histories

Paper No. 11.07

The two major remediation projects located in the German Ruhr District were introduced. The first case study is the Branck Park where a coking plant was built followed by benzol and ammonia factories. A serious hydrocarbon contamination has been detected in the vicinity of the former coking plant. A special surface covering technique was chosen for the heavily contaminated sectors. In the paper it was stated it was required by the environmental protection agency to minimize all excavation. I assume the excavation was minimized due to air emissions. The air emissions could have been controlled with foam, water, or some type of encapsulation during the excavation. Was it not more dangerous to leave the contaminates in the ground than to excavate it.

If the source area alone would have been excavated it would greatly reduce any higher concentrations of contaminates in the plume. If the contaminated sediment were to be excavated, would not thermal desorbtion be a viable remediation alternative for the soil and sludge? It seemed as though cost was their only consideration in the remediation of this project not protecting the environment.

The second case history was on Prosper Park which was a former coal mine. Excavation of contaminated soil was done at this site, yet none of the contaminated water was pumped from the site. It stated if increased values of contaminated concentrations were observed some of the observation wells would be converted to recovery wells in order to extract and clean the contaminate water. What are the actions levels for this site and from what source did they come from? It seems as though with the large amount of contaminate soil which was present there and some of the soil was even considered hazardous that there would be concern for the groundwater in the area.

Discussion by Aswath V.Rao
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on
Remediation of Contaminated Sites - Case Histories

Paper No.11.07

Two major remediations projects located in the German Ruhr District is discussed. The first remediation project site is the Brauck Park and the second remediation project site is the Prosper Park. At both the above sites, coal mining was carried out previously and because it became cheaper buying coal from aboard both the coal mining sites were closed down. The remediation work is carried out at both the sites for building Technology parks housing a different, sometimes copperating industry branches.

The first remediation site is the Brauck Park. The coal production was about 1 million tons per year in the 1960's until the mine was closed down in 1971. After the coal mine was closed down, the area became a typical industrial wasteland. But the infrastructure of the surroundings and the immediate neighborhood is still intact. The funding for this remediation site is being provided by the European Fund for Regional Development EPRE, and only the 50 % of the remediation costs had to be supplied be the owners of the former running site.

The subsoil of the Brauck site can be divided into three parts: an upper filling with foundation fragments (2 to 9 meters), a middle stratum of quarternary sediments (about 10 meters below surface) and a fractured cretaceous marl as bedrock. The groundwater table is located at a depth of about 5 meters. A serious hydrocarbon contamination has been detected in the vicinity of the former coking plant. During the past decades the pollutants have migrated through the porous sediments into the fractured rock where they have been percolating through the joint network.

The second remediation site is the Prosper Park. The coal was closed down in this area in 1986 and an industrial waste site remained, part of which was identified as highly contaminated. This site is located in the very center of the city of Bottrop and it was decided to remediate the abandoned site and establish both, new industries and residential areas. No public funding was available for this site, and the remediation is to be carried out at the expense of the former mine owners.

The geology of the Prosper Park is similar to the first site. Again there were three strata that could be distinguished: the upper one consists of about 1 to 3 meters of loose manmade fillings such as wasted soil, bricks and the like. Extreme inhomogeneous ground conditions exist because of the foundation fragments of the former sites.

The remediation strategy for the Prosper Park site included the excavation of large areas within the site including some local contaminations and massive foundation fragments to depth of about 2 meters. After excavating, the existing ground was replaced with coarse cohesionless material, the soil was good enough to allow the construction of streets and buildings.

The highly contaminated soil and foundation fragments were stored in a separate identified sector whereas the less contaminated materials was distributed on the remaining sectors. As the author points out there is a considerable increase in cost if certain contamination theresold is exceeded. The excavated material was utilized by architects and landscape engineers to shape an undulating topography, part of which is used as recreation area. The highly contaminated sectors were covered with a drain and seal system to avoid an immediate contact with polluted soil and to stop the

infiltration of precipitation through the contaminated ground since this would cause the migration of solved pollutants from above the groundwater table into the saturated zone. Many observation wells were installed in this highly contaminated sealed area to monitor the movements of the contaminant.

The remediation strategy for the Brauck Park was different from the Prosper Park site. In addition the environmental protection agency had required that the excavation of the site be kept minimum. For the heavily contaminated sectors, special cover system, known as reinforced geotextile sandwich system was designed. These cover system is composed of three elements: a lower reinforced support layer, a drain and seal system, and an upper layer of reinforcement elements (grits) to account for the vehicular and structural loads. The author points out that these special covers are in use in other countries like eastern Germany, France, England and in the United States. The cost and alternative methods for remediation which they thought before choosing this type of reinforced geotextile system, could have given the readers of the paper a good knowledge about the current state of the art in the field.

The author correctly points out that the success of a remediation project refers to the cost. In addition, he points out that the time needed to complete a remediation work is an important parameter in any remediation work.

I agree with the conclusion of the author, which states that no single industrial waste site resembles another one and the strategies have to be coined to the special characteristics of the remediation project.

Replies by Dieter Genske
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on
"Remediation of Contaminated Sites - Case Histories"

Paper No. 11.07

We are very greatful for the statement of Karen Breakfield, commenting our paper on the remediation of contaminated sites since it gives us the opportunity to clarify some points. The reason for the environmental protection agency asking us to minimize all excavation on the Brauckside was not because of the possible air emission but simply because of the lack of landfill space available for toxic wastes. This is because Germany, especially the Ruhr District is highly populated and only little space is left for waste sites. The chemical, biological or thermal treatment on site has proven to be rather expensive, time consuming, and not always successfull. Therefore, the contaminants were left in the ground. However, since the contaminated sectors were covered the infiltration of precipitation through the contaminated soil was stoped, as well as the migration of pollutants from above the ground water table into the ground water. Based on our experience from similar projects we are certain, that this technique significantly reduces the ground water contamination. As to Prosper Park we would like to mention that the action levels for decontaminating ground water were based on the Netherlands` ground water pollution standard, the so called VROM Listing or Holland Listing. Furthermore, as to the question of ground water contamination due to contaminated soil one should keep in mind that if no water is available to solve the contaminants they can hardly migrate to the saturated zone. Since the contaminated soil was stored well above the ground water table and sealed with a cover system the contamination was trapped in a cost effective way.