Updating ICs to implement Ovation change

Init_IC and BatchIC

(or vendor specific utility)

The problem

- While many simulator sites may have had to extensively use the tools for initializing IC's (Init_IC and BatchIC, in GSE Opensim), Farley had always managed to structure major mods to either run with a single initialization (in icdriver.f) or run from a supplied 100% power IC and build all other IC's by operating from the 100% power IC.
- For minor mods, sometimes even new models using model builders, we could get by with one initialization loaded by icdriver.f, take the kick upon going to run, stabilize the IC and resnap it. Service Water and Component Cooling Water, for example, were done this way.

What changed?

- We finally got a big DCS (Ovation Turbine Control). This was introduced during an outage the old fashioned way by operating to all conditions from a supplied 100% IC. However, by the time the installation was done in the plant, several modifications had been made. At this point, the simulator IC's had already been re-snapped. This will be the case for most outages going forward. We won't be able to wait for the Ovation output file from the plant because we can't wait to start our IC updates.
- Even minor Ovation updates, require re-initailizing all IC's.

Solution (the below uses Opensim terminology):

- Note: We're not getting into the specifics of the utility program usage, just the overall process.
- Make a list of ic's by IC number.
- The list includes the ic number, the turbine load, various parameters that will need to be matched when the IC is run later to tweak it in (such as Tavg, reference demand, ramp rate, etc.)
- Sort the list by turbine load.

Solution (cont)

- From this list, pick the load steps for the various IC's we want to update. For Farley, this turned out to be the following:
- Full power
- 900.2
- 878.0
- 767.7
- 642.4
- 586.3
- 513.0
- 498.2

Solution (cont)

- 325.5
- 256.6
- 240.0
- 204.0
- 194.4
- 159.4
- 153.6
- 122.7
- 111.5
- 40.9
- Shut down

Solution (cont)

- Now, ramp the simulator down from 100% to shutdown at 5 mw/min (chose your own speed), pausing at each one of the above steps to use Init_IC to write out a variable=value (output file or dump file) file for each variable in the ovation global partition. The same could be done for other globals, while you're at it, if the need exists.
- Also create a full power and shutdown output file for the ovation global.

Solution (cont)

- Construct an input file for use with BatchIC (or equivalent utility) using the IC list and a column editor (input file example in later slide).
- Run BatchIC with the input file, updating all your IC's with the appropriate new Ovation global values.

Finishing up

- The full power IC's will have very minor kicks since not all full power IC's are at exactly the same load, valve position, etc. A short stabilization period is necessary for each one.
- Shutdown IC's can be reset and run for a few seconds and resnapped to allow turbine speed to propagate through ovation.

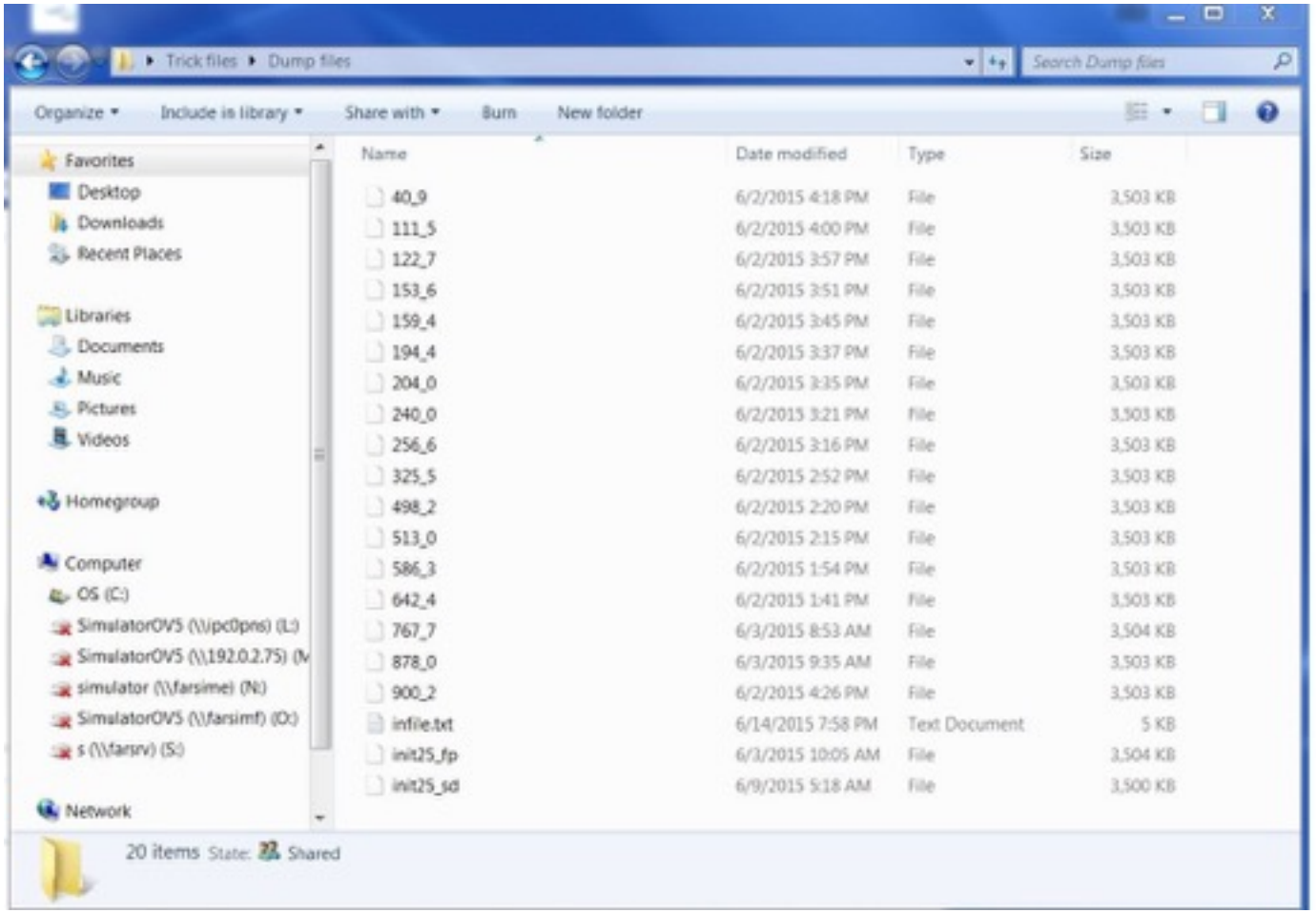
Finishing Up (intermediate power IC's)

