Glynn County Superfund Sites Environmental Cleanup Newsletter

August 2010

In This Issue

LCP PUBLIC MEETING

Mon. September 27, 2010 6:30 to 8:30 PM, and Tue. September 28, 2010, 11:00 AM to 1:00 PM, Selden Park Gym, 3401 Ross Rd., Brunswick. Release and discussion of the Public Health Assessment by the Agency for Toxic Substance and Disease Registry.

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Galo Jackson, EPA Remedial Project Manager for the LCP Chemicals Superfund Site, stands next to one of the tanks installed to treat the Caustic Brine Pool. Due to disappointing treatment results, other technologies are being considered to reduce migration of contaminated groundwater.

LCP Chemicals Superfund Site

Overview

Several documents were received and reviewed for the LCP Chemicals Site in Brunswick, Georgia, including risk assessments for both the upland site soils and marshlands, and studies on the cleanup field test of the caustic brine pool underneath the site. Overall, the risk assessment documents lead to more questions than they attempt to answer and raise issues about the credibility of the science used to guide cleanups of the LCP site. Based on the materials provided, the Caustic Brine Pool field test is a total failure with no potential for reducing toxicity or mobility of site toxins in groundwater.

These documents indicate no treatments of the toxic areas in the uplands and marsh are planned, and no reduction in the danger posed by this site is expected in the foreseeable future.

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Background

The uplands at the LCP site are all the lands that remain dry year-round. The marshlands are those areas that are wet year-round and wet through seasonal tidal action. Polychlorinated Biphenyl's (PCBs), Mercury, Lead, Dioxins, and carcinogenic hydrocarbons are some of the common contaminates at this site. In the past the area was home to a number of industries; however, at this time the site mainly consists of a number of run-down and disintegrating buildings on overgrown brush-covered marsh front.

There are undeveloped areas of the uplands that were never contaminated embedded within highly industrialized areas made toxic from past activities. Some of the uplands were completely remediated, some areas were cleaned up only on the surface and subsurface soils continue to pollute groundwater, other areas remain untreated and toxic.

The marshlands were contaminated from several sources, such as paint manufacture and use of toxic waste materials as fill. The marsh continues to receive toxic runoff from contaminated upland soils and contaminated seepage water. Until it is cleaned up the LCP marsh is a source of contamination for the rest of the river estuary.

In addition to toxic groundwater in the upper aquifer there is a pool of contaminates called the "CBP" for Caustic Brine Pool. The CBP is strongly alkaline (pH, a measure of ion concentration related to acidity, is over 12 pH units indicating it is a strong "base") and it can dissolve the soil and rock beneath the site. There are several aquifers, or water zones, from the surficial aquifer that receives rainfall down to the deepest drinking water aquifer. Site contaminants in the groundwater are dispersing downward within a middle aquifer and some models suggest site toxins could eventually pollute drinking water aquifers—although this is far in the future. The CBP is heavier than water and is suspended in the water column, not dissolved into it. As the CBP sinks in the ground it encounters and dissolves silica in the sandstone layer underlying the site. The silica gel formed from this process appears to somewhat retard movement of the CBP; however, other site toxins are more mobile and can move downward regardless of the speed of the Caustic Brine Pool.

Risk Assessments, Overview and Conclusions

Over more than a decade and a half there have been numerous Risk Assessments at this site related to human and environmental health. Risk Assessments are required by law to guide site cleanups in accordance with other laws related to technical feasibility and final site use. For example, a risk assessment for a site that is capped and used as an industrial parking lot would be very different than a risk assessment for land used as human residences.

The Baseline Ecological Risk Assessment for Operable Unit No.3, Revision 2; and the Human Health Baseline Risk Assessment for Upland Soils (Operable Unit 3) LCP Chemicals Site are poor science. Areas were sampled briefly and with little attempt to obtain *bona fide* representative animals. Failure to obtain animals for study is explained away and "modeling" interpretations are done instead. The models are oversimplified, absurd and unrealistic; for example, some assumptions are made that marsh animals remain in the marsh to forage or upland species rarely enter the contaminated marshland areas. Very little new data was collected since the last set of studies and this report mainly consists of a few "tweaks" in the way site areas are pooled for calculations. This study appears to be "busy work" commissioned to provide the Environmental Protection Agency with a report. Since no feasibility studies have been provided for the final site usage there are no benchmarks to use in measuring the risk parameters and no cleanup strategy can be readily derived.

That said, the study concludes that site chemicals are still present in levels that are still dangerous. Not a big surprise since nothing has been done to eliminate site chemicals in many years. Since there is no imminent cleanup this is likely just another in a series of reports that will be commented on by the EPA and filed away with no action taken.

