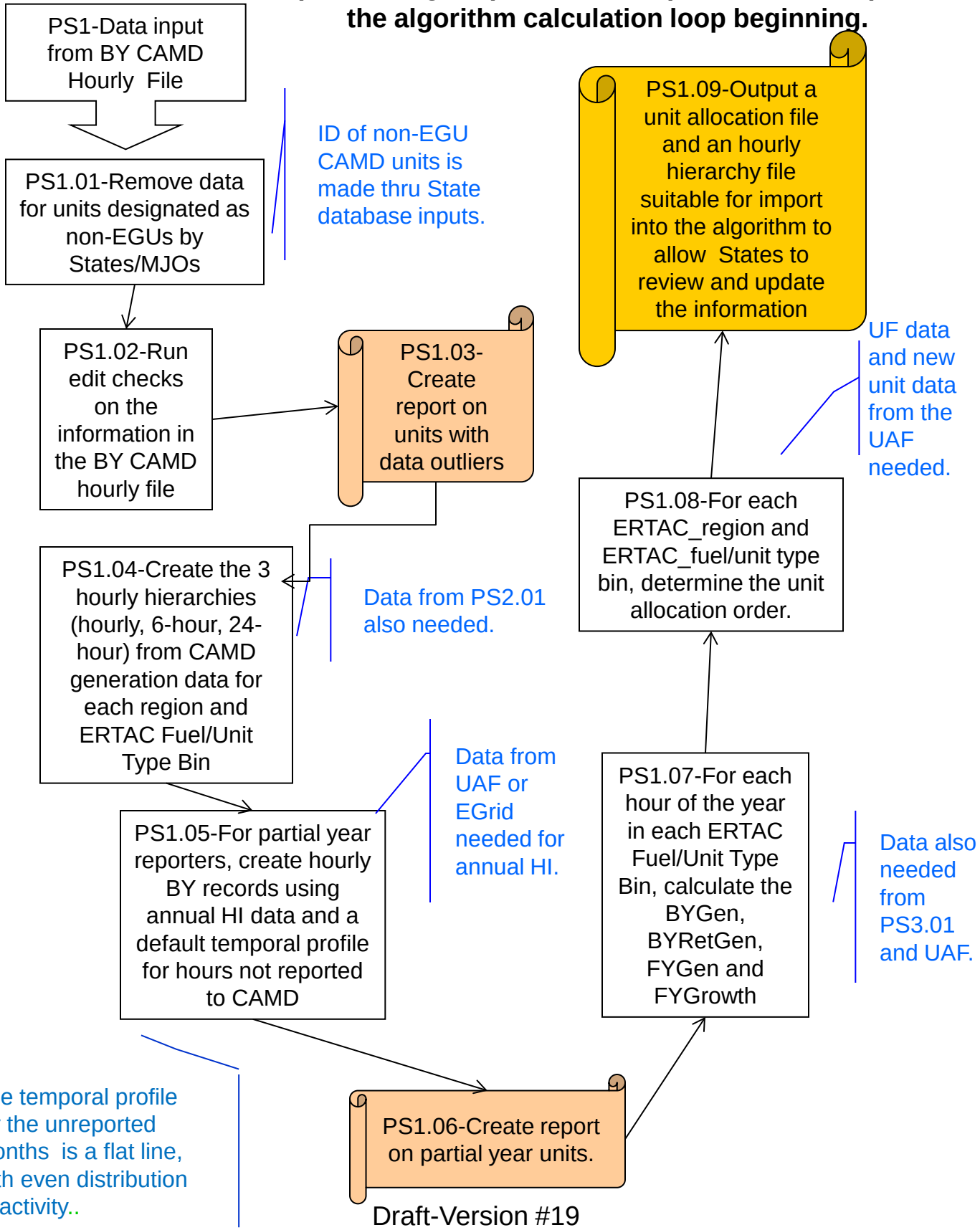
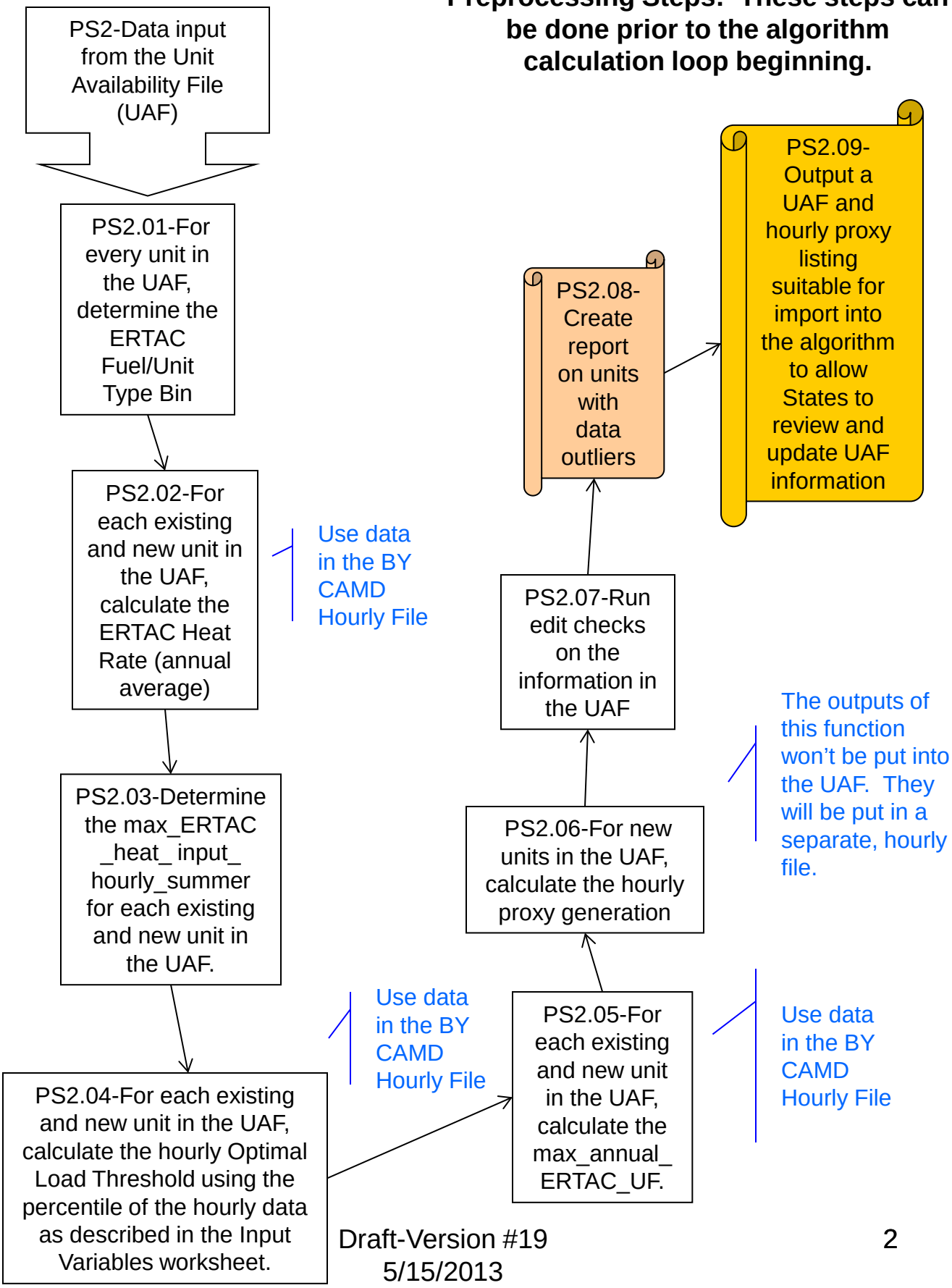
Preprocessing Steps: These steps can be done prior to the algorithm calculation loop beginning.

