

## Supplementary Materials

### **Violations summary for counties with the highest values of different types of violations and indices:**

In Humphreys County, there are four CWSs, three NTNCs, and eight TNCs serving 15,444 people. Monitoring violations are dominant in the violation database in which most of the systems have major routine violations for different inorganic, organic, and microbial contaminants.

In Gilles County, there are six CWSs serving 30,259 people. All systems except the Large PWS Pulaski water system is using purchased surface water. The dominant MCL contaminant is HAA5, one of the two common disinfectant by-products in the systems that use purchased surface water. On the contrary, no DBP MCL violations were found in the Pulaski water system that treat its own water.

In Marion County, there are three CWSs and two TNCs serving 8,648 people. The most frequent treatment technique violation is monthly combined filter effluent which could be found in both CWS and TNC systems. The most frequent public notice violation is the public notice rule linked to violations from River Landing Condominium system.

In Clay County, there are two CWSs serving 9,624 people. The most frequent reporting violation is the recording keeping with rule code that could only be found in Northwest Clay County Utility system. There was one record found in the other PWS, Celina Water System, which was associated with the consumer confidence report adequacy, availability, and content.

In Stewart County, there are six CWSs and three TNCs serving 7,697 people. There are five records of the only one kind of Other violation, sample siting plan errors for revised total coliform rule in the SDWIS database in Tennessee. There are two records in Stewart county found in two different CWSs. The other three cases can be found in Humphreys, Robertson, and Grainger.

There is only one CWSs in each of the four counties where they have high violation frequencies, Pickett, Trousdale, Cannon, and Van Buren. In Pickett County, the Byrdstown water department (medium system serving 7,060 people) resulted mostly in major routine violations of the inorganic, organic, and microbial contaminants. Byrdstown water department also have repeating disinfectant by-products MCL violations from 2014 to 2018. In Trousdale County, the Hartsville-Trousdale Water/Sewer Utility District (medium system serving 8,055 people) mostly resulted in major and minor routine reporting violations of different contaminants. In Cannon County, the Woodbury water system (Large system serving 10,505 people) resulted in various types of violation with mostly monitoring and reporting violations in the study period except 2018. In Van Buren County, the Spencer water system (medium system serving 5,217 people) resulted in 14 records of health-based violations (11 MCL violations and three TT violations) and 15 monitoring violations. The MCL violations are all disinfectant by-products violations. It is worth noting that Spencer water system has a qualified operator failure violation as one of the treatment technique violations in 2018. All the systems except the one in Pickett were among the systems having punctuated changes.

