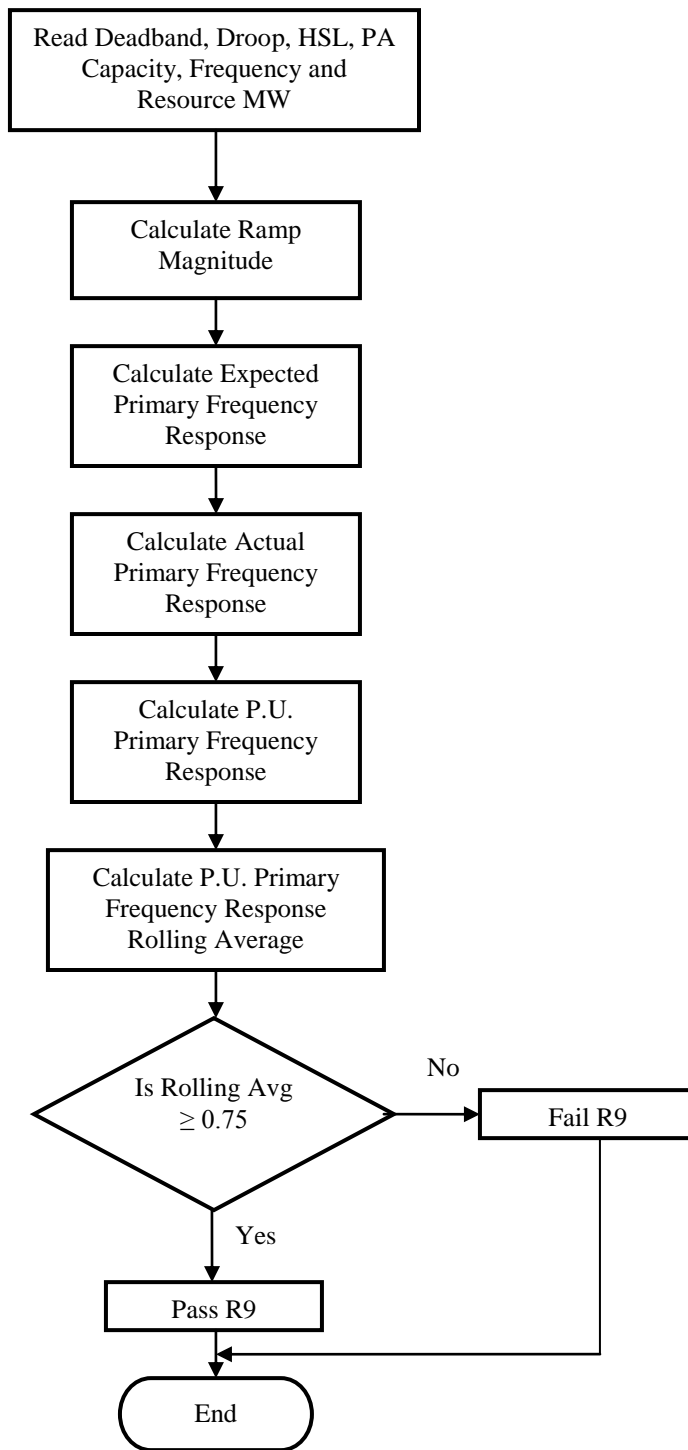


**Attachment A to
Primary Frequency Response Reference Document**

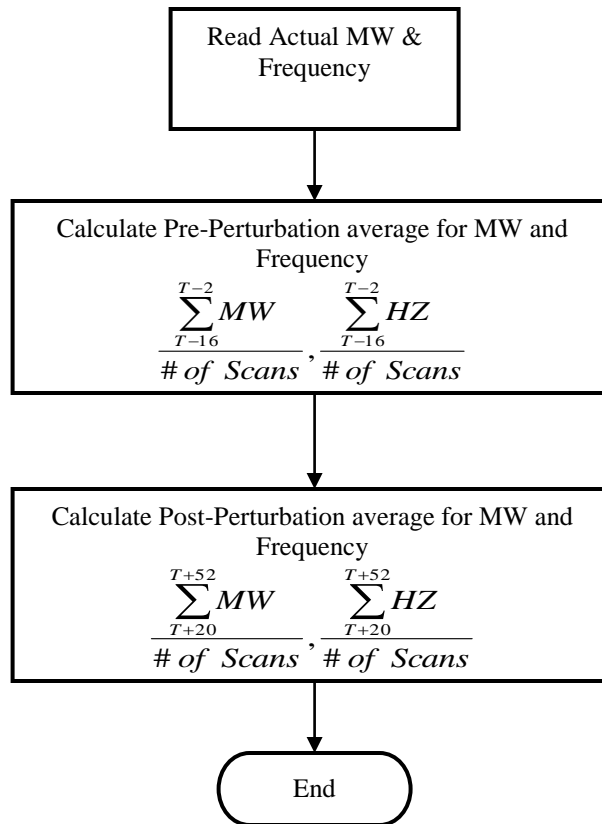
**Initial Primary Frequency Response Methodology for
BAL-001-TRE-1**

Primary Frequency Response Measurement and Rolling Average Calculation – Initial Response

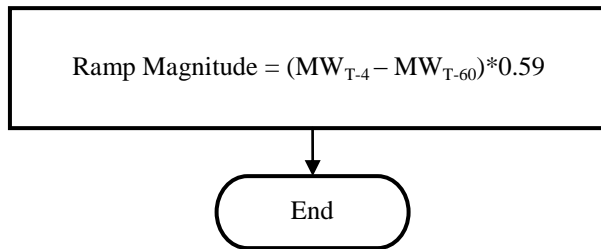
PA=Power Augmentation
HSL=High Sustained Limit