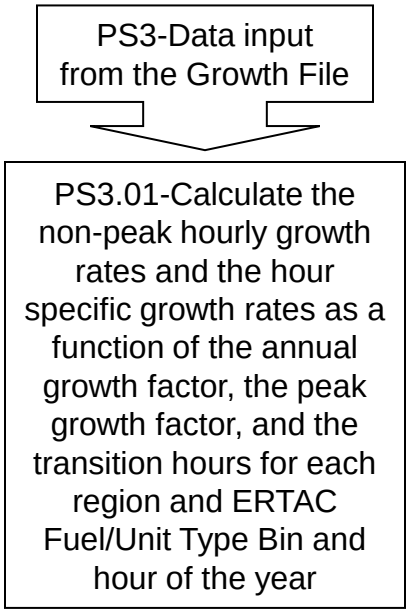


Draft-Version #19
5/15/13

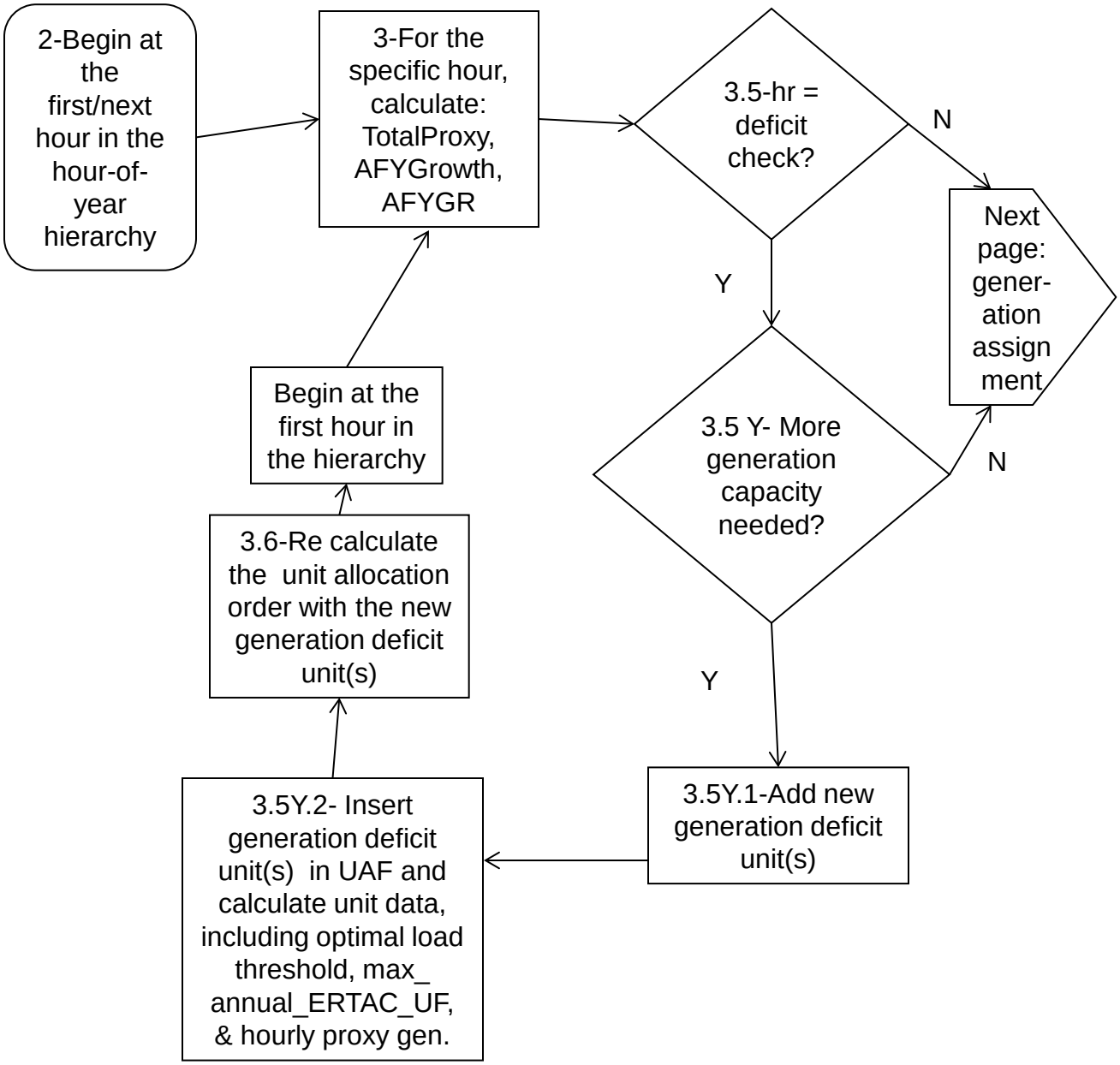
Preprocessing Steps: These steps can be done prior to the algorithm calculation loop beginning.