CBP Test, Overview and Conclusions

The highly alkaline Caustic Brine Pool comes from leaky tanks in the old cell building used during the LCP bleach production process. The high pH solutions leaked from the tanks and flowed into the porous sandstone beneath the building dissolving the ground as it moved. Mercury and other site contaminates dissolved in the leaked brine solution were carried along with the solution to form a pool of dense material in the ground layers on the site.

The CBP dissolves silicates in the sandstone beneath the site in proportion to the pH level of the water. Lowering the pH decreases the ability of the water to carry silica and causes dissolved silica to precipitate out as a solid. A test site was constructed that pumped

CBP water out of the aquifer through a well field, buffered it with pH-lowering acid, and then re-pumped the water back into the aquifer using an infiltration gallery. The thought was the well field pumping could reverse the flow of material away from the lower aquifers and slow or eliminate further dissolution of the rock under the site to trap site chemicals and prevent their spread. Specific goals were never provided as part of this study; only expected flow rates at both ends of the pumping system and some rough guesses on the amount of buffering acid that would be needed. One major criticism has been that the plan did nothing to lower the toxicity directly; the plan was to redistribute the toxins with a small amount of dilution. Any benefits would have come from decreased groundwater mobility as the rock beneath the site became less soluble and silicates precipitated out as the pH became more acidic.

This test bed was a failure. Silicates began precipitating out of solution immediately upon removal from the ground (EPA correspondence). The engineers designing the system may not have considered that pH is temperature dependent, or that hydrodynamic effects from the pumping system that can lead to crystalline nuclei forming in saturated solutions of dissolved minerals. Either way, the system clogged from the beginning and never achieved significant-- or even mediocre-- flow rates. Vertical movements of toxins were unaffected by the test system, and no changes in the chemical makeup of the CBP could be accomplished with this design.

Direct injection of liquid carbon dioxide into the aquifer is now proposed. This highly experimental system has never been attempted for this type of waste. It is by no means clear if this is a feasible option for this site.

Glynn County Superfund Sites and the Superfund Process

How Many Superfund Sites in Glynn County?

Four Superfund sites in Glynn County -- the Brunswick Wood Preserving Superfund Site, the LCP Chemicals Superfund Site, the Terry Creek Dredge Spoil Areas/Hercules Outfall Site, and the Hercules 009 Landfill Superfund Site -- are regulated by the Environmental Protection Agency as Superfund sites.

What Are the Cleanup Goals?

Under Superfund law, environmental cleanups must meet several criteria before the site is considered safe. These criteria include practices that: are protective of human health and the environment; meet all environmental and regulatory laws; are technically feasible and implementable; can provide a reduction in toxicity, mobility and volume; will provide short- and long-term benefits; are cost-effective; are accepted by the state in which the Superfund site is located; and, have community acceptance.

What Do the Cleanup Goals Mean?

In practice, the criteria do not carry equal weight and there is considerable overlap in their use. **State and Community acceptance** are "balancing criteria" the EPA can ignore, for example.

"Protective of human health and the environment" is a very broad criterion. In some cases protection of human health can be met with just a warning sign. Human health has priority and long-term impacts on the local environment are often not used by the EPA—unless a specific law, such as the Endangered Species Act, would mean there are two criteria in play. A "short-term" effect generally means that the remedy does not increase damage to the environment while the remedy is being implemented. For example, burning waste might destroy it but the toxic smoke produced would be an unallowable short-term effect.

"Meets all laws" has to do with parallel and sometimes overlapping Federal and State laws regarding land use. States can set more stringent environmental laws impacting the site and the State acceptance criteria may not be met under that condition. On-site disposal also has to meet other laws related to the Resource Conservation and Recovery Act.

The **"feasibility"** rule means that the EPA cannot choose a remedy that requires extensive research and development in order to use. The "implementable" rule means that EPA must prove the effectiveness of the proposed engineering. Taken together, the final decision for the site must be practical, safe, and available now.

Overall, the **"cost-effectiveness"** and **"reduction in toxicity, mobility, and volume"** are the criteria that actually drive remedy selection at Superfund sites.

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Merely fencing the area and posting signs does not reduce toxicity, mobility, and volume, even though fencing and signage can be protective. Any technology chosen for the cleanup has to reduce toxicity, mobility and volume in the near-term, without breaking other laws. In practice, the three goals are treated as "either/or" in view of costs, and the selection of a cleanup remedy usually comes down to the cheapest method to reduce either toxicity or mobility or volume, with a particular emphasis on volume.

By Dr. R. Kevin Pegg

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