Pre/Post-Perturbation Average MW and Average Frequency Calculations

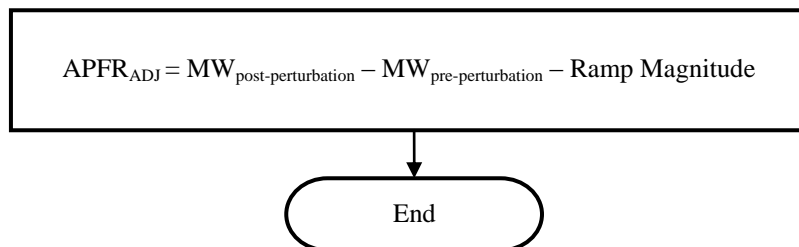


Ramp Magnitude Calculation



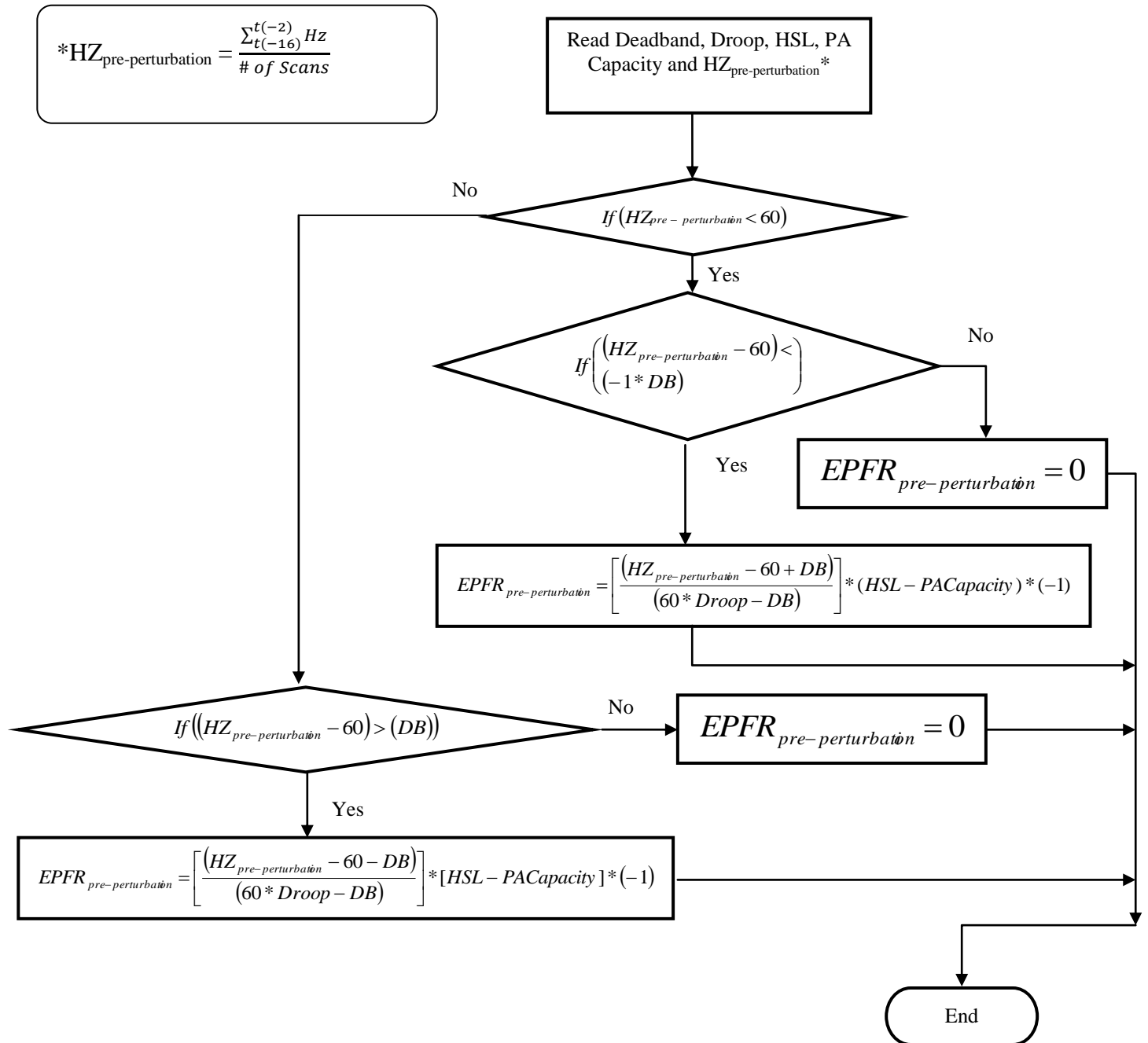
$(MW_{T-4} - MW_{T-60})$ represents the MW ramp of the generator resource/generator facility for a full minute prior to the event. The factor 0.59 adjusts this full minute ramp to represent the ramp that should have been achieved during the post-perturbation measurement period.

Actual Primary Frequency Response (APFR_{adj})