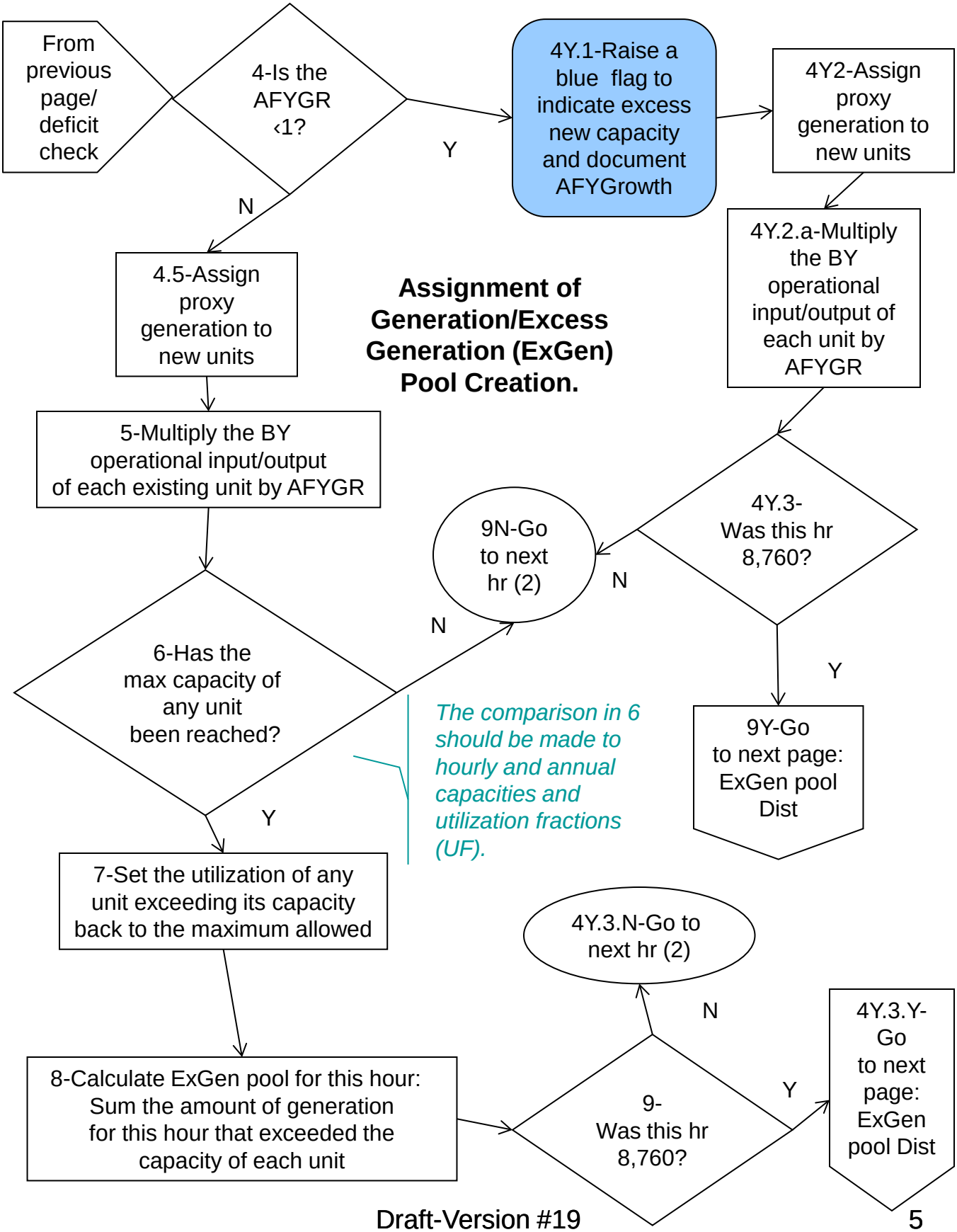


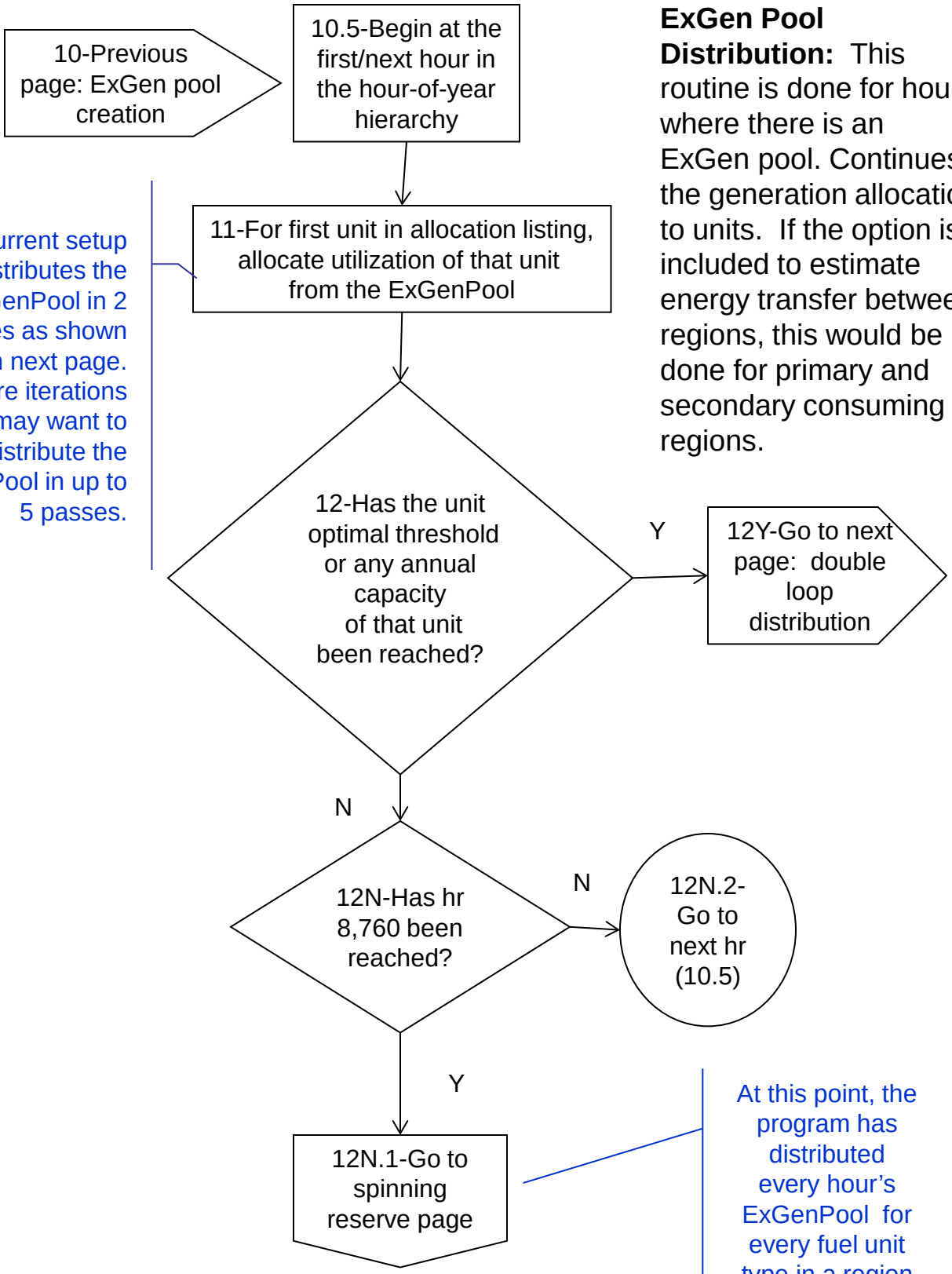
Preprocessing Steps: These steps can be done prior to the algorithm calculation loop beginning.



Beginning of projection tool: Deficit check and creation of generation deficit units, if needed. New units inserted into the hierarchy. Run by fuel/unit type and region. Order of regions run may be important for future iterations of the model, to try to account for regional energy transfers.



