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May 3, 2016

Via Email and U.S. Mail

Ms. Amy Axon, Hydrogeologist
N.C. Department of Environment and Natural Resources
Division of Waste Management
1646 Mail Service Center
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Dear Ms. Axon:

On behalf of Friends of Bolin Creek, the Southern Environmental Law Center submits the following comments to the N.C. Department of Environmental Quality (DEQ) on the April 1, 2016 revision of the Environmental Site Characterization report (the "Report") submitted by the Town of Chapel Hill for its Police Station property coal ash dump site (the "Site").

The Report shows that soil along the Bolin Creek greenway path contains high levels of arsenic, chromium, and other dangerous pollutants. Children and pets are likely to be exposed to this contaminated soil as they explore and play along the greenway. In addition, side-by-side results for filtered and unfiltered samples from MW-1 demonstrate that the high levels of groundwater contamination that have been detected in monitoring well results for the Site since 2013 are not the result of turbidity, as the town's consultant has suggested, but in fact appear to represent actual groundwater contamination far in excess of numerous state standards.

1. Soil Contamination

Soil samples from along the existing greenway and proposed expansion show high levels of coal ash contaminants. Falcon's Report and its Table 2 do not fully disclose the extent of the contamination. In addition, the Report does not correctly identify all exceedences of the Preliminary Soil Remediation Goals (PSRGs) in Table 7. Some results that exceed one or both of the PSRGs are not identified in bold. This gives the false impression that fewer samples were above these levels.

The full results contained in Table 7 show the following substances above PSRGs or otherwise have high levels of dangerous pollutants:

- **Chromium**
 - The levels of total chromium along the greenway are very concerning. The exact amount of hexavalent chromium in these samples is not known, because DEQ did not require the town to speciate its chromium samples,

but the high levels of total chromium indicate a risk of serious hexavalent chromium contamination.

- The soil samples at the Site had total chromium as high as 35 mg/kg, over 100 times North Carolina's residential health based PSRG for hexavalent chromium. The health based PSRG for hexavalent chromium is 0.3 mg/kg, and the PSRG for protection of groundwater is 3.8 mg/kg.
- The highest chromium result was from SS6, one of the samples taken on the creek side of the existing greenway where the proposed extension project would be constructed. This poses a potential health risk to workers for that project, but also to families and pets who use this area today.

- **Arsenic**

- Concentrations of arsenic as high as 24 mg/kg were found in the soil samples. That is over 35 times the health based PSRG and nearly five times higher than the groundwater protection PSRG.
- The samples from the public areas on the Bolin Creek side of the greenway all exceed the health based PSRG, with concentrations as much as 12.5 times higher than this level.

- **Cobalt**

- All samples exceeded both the health based and groundwater protection PSRGs, with concentrations as much as 31 times higher than these levels.
- All samples from the public areas along the greenway exceeded both the health based and groundwater protection levels.

- **Manganese**

- All samples but one exceeded the health based and groundwater protection PSRGs, by as much as 50 times.
- All samples from the public areas along the greenway exceeded both the health based and groundwater protection levels.

- **Selenium**

- One sample (SS2) exceeded the groundwater protection PSRG.

- **Thallium**

- Three samples exceeded both the health based and groundwater protection PSRGs, with concentrations over 10 times higher than the health based level.

- **Vanadium**

- Samples SS1, SS1 Dup, and SS2 exceeded the health based and groundwater protection PSRG.
- All samples from the public areas along the greenway exceeded the groundwater protection level.

These constituents are all associated with coal ash pollution. The coal ash dump appears to be contaminating the surrounding environment of the greenway and Bolin Creek, likely through a combination of surface runoff and migration of pollutants through the shallow groundwater that recharges into Bolin Creek. The coal ash must be removed to stop the ongoing pollution, and the contaminated soil must be remediated and/or removed.

Today, the area around the coal ash dump site may pose a health risk to the public. **We ask that you require Chapel Hill to take action immediately to warn the public of the soil contamination along the greenway and direct it to develop a plan to remove the source of the contamination.** Chapel Hill also must be required to test for hexavalent chromium in all soil samples, especially those along the greenway.

In addition, the soil samples far exceed the protection of groundwater PSRG levels, and there can be no question that this soil contamination is polluting the groundwater that recharges into Bolin Creek. The groundwater at the base of the steep slope on the property is extremely shallow – just 1.10 foot below ground surface in MW-3A, for example. Thus, the contaminated soil is directly in contact with this groundwater, which in turn flows into Bolin Creek.

Finally, we note that these contaminated soil samples were taken from locations in the floodplain of Bolin Creek. During flood events, coal ash and contaminated soil will be washed into Bolin Creek and downstream to Jordan Lake.

2. Background Concentrations

Identification of areas impacted by coal ash is typically performed by comparing soil and groundwater contaminant concentrations against PSRGs or North Carolina Subchapter 2L groundwater quality standards (2L), and site-specific background concentrations. Despite the fact that Chapel Hill has conducted multiple phases of environmental characterization over the last three years, the town has never developed site-specific background values for soil and groundwater. In the absence of site-specific background concentrations, site data has been compared to PSRGs or 2L standards in order to identify contaminants and concentrations of potential concern.

The town's environmental consultant responded to citizen concerns about the high levels of contamination in an April 21, 2016 letter (Attachment 1), suggesting that soil contaminant concentrations be compared to the range or mean of background concentrations in soil from across the state of North Carolina, rather than to PSRGs. **But comparison of the Chapel Hill samples against the state-wide range or mean concentrations is a meaningless exercise that does nothing to describe local impacts from the ash.** The range of background values from across the state likely includes soil types ranging from dune sands to soils associated with highly mineralized bedrock. It is even likely that some soil samples assumed to represent background concentrations included in the statewide data would include some samples that contain coal ash fallout from many decades of burning coal across the state.