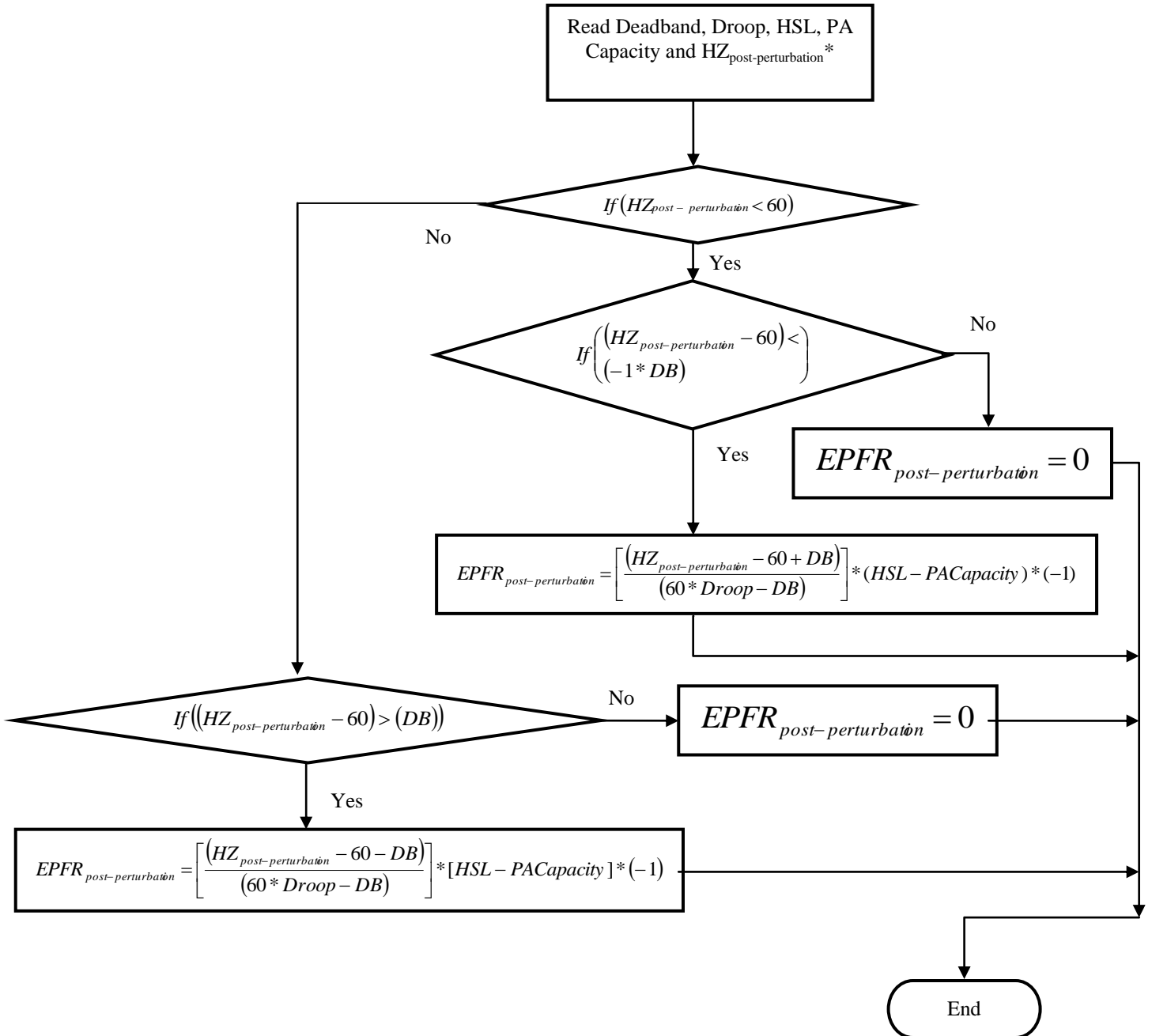
Expected Primary Frequency Response Calculation

Use the maximum droop and maximum deadband as required by R6. For Combined Cycle Facility evaluation as a single resource (includes MW production of the steam turbine generator), the EPFR will use 5.78% droop in all calculations.



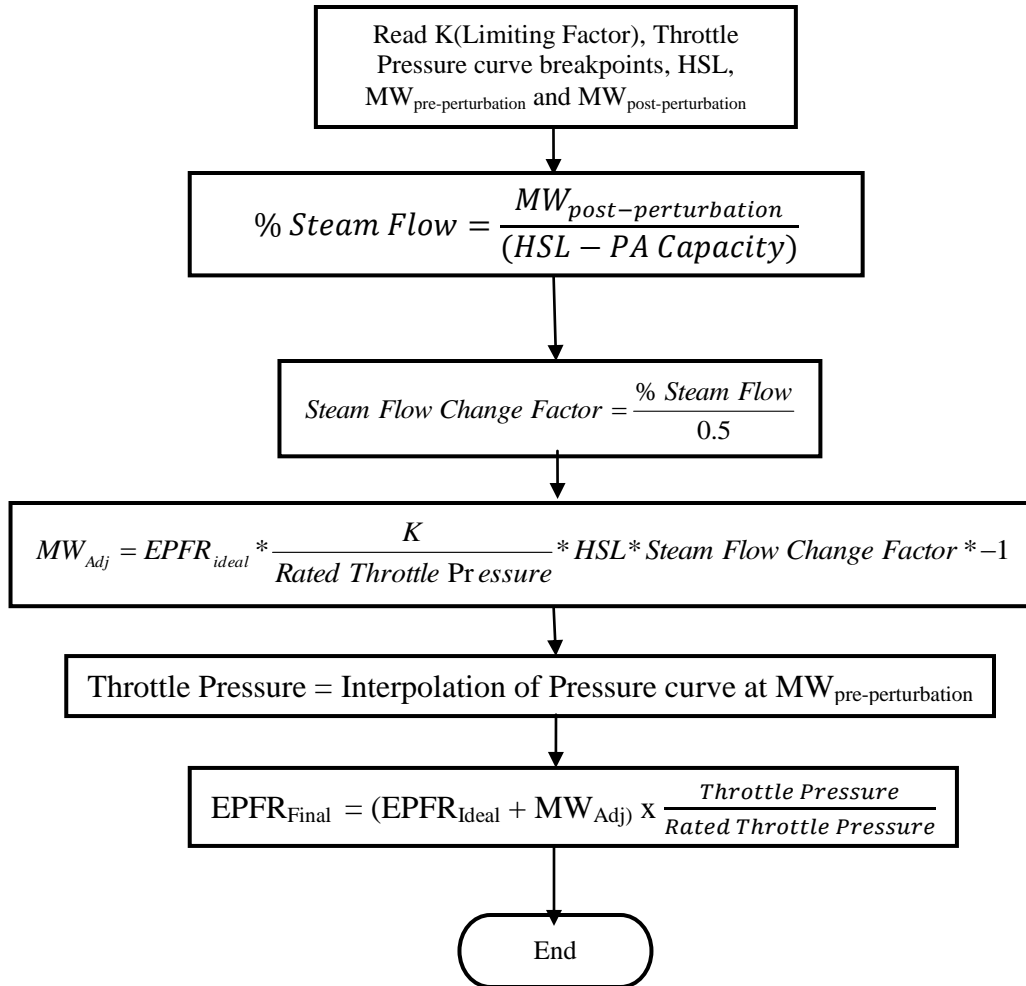
R9. Initial Primary Frequency Response Measurement