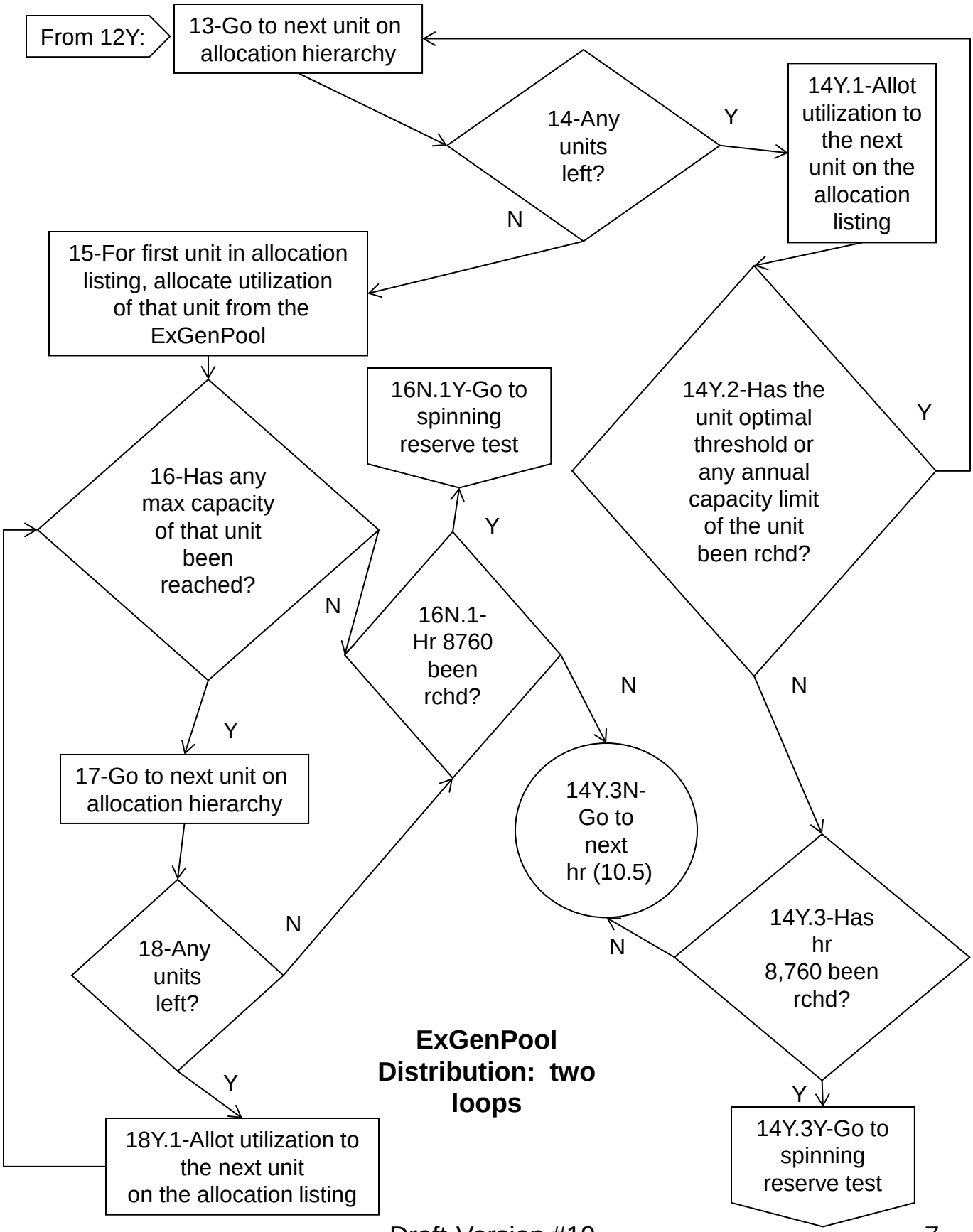

From previous page/ deficit check
4-Is the AFYGR ‹1?
Y
N
4Y.1-Raise a blue flag to indicate excess new capacity and document AFYGrowth
4Y2-Assign proxy generation to new units
4Y.2.a-Multiply the BY operational input/output of each unit by AFYGR
4.5-Assign proxy generation to new units
Assignment of Generation/Excess Generation (ExGen) Pool Creation.
5-Multiply the BY operational input/output of each existing unit by AFYGR
4Y.3- Was this hr 8,760?
9N-Go to next hr (2)
N
Y
6-Has the max capacity of any unit been reached?
N
Y
9Y-Go to next page: ExGen pool Dist
The comparison in 6 should be made to hourly and annual capacities and utilization fractions (UF).
