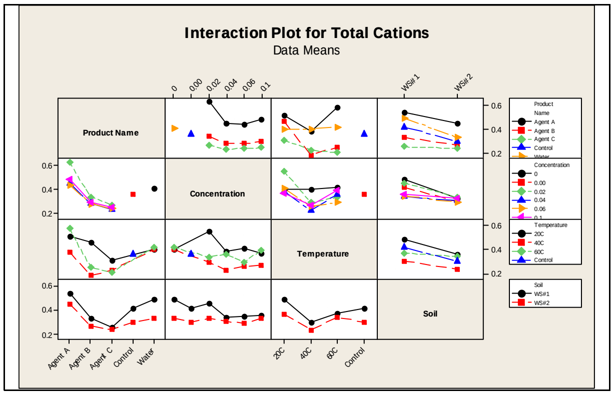

Figure 26. Interaction Plot for Total Cations

Once again, Agent C comes out on top for total Cations as well. Not by a wide margin, but a discernible margin.

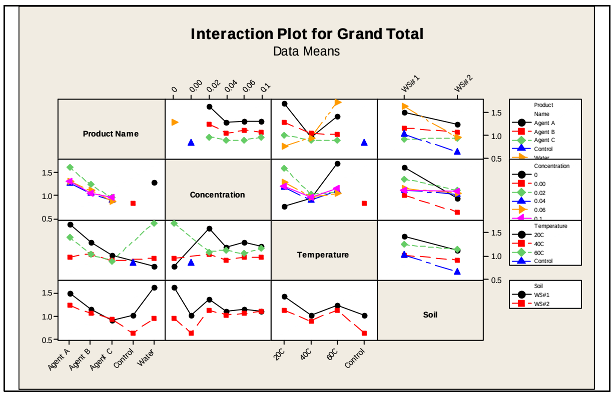

Figure 27. Interaction Plot for the Grand Total

Not surprisingly, Agent C again breaks out of the data by a small margin.

CONCLUSION

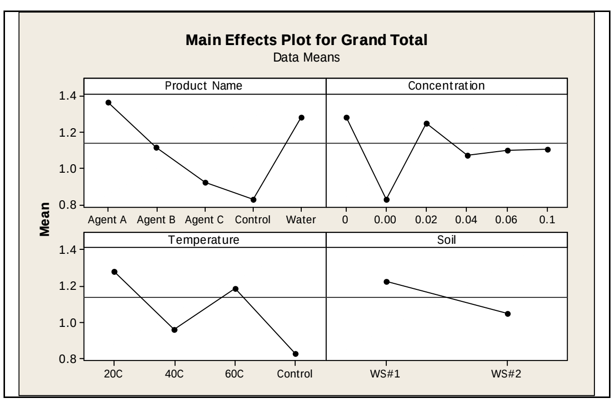

Figure 28. Main Effects for Grand Total

With the control data skewed, Agent C breaks out as the winner though temperature and concentration do not trend toward more is better.

The large data package in this DOE makes the analysis rather straight forward. As in most protocols, there are ambiguous results at times and not every dataset reaches the same conclusion. This point is key; any particular product life cycle may have unique sensitivities important to its operating for everyday of its service life. Detailed data such as this, though expensive and time consuming to generate can be enormously instructive for such high value, long lived devices.

FUTURE RESEARCH

Work such as this has several potential paths forward. One is to include more soils into the current data matrix. Another is to keep the same dataset and move downstream into commercial grade cleaning equipment to evaluate the impact of meaningful mechanical energy. More importantly for the industry, as work such as this propagates industry standards will need to be developed and validated for these point source contamination levels.

ACKNOWLEDGMENTS

Data such as this does not come quickly, easily nor inexpensively. Much thanks goes to the leadership at Kyzen for allocating the substantial resources to complete this project. Those resources are in house IC equipment of course, but more importantly a talented team led by Dr. Mike Bixenman and David Lober that includes John Garvin and James Perigen.