

As anticipated, the reports (except for Duke’s Belew’s Creek Plant in North Carolina) do not admit statistically significant increases (SSIs) in groundwater contaminants. The utilities interpret the EPA rule to allow such determinations to be made within 180 days of the sampling event, which places the deadline for determining a SSI in spring 2018. This may be a misinterpretation of the rule- especially since many samples were taken before fall 2017.

Nevertheless, even without the admission of SSIs, the monitoring results are revealing. At all sites, there are significant exceedances in wells, and usually this is seen in the high arsenic levels in downgradient groundwater. Often these levels are many times the federal drinking water standards.

The table below provides EPA’s maximum contaminant levels (MCLs) for drinking water for several common CCR contaminants. For chemicals that have no MCL, I have provided the EPA’s regional screening level (RSL), which is commonly used as the cleanup level for Superfund sites.

CCR Contaminant	Federal Drinking Water Standard (MCL)	US EPA Tap Water Regional Screening Level (RSL)
Arsenic	10 ppb	
Selenium	50 ppb	
Radium 226 and 228, combined	5 pCi/L (picocurie per liter)	
Lead	15 ppb (not legally a MCL- an “action level”)	
Cobalt	NA	6 ppb (ug/L)
Lithium	NA	40 ppb
Molybdenum (Moly)	NA	100 ppb

In sum, of the 17 Duke plants reporting, 11 documented exceedances of the MCL for radium 226 and 228, combined. Many of the levels are far above the drinking water limit. In the case of one plant, the radioactivity exceeded the MCL by 95 times (Asheville). The frequency of MCL exceedances for radium is significant because this is the first time utilities have been required to test for radioactivity. It appears that plants in the Midwest may not trip the radium MCL as frequently, perhaps due to the characteristics of Illinois Basin coal.

Below are snapshots of the contamination levels at the Duke and Ameren plants. I did not look at each of the 700-2400 pages per report, but I clicked through quite a bit of data (averaging about 300 pages per report).

Here are the summary statistics from the industry data:

1. Duke Sutton Steam Station (1971 AND 1984 ASH BASINS)

- a. Arsenic MCL exceedances with concentrations at least 461 ppb (Well 104C, p. 743)
- b. Radium MCL exceedances at least 29.3 pCi/L (relatively few exceedances) (p. 786)
- c. Cobalt RSL exceedances with concentrations at least 26.9 ppb (p. 1847)
- d. Molybdenum RSL exceedances with concentrations at least 132 ppb (p. 445)

2. Duke Crystal River Steam Station

- a. Arsenic MCL exceedances up to at least 1140 ppb (p. 92)
- b. Radium MCL exceedances up to at least 20.45 pCi/L (p. 42)

3. Duke Gibson Generating Station

- a. Arsenic MCL exceedances up to at least 28 ppb (Well 32B, p. 57)
- b. Lead level above action level at 20 ppb (Well 10C, p. 283)
- c. Boron levels up to 28,700 ppb (MW 34B, page 286)
- d. Cobalt RSL exceedances with concentrations at least 39 ppb (p. 283)
- e. Moly RSL exceedances with concentrations at least 1400 ppb (p. 287)
- f. Lithium RSL exceedances with concentrations at least 120 ppb (p. 233)

4. Cayuga Generating Station

- a. Arsenic MCL exceedances at levels up to at least 17 ppb (p. 536)
- b. Lead action level exceedances at concentrations up to at least 43 ppb (Well MW-103, p. 274)
- c. Boron levels up to at least 17,900 ppb (MW A-29, p. 82)
- d. Molybdenum RSL exceedances at levels up to at least 4500 ppb (p. 84)
- e. Antimony exceeded MCL with concentration of 15 ppb (p. 269)

5. Duke Asheville Steam Electric Plant

- a. Radium exceedances up to 190 (p. 42) and 98.89 (p. 589) pCi/L recorded
- b. Chromium levels in groundwater at least 93.3 ppb (CA drinking water standard 10 ppb for Cr6) (Well 105D, p. 360)
- c. Boron levels at least 9560 ppb (Well 102S, p. 637)