Site-specific soil, groundwater, and surface water background concentrations are needed to appropriately evaluate the Chapel Hill data.

3. Groundwater Contamination

Since 2013, groundwater samples from monitoring wells across the Site have shown high levels of coal ash pollutants. The town and its consultant have claimed these results should be discounted, citing issues with turbidity in the samples.

However, the results in the Report demonstrate that serious groundwater pollution is occurring at the Site. A side-by-side comparison of the unfiltered and filtered results from MW-1 shows that the levels of pollutants in the samples are quite similar:

Contaminant	February 2016 MW-1 Result	
	Unfiltered (ug/L)	Filtered (ug/L)
Arsenic	67	52
Beryllium	11	8.8
Chromium (total)	100	86
Cobalt	78	61
Copper	170	130
Lead	36	29
Manganese	9600	9000
Mercury	.26	.21
Nickel	58	46
Strontium	2900	2700
Vanadium	260	200
Zinc	330	260

These results, taken after the monitoring well had stabilized, show that filtering removed less than 25 percent of the pollutants in every case, and in many cases it removed much less than that. These results demonstrate that the high levels of groundwater pollution that have been recorded in these and other monitoring wells at the Site are not artifacts of turbidity, as the consultant has suggested in the past, but in fact appear to represent real groundwater pollution that in many instances exceeds North Carolina's groundwater standards.

Inadequate Groundwater Flow Map

On October 23, 2015, DEQ instructed Chapel Hill to produce a "water table elevation contour map with flow patterns depicted." The town's consultant has failed to do so.

The Report contains no recognizable groundwater contour map. Instead, it has done nothing more than draw a large arrow on a map of the site. Report, Appendix A, "Groundwater Flow Map." This approach does not account for the topography of the site and is not a valid hydrogeologic analysis.

According to DEQ's October 23, 2015 letter to Friends of Bolin Creek, the purpose of mapping the groundwater flow was supposed to be to evaluate whether wells MW-3A and MW-4A were sufficient to monitor the pollution downgradient of the coal ash dump. But the figure in the Report makes that evaluation impossible. By ignoring the topography of the site and reducing complex hydrogeologic flow to an oversimplified, unidirectional arrow calculated using

a simple geometry problem, the Report assumes that MW-3A and MW-4A must be downgradient of MW-1 – the very thing the analysis was supposed to determine.

The Report simply subtracts the groundwater elevation measured in MW-4A from that in MW-1 and assumes the groundwater flows in a straight line from MW-1 towards MW-4A. Relying on this completely unrealistic straight line assumption, it then uses the groundwater elevation measured in MW-3A to calculate how far along that straight line the same elevation from MW-3A would occur, and uses that point to calculate a single arrow meant to represent a unitary “direction of groundwater flow.” None of this gives any consideration to the pre-fill topography of the site, including features that would cause the groundwater to flow due south or southwest from the upper portions of the coal ash dump. By assuming an unrealistic straight-line flow directly to wells MW-3A and 4A, this approach is predetermined to conclude these two wells are downgradient of MW-1. In effect, this method merely shows that the water level elevations are lower in wells 3A and 4A than the level in MW-1, regardless of what features occur in between. As a result, the map is not valid and its conclusion cannot be relied upon.

Comparison of the pre-fill topography and current site conditions indicates that much of the coal ash is located on the west side of the property, where there are no active monitoring wells. The pre-fill topography also suggests that groundwater may flow to the southwest in parts of the site and directly south on the far west side of the property. As a result, a monitoring well must be properly installed on the west side of the property to adequately evaluate the extent of the contamination.

Inadequate Delineation of Coal Ash Waste Boundary

The recent soil test results highlight the importance of understanding how far the coal ash waste boundary extends. Previous soil borings have not adequately delineated this boundary. The boring logs reproduced on p. F-5 of the Report indicate that the Town has not located the edge of the waste. On the north side of the site, probe GP-12 encountered eight feet of ash. On the east side, probe GP-8 encountered 10 feet of ash. On the west side, probe GP-2 encountered 25 feet of ash. Thus, these results did not find the edge of the waste boundary. And no geoprobes appear to have been used on the south side of the site. Especially in light of the contaminated soil sample results from the greenway area, it is imperative that DEQ require the Town to delineate the waste boundary.

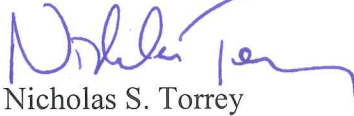
Conclusion

The contaminated soil at the base of the coal ash dump and along the Bolin Creek greenway is a serious concern because this area is heavily used by the public. DEQ should require the Town to ensure the public and town workers are not exposed to dangerous levels of coal ash contamination.

The groundwater results in this latest report confirm that there is real, ongoing pollution of the groundwater at the Site. Additional groundwater and soil sampling are needed, including background concentrations at the site. In conclusion, in light of the high levels of soil and groundwater pollution already documented at the Site – and especially its location along the public greenway and Bolin Creek – the Site should be treated as a high priority and the coal ash should be removed to lined, dry storage away from public waters.

Thank you for your consideration of these comments.

Sincerely,



Nicholas S. Torrey
Staff Attorney

cc (via email):

Mayor Pam Hemminger
Chapel Hill Town Council
Lance Norris, Public Works Director