Web Exclusive: From Wasteland to Wonderland | The Cerro Villa Landfill

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The Cerro Villa Landfill is situated on top of a hill with commanding views and surrounded by high end residential housing.

Commanding a magnificent 180-degree view of the Orange County coastal plain and the Pacific Ocean, oddly the Cerro Villa Landfill sits above the nearby suburbia. The property, surrounded by high-end luxury homes, is in a highly desirable area of the fast growing area of Orange, Calif. Yet, the site has been an unused, untouchable, and fenced piece of property for 45 years.

That all began to change in 2001, when the city applied for, and received, a $200,000 Brownfield Assessment Demonstration Pilot Grant from the Environmental Protection Agency (EPA). The grant required that a Phase I and Phase II Environmental Assessment be performed at the site. An engineering firm was selected to provide environmental consulting and assessment services for the Phase II portion of the project.

Background

Orange County acquired Cerro Villa in 1946 to be used as a refuse disposal and burn station. The landfill is located on the southern edge of the Peralta Hills and occupies 32 acres in an undeveloped, mixed-residential area. The land is flat at the top, similar to a mesa top, and abruptly gives way on the east and south sides to steep slopes. The mesa portion is barren and contains no structures of any type.

Prior to 1946, the site was undeveloped land in a natural state. Records for the landfill indicate that between 1946 and 1950, the landfill accepted all types of solid waste. After 1950, the landfill became the county¹s main landfill for the disposal of tree stumps, which were deposited near the edge of the mesa top, burned, and bulldozed over. However, the stumps had high moisture content and were difficult to ignite and burn completely. It was found to be more economical

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to burn the stumps in two large trenches located at the landfill entrance and remove the burned debris when the trenches filled. The debris from the trenches was deposited over the easterly edge of the working face and buried.

Sometime between 1956 and 1957, municipal wastes were received and managed in a standard landfill cut-and-cover operation until the site was closed in December of 1957. In 1972, the site was leased for park and recreational uses to the city with an option to purchase. At the end of the lease, the property was deeded to the City of Orange on May 4, 1982.

Work Performed

Engineers reviewed several studies that were conducted at the site since 1992, including the most important, the Solid Waste Assessment Test. Sampling and analysis of soils during that investigation determined that heavy metal concentrations, a major concern at most burn dumps, were very low and did not meet the criteria to be classified as hazardous waste.

After reviewing all available information for the site, meetings were held with each of the involved regulatory agencies to discuss the concerns each had about the site. Agencies included the Orange County Health Care Agency Environmental Health (OCHCA), the Lead Enforcement Agency, and the California Regional Water Quality Control Board (RWQCB).

In an effort to better understand the problem to be studied, several tasks were performed with site data that had previously been collected, and with information collected from other state and local agencies.

These tasks included:

1) Development of a Conceptual Model

A partial, conceptual model of the site was developed based upon the hydrogeologic setting, and the sampling and analysis work performed during previous investigations at this site. Obtainable information for the site included location of groundwater below surface, average regional rainfall per year, infiltration rate per year, predominant soil types, and composition of unsaturated zone.

2) DRASTIC Testing

This standardized system evaluated the site¹s pollution potential based on its hydrogeologic setting. The hydrogeologic setting forms the basis of the system and incorporates the major hydrogeologic factors that affect and control groundwater movement, including depth to water, net recharge, aquifer media, soil media, topography, impact of the vadoze zone media, and hydraulic conductivity of the aquifer. These factors were incorporated into a relative ranking scheme that uses a combination of weights and ratings to produce a numerical value called the DRASTIC Index. The higher the DRASTIC Index, the greater the groundwater pollution potential.

Exposure Pathways

Based on the information developed, various exposure pathways were deemed to be relevant at the site. In order to remain "conservative" in a Phase II sampling and analysis program, all analysis applied assumed that the site¹s future use would be designated as "residential land use" instead of "municipal park". If the final results indicated that no significant risks existed for residential uses, then the results automatically would apply to the less sensitive uses of a municipal park.

The relevant exposure pathways at the Cerro Villa site included: 1) inhalation of volatile landfill gases; 2) fugitive dust-borne particulate; and 3) migration of volatile gases into surrounding structures. The following exposure pathways were determined to be "incomplete", and therefore ruled out:

Direct ingestion was ruled out based on the low levels of contaminants detected in soils during previous investigations.

Dermal contact and absorption was ruled out based on the low levels of contaminants detected in soils during previous investigations.

Ingestion of contaminated groundwater caused by migration of chemicals through soil to an underlying potable aquifer was ruled out based on the low levels of contaminants detected and the depth to groundwater.

Ingestion of homegrown produce that has been contaminated via plant uptake was ruled out due to the very low levels of contaminants detected in the soil and their depth location. The contaminants were well below the root zone for most commonly grown edible plants.

Work Plan

The perimeter and interior probes were monitored for gases using a Landtec GEM 500 Gas Extraction Monitor.

After the meetings with the regulatory agencies and data analysis were complete, engineers then prepared a work plan for a Phase II investigation of the site. The plan was prepared with guidance provided by the EPA and reviewed by the involved regulatory agencies.

Upon review of the work plan, the RWQCB was satisfied by the results and analysis generated from past studies that determined the site did not represent a risk to groundwater. The agency issued a "no further action" letter to the City of Orange. However, the OCHCA was concerned that the past studies did not adequately address methane gas-related issues, especially the potential for gas to migrate to nearby residential areas. They requested a study that conformed to applicable state regulations for closed landfills. The EPA was mainly concerned with the quality assurance and quality control aspects of data collection and how the data would be used.

The final approved work plan included the installation of five perimeter probes around the site, placed between the existing landfill and the surrounding residential communities. Additionally, four probes were placed inside the landfill areas in areas of known refuse disposal. The probes were to be monitored for methane gas one time per month for six months. If methane levels were detected at levels below five percent by volume, then monitoring would continue on a quarterly basis for two quarters. The entire monitoring program was to take one year to complete.

Monitoring

After the first six months of gas monitoring had been completed, no methane gas was detected. The landfill probes were then monitored two more times at three-month intervals. Again, no gas was detected. The OCHCA was satisfied that the former landfill posed no potential problems to surrounding neighborhoods and had no further requirements. By January 11, 2005, monitoring was complete, opening the door for the next phase in the landfill¹s redevelopment.

A series of nested probes were installed in and around the landfill to monitor for methane and other gases that might pose a potential threat to the surrounding neighborhoods.

Now, the Cerro Vista Landfill is in the process of being turned into a community park for local residents to enjoy. What was once a lot used for dumping and burning of waste will be home to a lush, green field with glorious views of the basin and beyond.

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