7-Set the utilization of any unit exceeding its capacity back to the maximum allowed
4Y.3.N-Go to next hr (2)
N
Y
4Y.3.Y-Go to next page: ExGen pool Dist
8-Calculate ExGen pool for this hour: Sum the amount of generation for this hour that exceeded the capacity of each unit
9- Was this hr 8,760?



ExGen Pool Distribution: This routine is done for hours where there is an ExGen pool. Continues the generation allocation to units. If the option is included to estimate energy transfer between regions, this would be done for primary and secondary consuming regions.

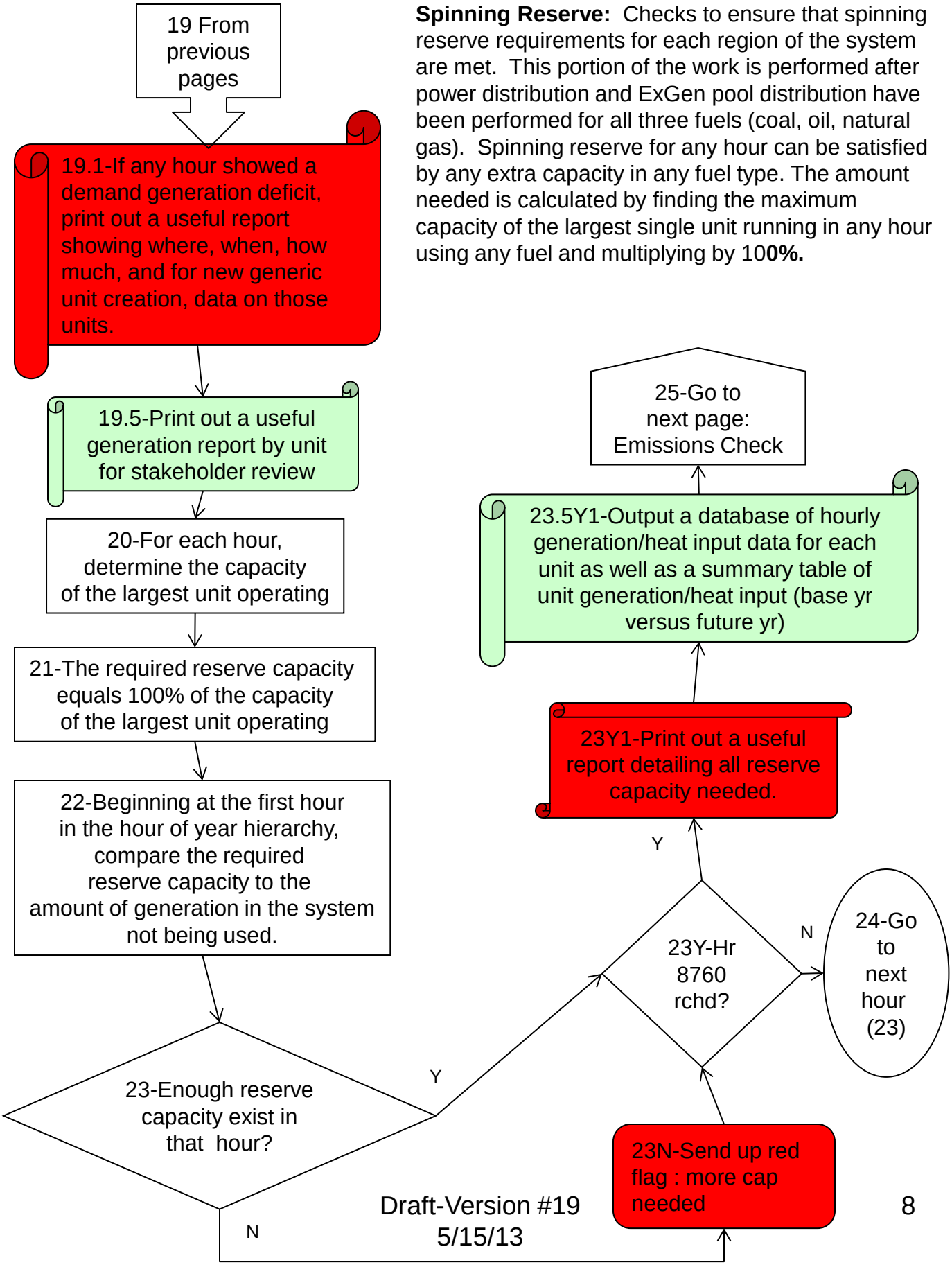
The current setup distributes the ExGenPool in 2 passes as shown on next page. Future iterations may want to distribute the ExGenPool in up to 5 passes.