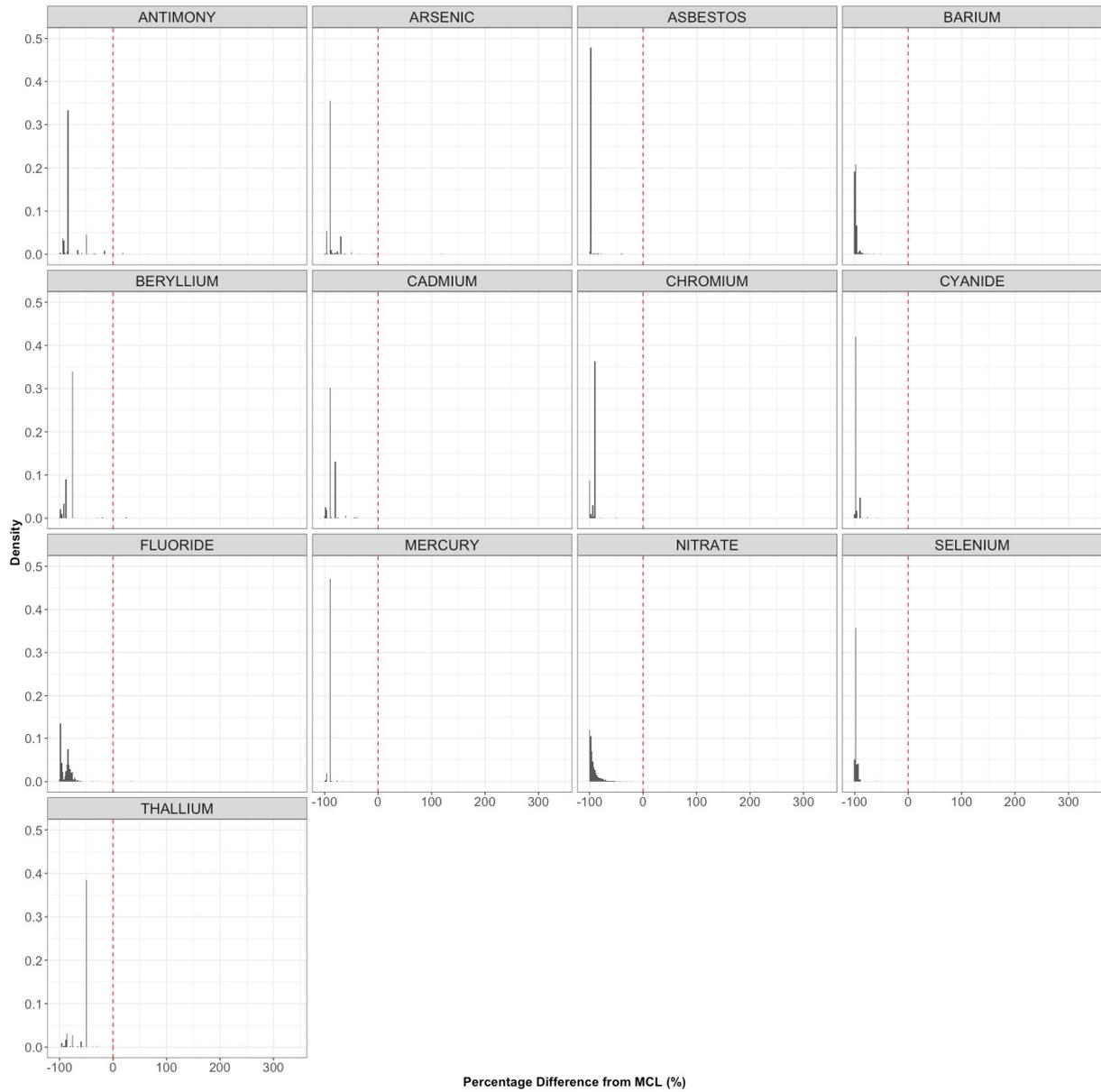


Figure S1. Individual concentration distributions of inorganic contaminants (IOC). Red dashed line in each subplot indicates the Maximum Contamination Level (0% difference from MCL).

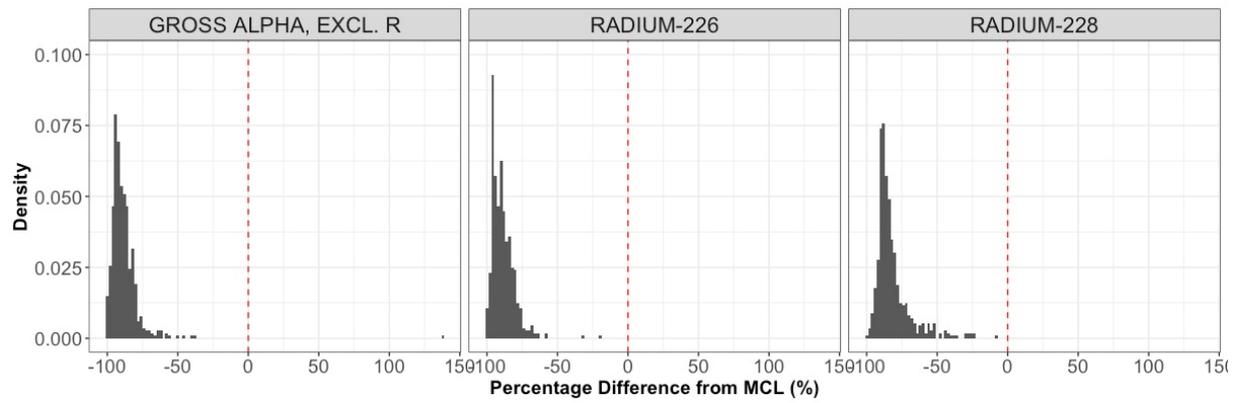


Figure S2. Individual concentration distributions of radionuclides (RAD). Red dashed line in each subplot indicates the Maximum Contamination Level (0% difference from MCL).