- d. Selenium in groundwater at least 26.2 ppb (Well 101BR, p. 312)
- e. Cobalt RSL exceedances of at least 16.9 ppb (Well 105D, p. 360)

6. Duke Wabash River Generating Station

- a. Boron levels at least 44,700 ppb (p. 287)
- b. Lead levels at least 20 ppb (Well MW-11D, p. 250)
- c. Arsenic levels at least 16 ppb (p. 250)
- d. Moly levels at least 1400 ppb (p. 475)
- e. Lithium levels at least 280 ppb (p. 1428)

7. Duke Gallagher Generating Station

- a. Boron levels at least 17,400 ppb (p. 295)
- b. Arsenic levels at least 73 ppb (p. 295)
- c. Molybdenum levels at least 3100 ppb (p. 108)
- d. Lead level at least 18 ppb (p. 295)
- e. Chromium level at least 24 ppb (p. 295)
- f. Cobalt levels at least 15 ppb (p. 295)
- g. pH at 9.2 (exceeds EPA secondary drinking water level (SMCL) (p. 191)

8. Duke Belews Greek Steam Station

- a. Radium at 5.51 pCi/L (p. 494)
- b. Arsenic at 89.3 ppb (p. 1041)
- c. Cobalt at 79.1 ppb (p. 258)
- d. Chromium at 62.0 (p. 258)
- e. Lithium at 275 ppb (p. 1337)
- f. Boron at 13,300 (p. 652)

9. Duke Cliffside Steam Station (Inactive units 1-4 basin)

- a. Arsenic at least 177 ppb (p. 185)
- b. Cobalt at least 712 ppb (Inactive basin 5 report, p. 193)

10. Duke Dan River Steam Station (CCP Landfill)

- a. Arsenic at least 19.4 ppb (p. 387)
- b. Lithium at least 109 ppb (p. 1492)

11. Duke H.F. Lee Energy Complex (Active Ash Basin)

- a. Radium at least 27.2 pCi/L (p. 447)
- b. Arsenic at least 626 ppb (p. 215)
- c. Lithium at least 367 ppb (p. 215)
- d. Cobalt at least 22.6 ppb (p. 179)

12. Duke Marshall Steam Station (ACTIVE ASH BASIN AND INDUSTRIAL LANDFILL NO. 1)

- a. Radium at least 12.65 (p. 502)
- b. Cobalt at least 207 ppb (p. 1394)
- c. Thallium at 3.6 ppb (MCL is 2 ppb) (p. 1468)

13. Duke Mayo Steam Electric Plant (ASH BASIN, FGD FORWARD FLUSH POND, FGD SETTLING POND)

- a. Radium at least 41.08 pCi/L (p. 494, 12.06.16)
- b. Cobalt at least 6.98 ppb (p. 258)
- c. Chromium at least 28.1 ppb (p. 258)
- d. Arsenic at least 24.1 ppb (CCP Monofill at p. 212)
- e. Moly at least 148 ppb (CCP Monofill at p. 402)

14. Duke H.R. Robinson Steam Electric Plant (Ash Basin)

- a. Radium at least 23.83 pCi/L (p. 560)
- b. Arsenic at least 120 ppb (p. 769)
- c. Lithium at least 87 ppb (p. 1106)

15. Duke Roxboro Steam Electric Plant (West Ash Basin/East and West FGD Setting Ponds/FGD Forward Flush Pond)

- a. Radium at least 8.68 pCi/L (p. 271)
- b. Arsenic at least 13.3 ppb (p. 250)
- c. Cobalt at least 45.2 ppb (p. 145)

16. Duke W.S. Lee Steam Station (PRIMARY AND SECONDARY ASH BASIN)

- a. Radium at 77.5 pCi/L (p. 281, report date 9.28.16)
- b. Arsenic at 21.8 ppb (Well 100D, p. 171)
- c. Moly at 178 ppb (Well 100D, p. 171)
- d. Cobalt at 67.6 ppb (p. 201)
- e. Chromium at 47.9 ppb (p. 299)

17. Duke W.H. Weatherspoon Power Plant (1979 Ash Basin)

- a. Radium at least 36.71 pCi/L (p. 259)
- b. Arsenic at least 12 ppb (p. 192)

18. Duke Energy East Bend (Ash Basin)