**Workflow of Constraint Analyzer Project**

Transmission outages hourly data pulled **from Yes Energy (2014-2019)**

Constraint-Contingency Summary data pulled **from Yes Energy (2014-2019)**

Column values of outage data (all files) and mapping document are changed in order to make mapping easier

Constraint-contingency unique pair extraction

Column values of constraint data and mapping document are changed in order to make mapping easier

With the obtained excel sheet, vlookup is performed to map constraints to the respective from bus and to bus number

With the obtained excel sheet, vlookup is performed map constraints to their from bus and to bus number

All the files are combined in such a way that only unique outages which are mapped are stored in one sheet and unmapped outages are stored in another of resultant file

Mapped outages are verified using approximate string matching and a histogram is created to show verification results

Separation of mapped constraints, mapped contingency, unmapped constraints, unmapped contingency and mapped both

Unmapped outage data is used to perform approximate string matching between unmapped outages and mapping document

Above obtained sheet containing unmapped constraint data is used to perform approximate string matching between unmapped constraints and mapping document

Mapping of unmapped constraints is performed using approximate string-matching results

**Manual Process**

Mapping of unmapped constraints is performed using approximate string-matching results

**Manual Process**

After the manual process unmapped and mapped outages are separated into different sheets of an excel file

A final file is created containing unique constraint-contingency pair which are mapped

A final file (combining already mapped and newly mapped outages) consisting unique transmission outages data is created where mapped and unmapped outages are separated into different sheets

Hourly constraint-contingency data is pulled from **Yes Energy (2014-2019)**

A super list consisting of hourly outage data (subset = outage and start date unique) is created which contains mapped outages of all years

A final file consisting of hourly constraint-contingency data is created which is mapped using the above mapping file.

Result obtained from above step is used to define interface elements in powerworld case file which is stored after making changes to it.

Above obtained excel file data is extracted and formed such a way that it matches the powerworld case file format

Only mapped constraint-contingency pairs are stored in an excel sheet