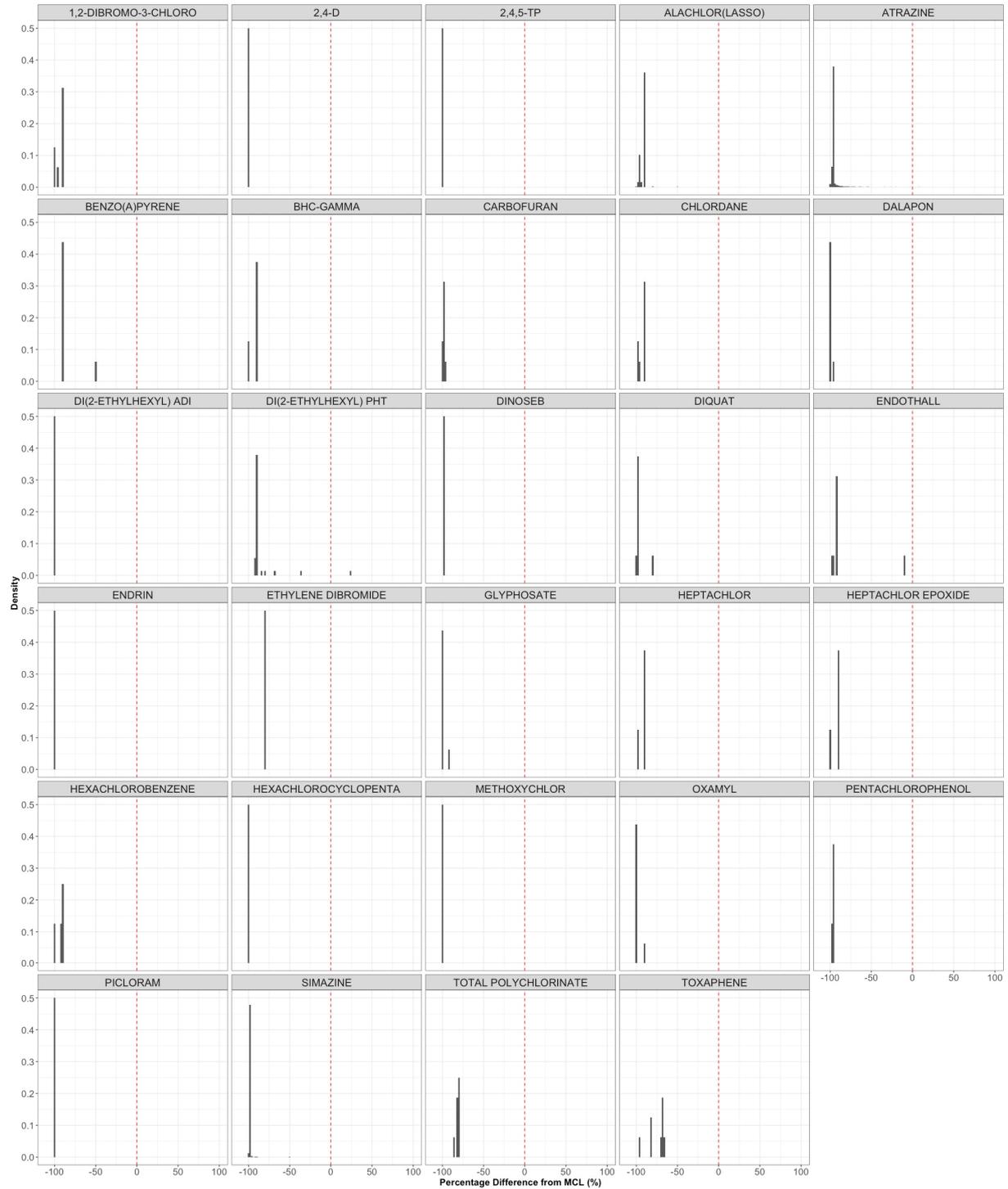


Figure S3. individual concentration distributions of Synthetic Organic Contaminants (SOC). Red dashed line in each subplot indicates the Maximum Contamination Level (0% difference from MCL).

