RTS.zip was created September 5, 2016 to make it easy to download .exe executable files. Download RTS.zip http://egpreston.com/RTS.zip and drag the files to a working directory using windows file manager.

If you want to duplicate how I edit data and run the .exe programs you will need to purchase the Semware editor http://www.semware.com/ . You will find this is a much more powerful platform than trying to do all your work inside excel and notepad. I also created a DOS window on my desktop I can click on that stays open as I do my Semware editing.

Let's start downloading the data. The University of Washington is a very good place to start downloading RTS data. The link is: https://www.ee.washington.edu/research/pstca/rts/pg_tcarts.htm The .txt files on this web page (in case the file goes away; printed here) are included in the RTS.zip file.

Power Systems Test Case Archive

Reliability Test System (RTS) - 1979

The Reliability Test System files includes load and generation data from the IEEE Reliability Test System published in 1979. The format is self-documenting, and there is a paper reference in the file.

- 1979 Reliability Test System (file ieeerts79.txt)

Reliability Test System (RTS) - 1996

The 1996 version of the Reliability Test System was published in Grigg, C., "The IEEE reliability test system: 1996", Paper 96 WM 326-9 PWRS, IEEE Winter power meeting 1996. Cliff Grigg provided the following data in files for WordPerfect and MS Word. I converted them to text files. The data may need some manipulation to put in a form suitable for input to a program. It's certainly better than typing it in by hand! Please direct questions about the data to Cliff, and questions about the Web site to me, Rich Christie.

Reliability Test System (RTS) - 1996

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Table	Contents	MS Word File	WordPerfect File	Text File
1	Bus data	Table-01.doc	Table-01.wpd	Table-01.txt
2	Weekly loads	Table-02.doc	Table-02.wpd	Table-02.txt
3	Daily loads	Table-03.doc	Table-03.wpd	Table-03.txt
4	Hourly loads	Table-04.doc	Table-04.wpd	Table-04.txt
5	Bus loads	Table-05.doc	Table-05.wpd	Table-05.txt
6	Generator reliability	Table-06.doc	Table-06.wpd	Table-06.txt
7	Generator parameters	Table-07.doc	Table-07.wpd	Table-07.txt
8	Generator startup heat input	Table-08.doc	Table-08.wpd	Table-08.txt
9	Generator heat rates	Table-09.doc	Table-09.wpd	Table-09.txt
10	Generator cycling and ramp rates	Table-10.doc	Table-10.wpd	Table-10.txt
11	Emissions	Table-11.doc	Table-11.wpd	Table-11.txt
12	Branch data	Table-12.doc	Table-12.wpd	Table-12.txt
13	DC line data	Table-13.doc	Table-13.wpd	Table-13.txt
14	Breaker reliability data	Table-14.doc	Table-14.wpd	Table-14.txt
15	Generator dynamic data	Table-15.doc	Table-15.wpd	Table-15.txt

RDC - 8/99

I noticed what I thought was a problem in the RTS data. My load flow program calculates line lengths from the X and C inductive reactance and shunt capacitance. The calculated line length did not match the stated cable lengths. In actual load flow data it's possible an UG cable can have shunt reactors on each end to cancel the charging but this does not seem to be the case with the IEEE RTS data. My analysis of this situation is given in a small paper I have included in the RTS.zip set of files: **ckt_length.pdf**.

I received several versions of RTS 96 PTI PSSE rawd format files.

RTS3P33RAW.txt is a good version of the 3 area RTS 1996 raw data in PSSE rev 33 format with suggested cable impedance corrections.

RTS3P33.txt is the output report base case load flow solution for the above data running my in-house "P33" load flow program.

RTS3ATCS.txt is an ATC (available transfer capability) output report showing the maximum injection of power at each bus, mimicking how much wind we could inject without overloading the transmission system. I do ATC studies for wind generators across the US.

Winddurationcurve.pdf is a small report showing a problem encountered when individual wind farms are modeled and treated as individual generators. A mistake is made by giving each wind farm its own EFOR, equivalent forced outage rate, which when these are convolved together to get the total wind, produces the F2 curve. The original raw data is more linear, the F1 curve. Therefore we will not want to do this in our studies of wind. We will want an hourly model with each hour's historical data retained for each wind farm along with the system load for that hour. Several years of hourly wind data in a time sequential model will be a good representation for wind. Stepping through these historical years as though they are possible futures will be used by the programs that are included in RTS.zip. Using an exact COPT procedure for the conventional generation provides an extremely fast and simple way to calculate the LOLE LOLH and EUE indices.

RTS1979.for (.txt)(.exe) is the 1979 RTS 24 bus system reliability model programmed in Fortran that prints out the 1979 IEEE RTS hourly load data. This hourly per unit data will be read by later programs. The generators are hard coded into this program and the COPT capacity outage probability table is calculated. This program provides the same "exact" solution to the 1979 RTS as in Roy Billington's 1986 RTS paper.

RTS2016.for (.txt)(.exe) is expanded to read the input data from a file **datain.txt** which contains the RTS generator data as well as the hourly load profile. Any number of historical years can be simulated as a continuous time stream. This program also gives the "EXACT" 1986 RTS indices results. The program can model other systems simply by entering new input data (such as the three area 1996 RTS).

RTS.for (.txt)(.exe) is modified to allow more generalized generator **gdata.txt** input as well as up to 20 variable wind and solar resources in **hdata.txt**. This program can be used to model large regions in the US. **RTSO.txt** and **RTSM.txt** are Octave and Matlab versions of the program. **OP.txt** is the output report for 2 identical years and 20 wind farms. These wind farms can be lumped back together into one hourly wind file and the reliability indices will be the same in the OP.txt file. The 20 separate wind farms in hdata.txt is a test to insure results are the same. The Matlab and Fortran (.exe) files run quickly but the Octave program runs rather slowly, most likely because it is reinterpreting code on each line of loops within the program. Octave does eventually get the same answers.

What we want to do now is build up an IEEE RTS wind model. I am looking for a good source of hourly wind data. I was impressed by this paper: http://www.esru.strath.ac.uk/Documents/MSc_2006/phoon.pdf About the only thing lacking is the actual wind data used in this paper.