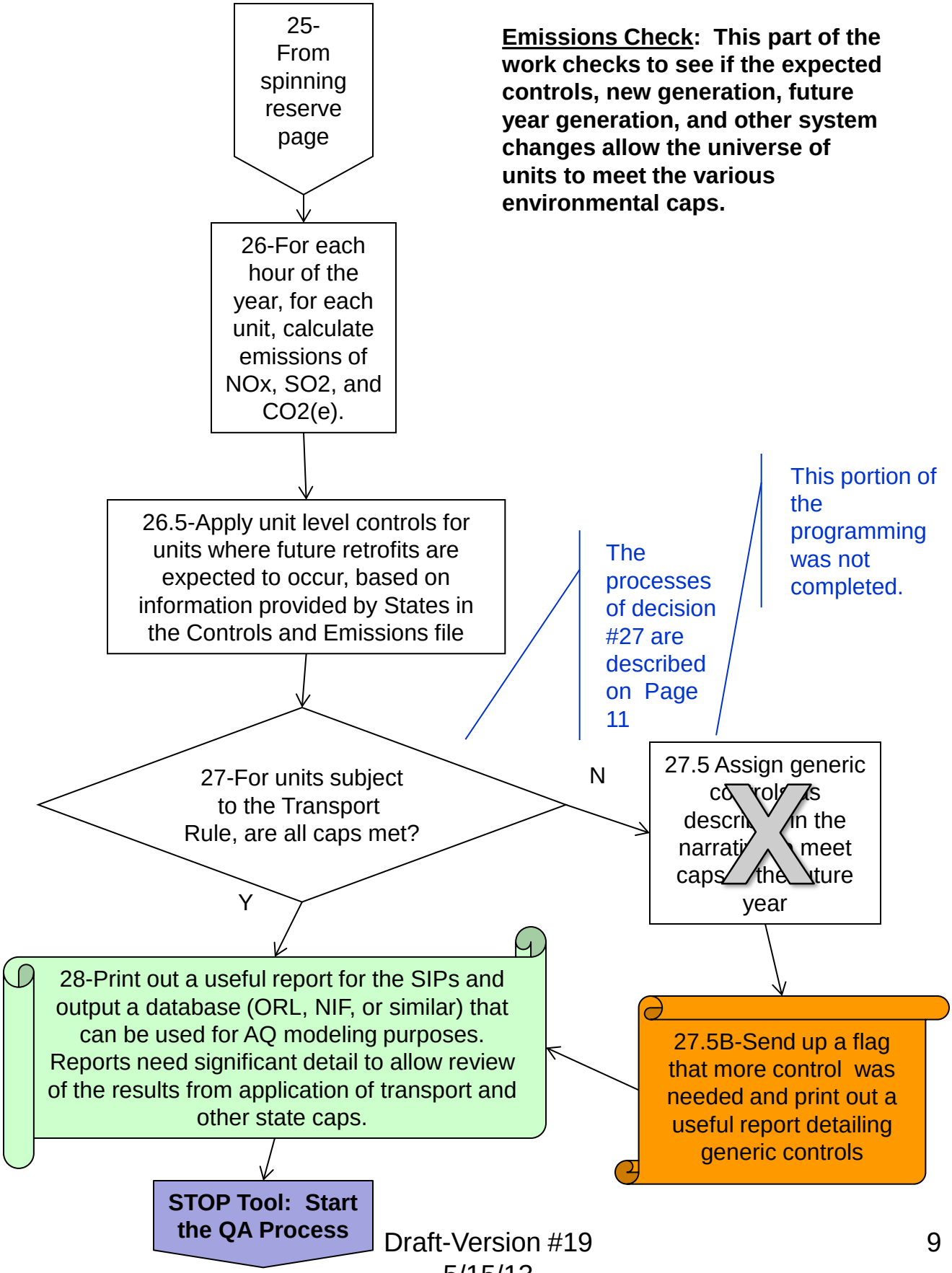
At this point, the program has distributed every hour's ExGenPool for every fuel unit type in a region and must begin the spinning reserve test.