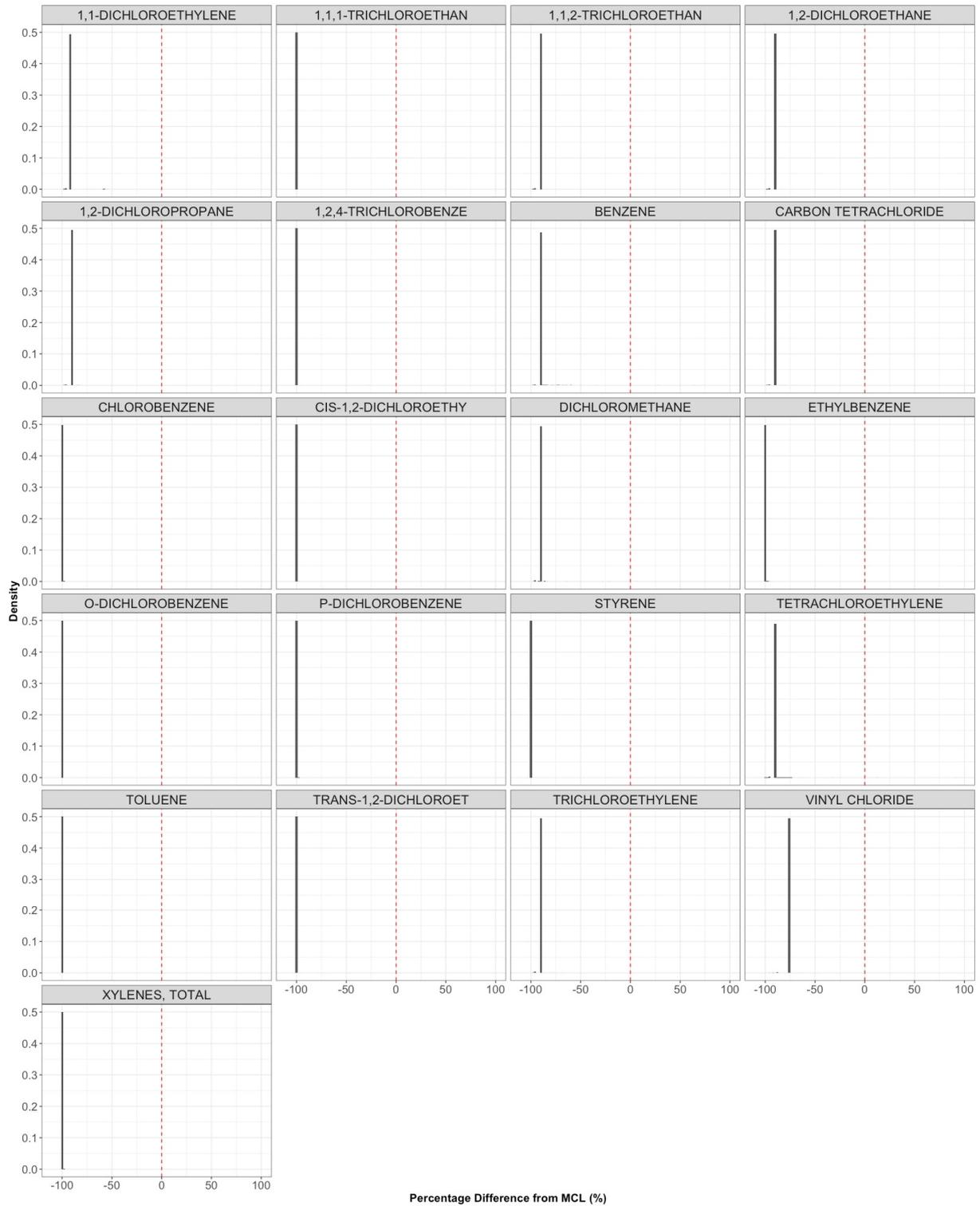


Figure S4. Individual concentration distributions of volatile organic contaminants (VOC).

Table S1. Summary of concentration distributions of IOC, RAD, SOC, and VOC.

Table S1 is uploaded separately to a GitHub repository: [https://github.com/ding-k/TN\\_Drinking\\_Water](https://github.com/ding-k/TN_Drinking_Water).