

4 Phase 3: Network Analysis

The following section includes the scripts necessary to generate the figures for the network analysis. This section is divided as follows:

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/EPA Research
├── Phase 3 LVVWDNetworkAnalysis
│   ├── Double061812
│   ├── Half061812
│   ├── None061812
│   ├── Normal061812
│   ├── MSX_VALIDATION_MATLAB
│   ├── ReportFileReader_Python
│   ├── THMReductionVsPercentSupplyAlta
│   │   ├── PlotScript.m
│   │   └── NormalizedPlotScript.m
│   └── TraceAlphaNodes500hr.xlsx

```

4.1 MSX Input File Validation

This folder contains various exercises to test the MSX input file under various conditions. To show the comparison plots run the “PlotFigureTest#.m” available in each folder.

4.2 Step 1: Report File Reader

As the MSX Toolkit was not entirely Mac Friendly, python scripts were written to extract the time series data from text .rpt files and return the results for each node in a time series MATLAB .mat file. Another .mat file called “Node_name.mat” will be created including the names of each node in order read from the report file.

4.3 Step 2: Simulation Data and Input Files

Folders “Double061812”, “Half061812”, “None061812”, and “Normal061812” contain the respective simulation results (.rpt) files, the MSX input file and LVVWD network files. The folders contain the generated time series .mat files for each node, created using the “ReportFileReader_Python”. To create a vector of the last 24 hours of data for each node run the “DataBuilder.m” script. This will save a new .mat file called “full_mat.mat” to the same directory the files are located.

4.4 CDF Plotters

Once the “full_mat.mat” file is created using the “DataBuilder.m” script, CDF plots can be generated with the various CDF plotters. The “cdfplot_creator.m” generates the THM CDF plot on thesis page 66, the “cdfplot_creatorChlorine.m” generates the chlorine CDF plot on thesis page 63, the “ONEcdfplot_creator.m” generates the figure on thesis page 62

4.5 THM Reduction vs. Percent Supply from Alpha

The first step to estimating the absolute (or relative) reduction at a specific node is to run the “DataBuilderTracePair.m” script. This will gather the final 24 hours of concentrations from each node, take the mean, and store in a vector. The % of node water supply from the Alpha tank

can be found in the TracerAlphaNode500hr.xlsx. The % supply to each node from the Alpha tank was imported into MATLAB and stored in the THMReductionVsPercentSupplyAlta directory. To generate the figures found on page thesis pages 67-69, run the "PlotScript.m" script. To generate the same figures (thesis page 67-69) that are normalized from the greatest absolute reduction, use the "NormalizedPlotScript.m".