- Reset into each IC.
- Freeze Xe/Sm
- Go to run and immediately place the turbine in hold.
- Adjust reference demand and ramp to restore turbine load, Tavg, etc., to the original IC's values (recordered in the list at the beginning), finishing with ramp rate at the original IC's value and run to let the plant stabilize.

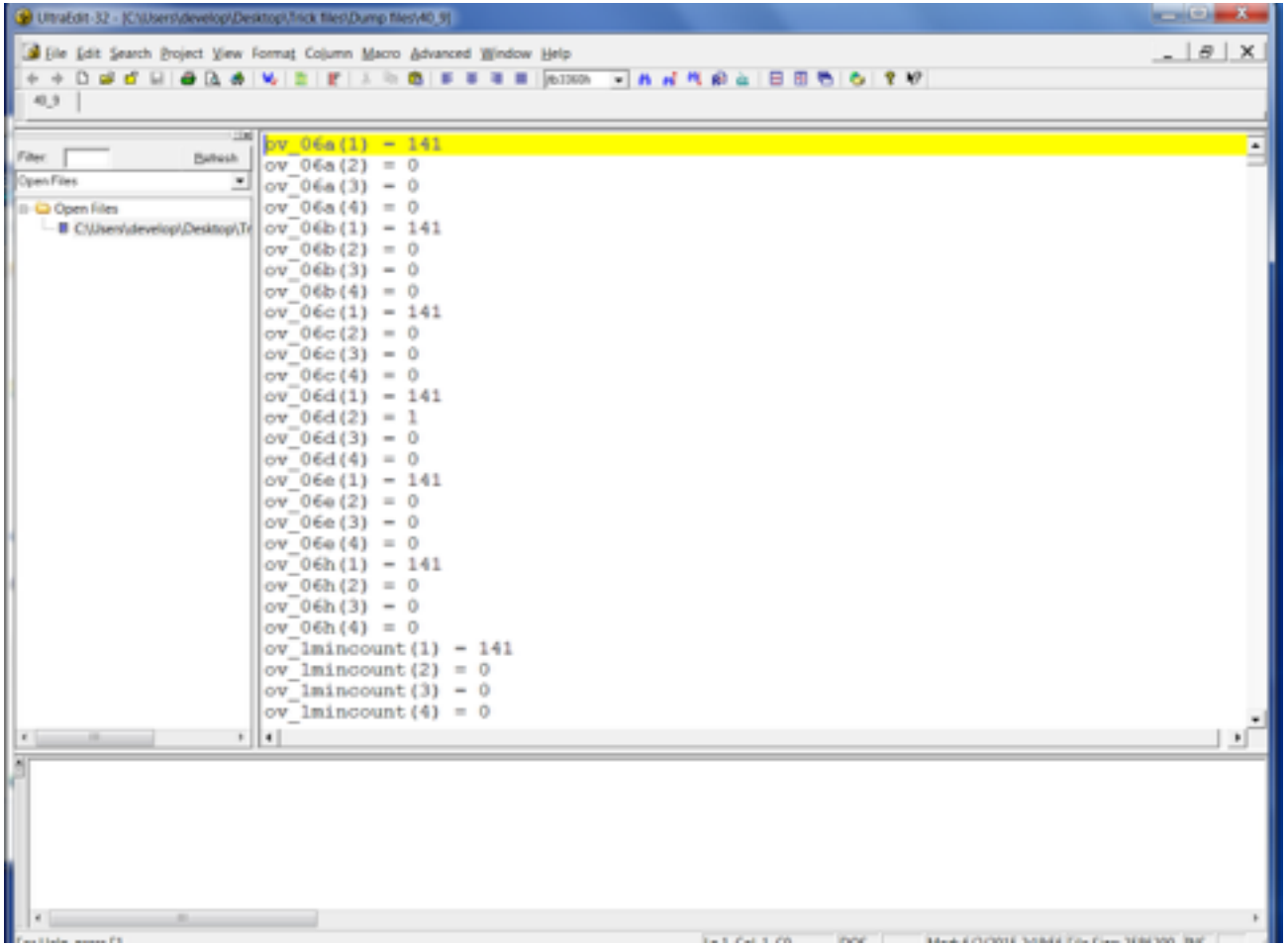
Finishing Up (intermediate power IC's)

- Unfreeze Xe/Sm
- Re-snap the IC.
- We got the ILT and LOCT programs to supply us a list of IC's for the upcoming weeks and concentrated on getting those stabilized and did the remainder of the IC's as time permits.

What the output (dump) files look like



A variable=value file



The input file for use with BatchIC