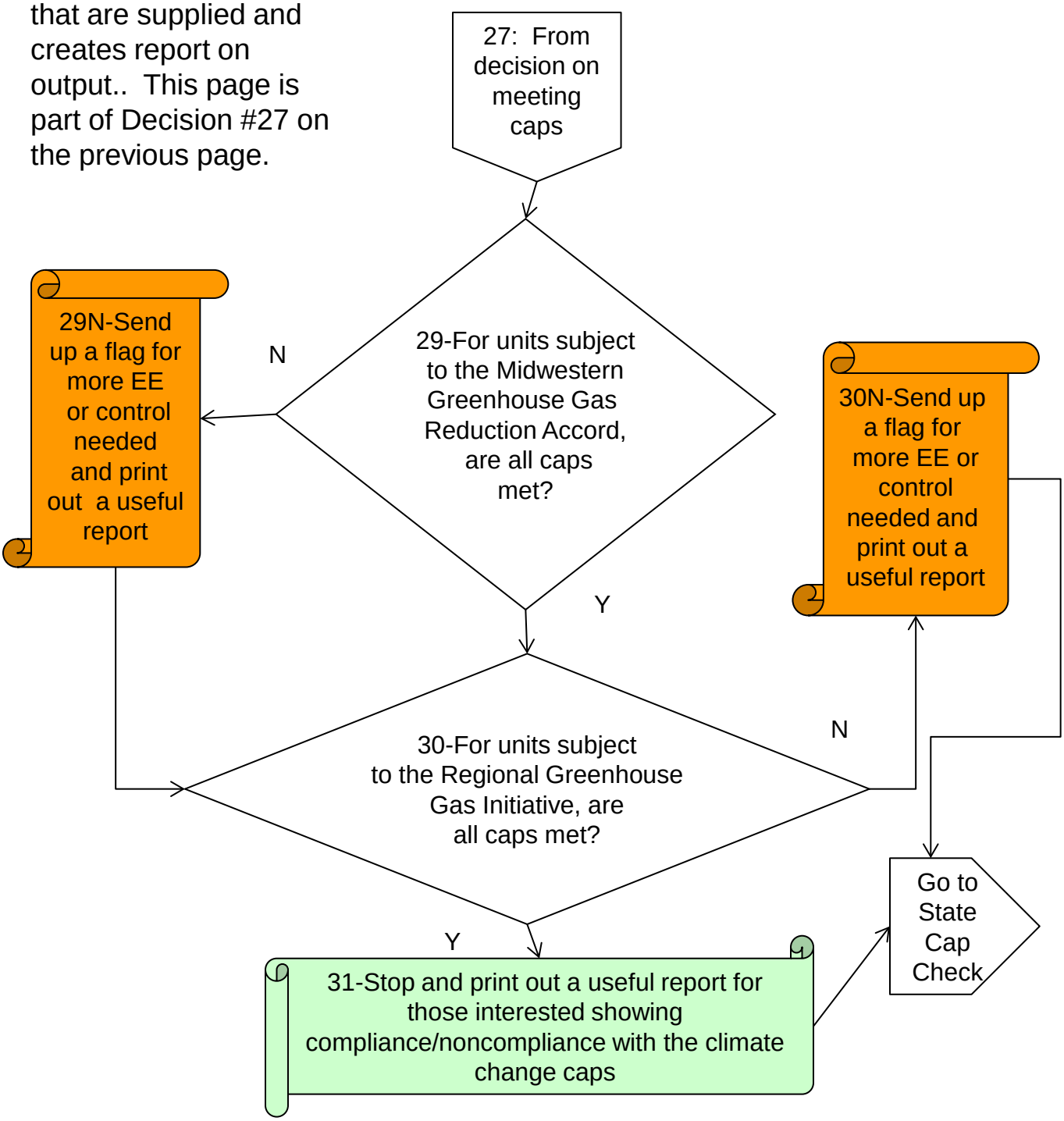
ExGenPool Distribution: two loops

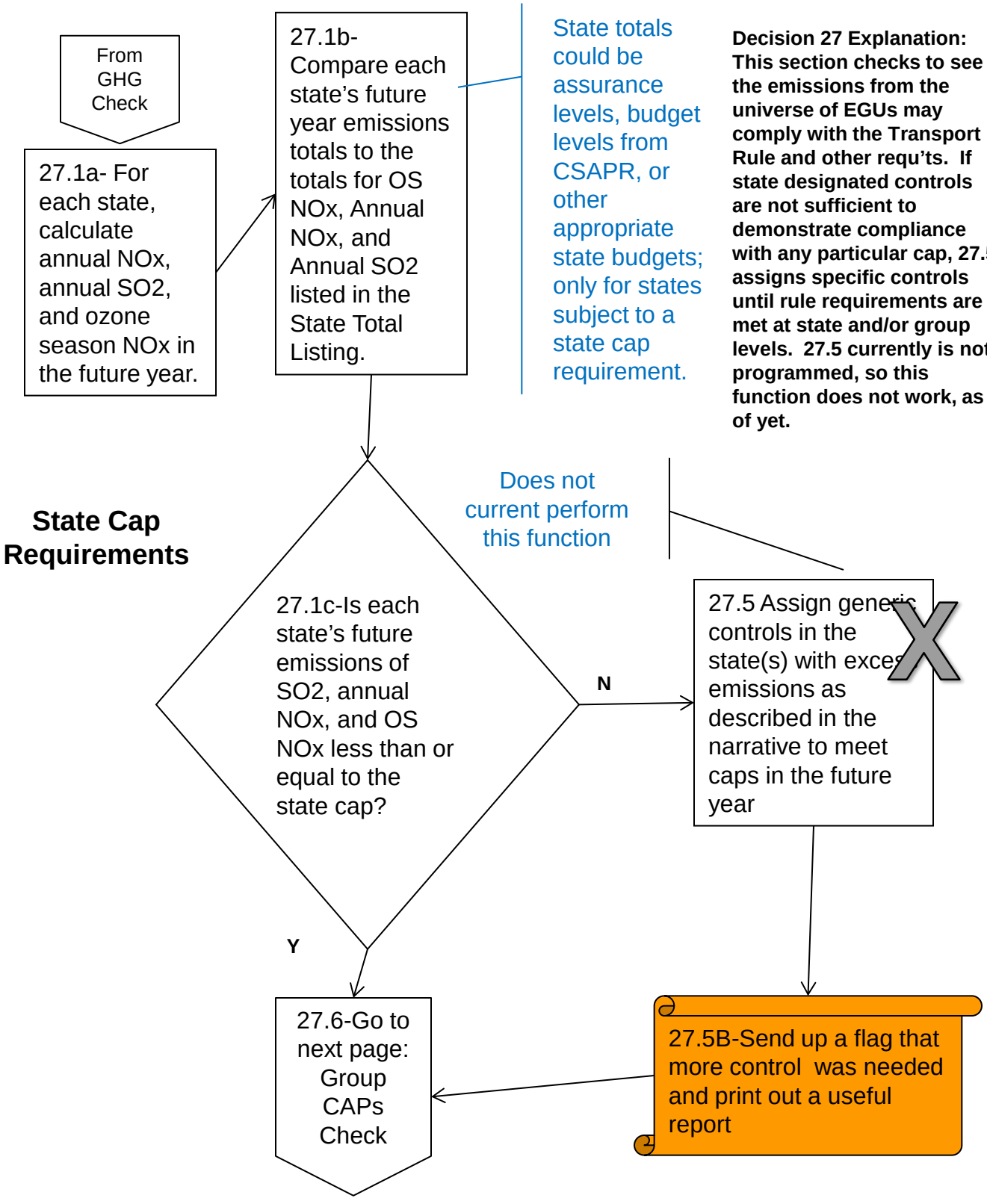
Spinning Reserve: Checks to ensure that spinning reserve requirements for each region of the system are met. This portion of the work is performed after power distribution and ExGen pool distribution have been performed for all three fuels (coal, oil, natural gas). Spinning reserve for any hour can be satisfied by any extra capacity in any fuel type. The amount needed is calculated by finding the maximum capacity of the largest single unit running in any hour using any fuel and multiplying by 10**0%.**



