

EES 217

Final Project

Due by May 9th by 1200^h.

The site in question “All-American Playground” (AAP) is located 1 km from the left bank of the Willamette River in Oregon approximately 5km upstream from the city of Eugene, Oregon. Eugene (home of the University of Oregon Ducks) has more natural food and Birkenstock stores per capita than any city in the country. The city draws its drinking water from the Willamette River and residents are concerned about contamination of the water supply (of course all residents drink only bottled spring water).

AAP has hired your firm to assess the company’s impact on the river and whether they’ll need to hire a major PR firm to explain the fish floating belly-up past the downtown bridge.

How could AAP pollute the Willamette River? Seems that AAP treated its lumber with CCA (chromated copper arsenate) as a preservative from 1960-1995. The “used solution” was placed in a clay lined settling pond and is essentially consists of a mixture of 1N chromic acid and 1N copper arsenate neutralized to a pH of 5. Because of high rainfall, the pond has periodically flooded and the solution has spilled onto the surrounding ground and into the permeable river sands. There is no record of the spills, but the old-timers remembered that they happened about once every 2 or 3 years and probably released about 10,000 liters of the CCA solution mixed with 90,000 liters of rain on each occasion.

How long before the Cr (VI) or AsO_4^{3-} reaches the river?
How would you assess the potential for contamination?

Consider these hydrologic features of the site:

- The settling pond is 100m X 100m X 1m
- The hydrologic gradient is 0.0005; The $K_H = 200$ m/day
- The aquifer thickness is 10m of sand overlying fairly competent lava and ash
- The sand is made up of altered volcanic material with many grains coated w/ iron

You’ll need to draw cross sections. Think wells, cores, adsorption, retardation, pH, transport rates, geochemistry, remediation (pump & treat, PRBs, etc.).

P.S. Erin Brockovich has already contacted the city of Eugene.