In 2009, I joined Consumers Energy as a corporate engineer overseeing cycle chemistry programs and performance for their fleet of fossil fuel generating plants. In this role, I developed cycle chemistry specifications and related programs for 16 different generating units. 124 of the 16 were coal-fired like Sherco 3. The chemistry programs at the coal-fired units included AVT (All-Volatile) boiler treatment, AVT-R (All-Volatile Reducing Treatment) feedwater treatment, AVT-O (All-Volatile Oxidizing Treatment) feedwater treatment, and OT (Oxygenated Treatment) feedwater treatment. These are the same treatment programs that were in place at Sherco 3 between 1999 and 2011.

As a part of my role with Consumers Energy, I evaluated unit performance against cycle chemistry specifications and program requirements on a regular basis and provided improvement recommendations and support for closing identified gaps. The results of these reviews were published broadly and reviewed with management on a regular basis. I also had system owner responsibilities for chemistry related equipment at 5 different generating units. 4 of these 5 units ran AVT-R followed by AVT-O feedwater chemistry treatment programs just like Sherco 3. The system owner role involved completing regular system health assessments along with developing and implementing improvement plans as appropriate. The results of these evaluations were also reviewed with management on a regular basis.

I retired from Consumers Energy in November of 2021.

generally consistent with each other. Xcel used EPRI cycle chemistry guidelines, so I reference the EPRI guidelines throughout my testimony.

Q. Did the cycle chemistry practices at Sherco 3 contribute to the SCC failure of the LP turbine in November of 2011?

A. Yes, Xcel's cycle chemistry practices contributed to the SCC failure of the Sherco 3 LP turbine in November of 2011. The failure mechanism for the Sherco 3 LP turbine was determined to be intergranular~~transgranular~~ SCC which is indicative of sodium hydroxide influenced corrosion.[7] Sodium hydroxide contamination was present at levels that were high enough to initiate and sustain ongoing SCC damage in both Sherco 3 LP turbines.[8] To the degree that sodium hydroxide concentrations were allowed to remain at these levels, Xcel's cycle chemistry practices failed to protect the Sherco 3 LP turbines from SCC damage.

My specific cycle chemistry areas of concern that relate to turbine SCC damage risk include steam drum mechanical carryover risk management, sodium monitoring, makeup water quality, and cycle chemistry performance review and improvement program practices.

[7] See Exhibit DOC-__, RAP-D-7 (Polich Direct) at 4; Exhibit DOC-__, SK-R-2 (Klotz Rebuttal) at 4-5 (GE Litigation Daniels Dep. Tr.) (Nonpublic).

[8] Exhibit DOC-__, RAP-D-7 (Polich Direct) at 4; Exhibit DOC-__, RAP-D-11 (Polich Direct) (Nonpublic) at 4.