

1.34 WASTE CONTAINMENT AND SITE REMEDIATION TECHNOLOGY HOMEWORK 1 – SOLUTIONS

1. According to Massachusetts regulations, your site qualifies for “downgradient property status.” The best place to start searching for information is the Massachusetts Department of Environmental Protection (DEP) web site at the home page for the Bureau of Waste Site Cleanup (<http://www.state.ma.us/dep/bwsc/bwschome.htm>). A brief summary of the 21E program is found by clicking Facts Sheets and the 21E program fact sheet at <http://www.state.ma.us/dep/bwsc/files/MSFS.pdf>. The downgradient property status is described in that document as follows:

In situations where a property is affected by contamination migrating from another property, meeting the requirements of the MCP may not be possible. Downgradient Property Status may be asserted by the PRP of the affected property in these circumstances. While a Downgradient Property Status is in effect, certain MCP deadlines and the assessment of annual compliance fees are suspended for the downgradient property owner.

For more detailed information you need to return to the BWSC home page and go to the regulations for Massachusetts Contingency Plan, 310 CMR 40.0000. Downgradient property status is defined under 310 CMR 40.0180 (note the regulation citation format). It says if you never owned or operated the property that is the source of the contamination, you qualify for Downgradient Property Status. You have to file a form with DEP which they review to determine if you are indeed a Downgradient Property. Once the form is submitted “the clock stops”—you don’t have to work on your site cleanup until and unless DEP finds you are in fact at fault in your site’s contamination.

2. For this problem, one needs to check the Massachusetts regulations for reportable quantities under the state Superfund law. Starting from the Massachusetts home page it is pretty straightforward to get to the Department of Environmental Protection and then find the hazardous waste regulations at: <http://www.state.ma.us/dep/bwsc/regs.htm>. The tables of reportable quantities by chemical are listed in a document accessible from the regulations web page. Click on “Reportable Concentrations in Groundwater and Soil” to get to http://www.state.ma.us/dep/bwsc/files/rqs_899.htm). This document in turn refers back to the regulations at 310 CMR 40, which you can also access from the web page at <http://www.state.ma.us/dep/bwsc/files/310CMR40.pdf>. Regulations on reporting are in Subpart C of the Massachusetts Contingency Plan at 310 CMR 40.03. The particular release in question can be fairly quickly identified as reportable in 120 days under 310 CMR 40.0315.

The reportable quantity tables give four values for each chemical, two for ground water and two for soils, with the significance of the values defined under 310 CMR 40.0315 cited above. For this site, which will be developed as a residential subdivision, the residential reportable quantities (RQs) for soils are the RCS-1 values. For arsenic, the RQ is 30 mg/kg.

One soil sample from Farmer Anderson's land exceeds the RQ, so he needs to report. (1 point of 2 – this is important to identify). As a follow up (and perhaps within the 120 days before reporting), it would be wise to collect additional samples. Two of the three samples were well below the RQ, and the high value may simply be an anomaly. Getting more samples will help determine whether there is indeed a problem with arsenic contamination. (1 point of 2).

3. Your answer to your client when he asks "I could not have contaminated the ground water, could I?" is "Sorry, but yes." First of all, concrete often has many small cracks and is pervious even if not cracked. Repeated small spills in one location could eventually migrate through the concrete and contaminate the soil. The resulting PCE residual in the soil could be a source of contamination to infiltrating rainwater and thereby the ground water. If enough perc was spilled over the years, the perc DNAPL could have eventually penetrated to the ground water. So the potential for contamination depends upon the duration, frequency, and location of releases, but his operations could have contaminated soil and ground water even if all releases were inside the building. (2 points out of 4 for recognizing the "yes" answer and providing reasons why.)

For my site visit, I would look for evidence of spills such as stains on the floors. Odors could also be indicative, but will be difficult to detect in an operating dry cleaner. I would also look carefully at the condition of the floor, taking note especially of small cracks and expansion joints near areas where perc was regularly handled. I would also get as complete a history of the building and its operations as possible by talking to the owner and his workers. I would find out who occupied the building prior to the dry cleaner and, if possible, get the dates. I would find out about the dry cleaner's operations over time, learning if equipment has been moved, operations changed, etc. Finally, I would find out whether his business is serviced by a sewer or by an on-site septic system. (1 point for this kind of site-specific examination.)

I would also look around outside the building and neighboring area. I would look at the land surface slope as a very rough indicator of the likely direction of ground-water movement. I would look at the site soils (preferably in a road cut or open excavation if possible) to get a sense for the grain size and thus range of permeability. I would see what other land uses are in the area. Particularly, I would look for manufacturing operations and other potential sources of perc or other hazardous materials. I would also look for sanitary sewer manhole covers: their absence indicates the area is not serviced by sewers and thus on-site septic systems are a potential source of ground-water contamination. (1 point for this evaluation of the neighborhood around the site.)

The following is beyond what was expected in the homework, but is provided as additional information on preliminary site inspections. A big part of an initial site review is gathering historical information on the site. Some historical information could be available in the local library or town offices. Many libraries have old town directories and phone books. Directories will tell you who occupied each address in town the year it was published and looking up businesses in the yellow pages of the phone book can give you more detail on the operations conducted. Town records sometimes have old building permits filed by location. Also, the local fire department will have records of underground storage tanks. The town health department and sewer authority may have old records of environmental problems or permits. As well, state environmental agencies typically have extensive records of businesses with environmental permits or issues. These are a good source of information, but may be scattered among different bureaus such as solid waste, hazardous waste, wastewater, etc. Wastewater typically has the oldest files.