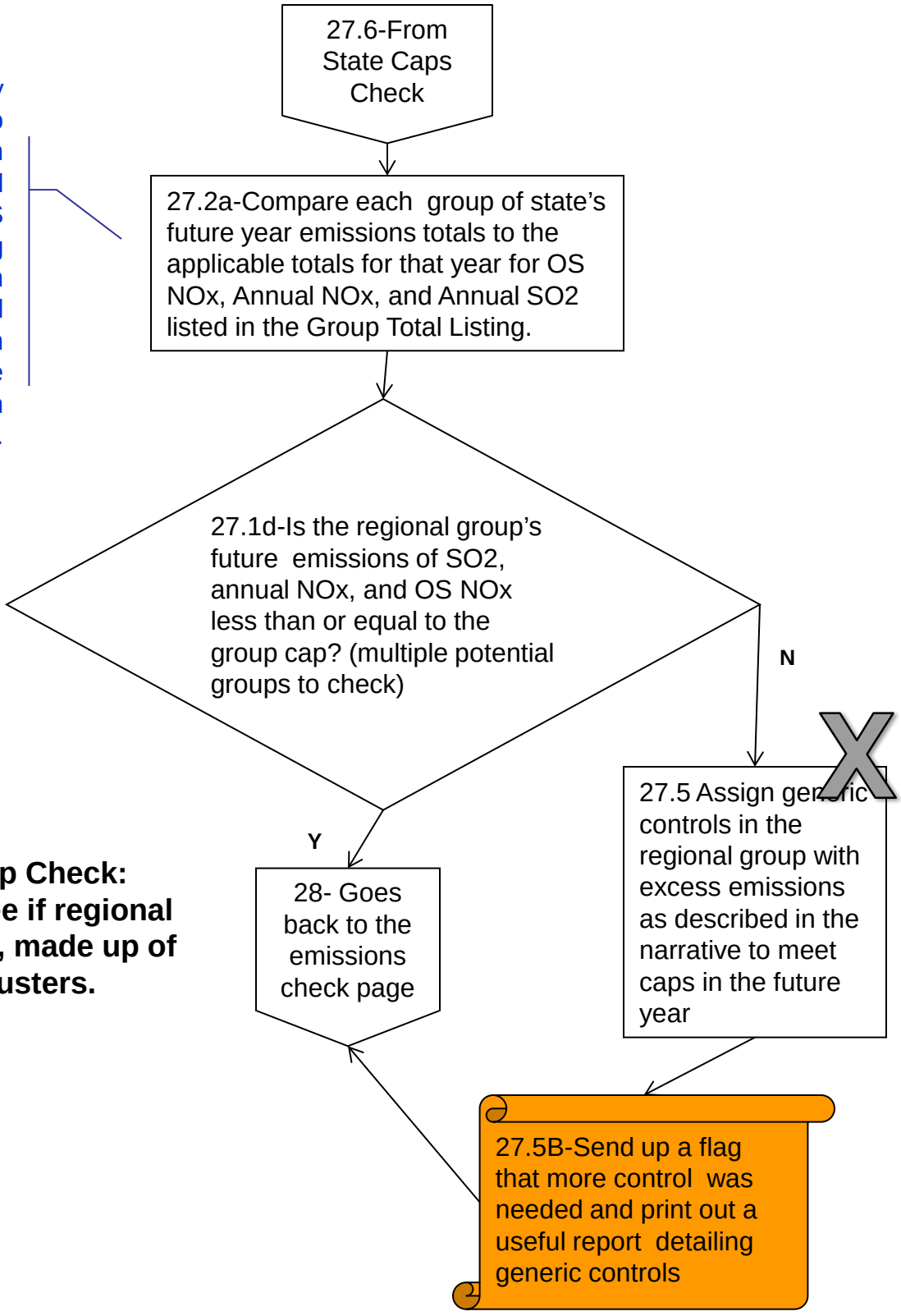

25- From spinning reserve page
Emissions Check: **This part of the work checks to see if the expected controls, new generation, future year generation, and other system changes allow the universe of units to meet the various environmental caps.**
26-For each hour of the year, for each unit, calculate emissions of NOx, SO2, and CO2(e).
26.5-Apply unit level controls for units where future retrofits are expected to occur, based on information provided by States in the Controls and Emissions file
The processes of decision #27 are described on Page 11
This portion of the programming was not completed.
27-For units subject to the Transport Rule, are all caps met?
N
Y
27.5 Assign generic controls as described in the narrative to meet caps in the future year
28-Print out a useful report for the SIPs and output a database (ORL, NIF, or similar) that can be used for AQ modeling purposes. Reports need significant detail to allow review of the results from application of transport and other state caps.
27.5B-Send up a flag that more control was needed and print out a useful report detailing generic controls
STOP Tool: Start the QA Process

GHG Cap Checks:
Checks any GHG caps that are supplied and creates report on output.. This page is part of Decision #27 on the previous page.




From GHG Check
27.1a- For each state, calculate annual NOx, annual SO2, and ozone season NOx in the future year.
27.1b- Compare each state's future year emissions totals to the totals for OS NOx, Annual NOx, and Annual SO2 listed in the State Total Listing.
State totals could be assurance levels, budget levels from CSAPR, or other appropriate state budgets; only for states subject to a state cap requirement.
Decision 27 Explanation: This section checks to see if the emissions from the universe of EGUs may comply with the Transport Rule and other requ'ts. If state designated controls are not sufficient to demonstrate compliance with any particular cap, 27.5 assigns specific controls until rule requirements are met at state and/or group levels. 27.5 currently is not programmed, so this function does not work, as of yet.
State Cap Requirements
Does not current perform this function
27.1c-Is each state's future emissions of SO2, annual NOx, and OS NOx less than or equal to the state cap?
N
Y
27.5 Assign generic controls in the state(s) with excess emissions as described in the narrative to meet caps in the future year
X
27.5B-Send up a flag that more control was needed and print out a useful report
27.6-Go to next page: Group CAPs Check

There are as many groups as need to be defined for each pollutant: annual SO2 and NOx, OS NOx. The listing must delineate both the group total emissions for each pollutant and the states included in each group.



Group Cap Check: Checks to see if regional caps are met, made up of state clusters.