**Changes and Updates from 1.7 to 2.0:**

* Base Year Inventory - The hourly BY inventory for 1.7 was CAMD 2007. For 2.0, the hourly BY inventory was CAMD 2011.
* UAF and Controls File Data – The UAF and controls file inputs for 2.0 were developed using the UAF and controls files dated July 18, 2013. The UAF and controls file for 1.7 were also dated July 18, 2013, but these files were based on a BY of 2007.
* Growth Rate Data – 1.7 growth rates were based on AEO2013, in the file named, “2-6-2013 Growth Rates Regional Template ERTAC Round 1\_6.xlsx.” The 2.0 growth rates were based on AEO2013, in the final named “2-6-2013 Growth rates Regional Template ERTAC Round 2\_0.xlsx.” Both files are based on AEO2013 and NERC data. However, there were some differences in the way a few regions were aggregated, which changed a few growth rates, both annual and peak. Overall, growth rate changes between 1.7 and 2.0 were mainly due to the different base year rather than changes in methodology or base EIA data.

* Units with little or no base year data – In the 1.7 input files, some of these units were included in the nonCAMD hourly file, with one line item of “fake” data for each unit that would allow the tool to calculate reasonable heat rates, emission rates, etc for that unit. Others of these units had the additional data supplied in the UAF to allow the program to process these units in the FY, with no additional hourly data supplied in the nonCAMD hourly file. In the 2.0 input files, all units with little or no base year data were supplied the additional data needed in the UAF to allow processing of the units. Version 2.0 did not need a non CAMD input file.
* Non-EGUs – In the 1.7 UAF, some states included units that were non-EGUs in the UAF, while others omitted those units. In the 2.0 UAF, all non-EGUs were included in the UAF and marked as “non-EGUs.”
* In the 1.7 UAF, several units were identified as causing the tool to crash (for example, Alma, Paradise #3). In the 2.0 UAF, only one unit caused a tool crash, an oil fired unit in NWPP (ORIS 2331, unit 1)

**Changes and Updates from 2.0 to 2.1:**

* UAF and Controls File Data – The UAF and controls file inputs for 2.0 were developed using the UAF and controls files dated July 18, 2013. The UAF and controls file for 2.1 were dated December 16, 2013. Changes provided by states included updates from the Midwest, Northeast (including NY information on RACT and other rule changes as well as updates from CT, NH, MD, and NJ), and SESARM (updates from VA and updates from KY including new information on the federal TVA consent agreement).
* The UAF was updated to ensure that any unit listed in the preprocessor as not having enough data to calculate an ertac heat rate, a base year utilization fraction, or a unit optimal load threshold had the appropriate data included in the UAF so that the unit could be processed and available for FY demand.
* In 2.0, Astoria (ORIS 8906) had 6 units identified by NY as being better represented by combining the data in to 3 units. Therefore, units 30, 40 and 50 were added to the UAF. 31RH, 32SH, 41SH, 42RH, 51RHY, and 52SH were marked as non-EGUs. Data from the 6 units were combined with consent and agreement by the state staff into 3 units within the nonCAMD hourly file.
* In 2.0, the preprocessor identified about 141 lines in the BY 2011 data where emissions were negative. CAMD representatives (Louis Nichols) explained these negative values were a by-product of the algorithm CAMD used to parse out data from units exhausting a combined stack and that CAMD was looking into the negative numbers. In 2.1, these 141 lines of hourly data were included in the nonCAMD hourly file, with the negative values replaced with zero. The flag for each was replaced with “ERTAC” to denote exactly which items of information had been substituted. Only negative values were replaced with zero.
* Growth rates used for 2.1 were from the file named, “v3b\_Merged\_gas-EGU-emissions plus capacity\_region.xlsx” from email correspondence with Bob Lopez on 12/5/2013. These rates in 2.1 reflect a no growth assumption (rate=1) for natural gas boilers, which was not included in the 2.0 growth rates. Combustion turbines and combined cycle units were adjusted in the 2.1 factors to account for the boiler-gas generation.

**Changes and Updates from 2.1 to 2.1L1:**

* All input files based on CONUS2.1 including growth rates with the exception of Midwest updates to the control and UAF files. Changes to the control file were submitted by Indiana, Illinois, Wisconsin, Michigan and Ohio primarily for coal fired units; this file is dated March 3, 2014. The UAF file was updated to reflect changes to refueling and/or shutdowns for Indiana, Michigan and Wisconsin; the UAF is dated March 5, 2014 for coal fired units.

**Changes and Updates from 2.1L1 to 2.2:**

* UAF used in 2.2 was from file2011BASUnit\_Availability\_V2.2\_April222014\_code1\_01.xls
  + A couple of additional edits were made:
  + Laskin (1891) in MN: switched to gas as of 12/31/17. A line item was added to the UAF to include the gas boiler.
  + Wheaton (4014) in WI had a county code switched to 55035 from 50089.
  + ORIS 50240 (Purdue University-Wade Utility) was changed to a nonEGU.
  + Removed the new unit flag Y from ORIS 564, CCB, as the unit started ops in 2009.
  + Added max\_unit\_heat\_input for 56807, Units 1A & 1B of 2,580 mmbtu/hr (each). (Honestly, those Virginia data people are complete idiots. Thank goodness the Virginia modelers are intelligent… ☺ )
  + ORIS 8042 Belew’s Creek was listed as retired in the UAF; NCs submittal showed it as having a 2030 retirement date, so I changed that retirement date to 2030.
* Controls file used in 2.2 was from 2011BASEControl File\_v2.2\_April222014\_code1\_01.xls.
* To make use of the functionality of the 1.01 code, a seasonal controls file was culled from the main controls file. It looks like at this point only GA is taking advantage of this aspect of the tool.
* Growth rates for 2018 and 2020 came from ***v2Working Doc2\_v8a Growth Rates Regional Template\_ERTAC Derived from Round 1 6 \_Active for Base and Future Selected Yr. xlsx***. The tab used was ***It 7 v2.1.2 ref w-Gas Adj***. These use AEO2013 information. The growth rates were rounded to three decimal places, e.g. X.XXX.
* In the Input Variables file, I removed the boiler gas ORIS codes for SRVC for any GDUs so that the program will place those automatically.
* For the state and group files, I added the CSAPR state and group totals from the file called CSAPR\_State\_Totals\_8-1-2012.xlsx and CSAPR\_Group\_Totals\_7-19-2012.xlsx.