$$*HZ_{\text{post-perturbation}} = \frac{\sum_{t(+20)}^{t(+52)} Hz}{\# \text{ of Scans}}$$

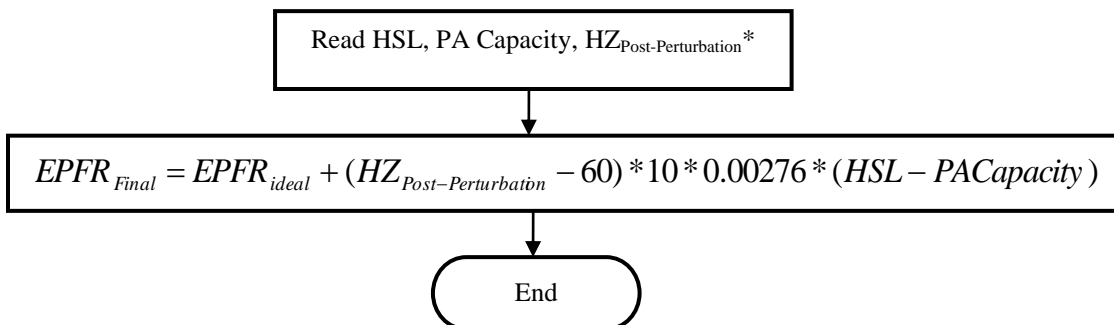


$$EPFR_{\text{ideal}} = EPFR_{\text{post-perturbation}} - EPFR_{\text{pre-perturbation}}$$

Adjustment for Steam Turbine

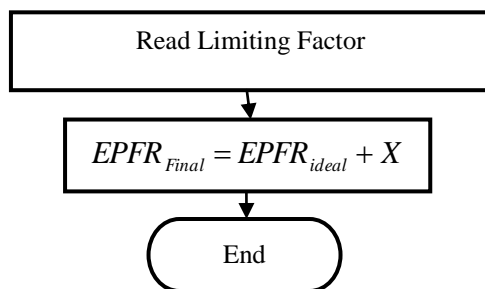


Adjustment for Combustion Turbines and Combined Cycle Facilities



0.00276 is the MW/0.1 Hz change per MW of Capacity and represents the MW change in generator output due to the change in mass flow through the combustion turbine due to the speed change of the turbine during the post-perturbation measurement period. (This factor is based on empirical data from a major 2003 event as measured on multiple combustion turbines in ERCOT.)

Adjustment for Other Units

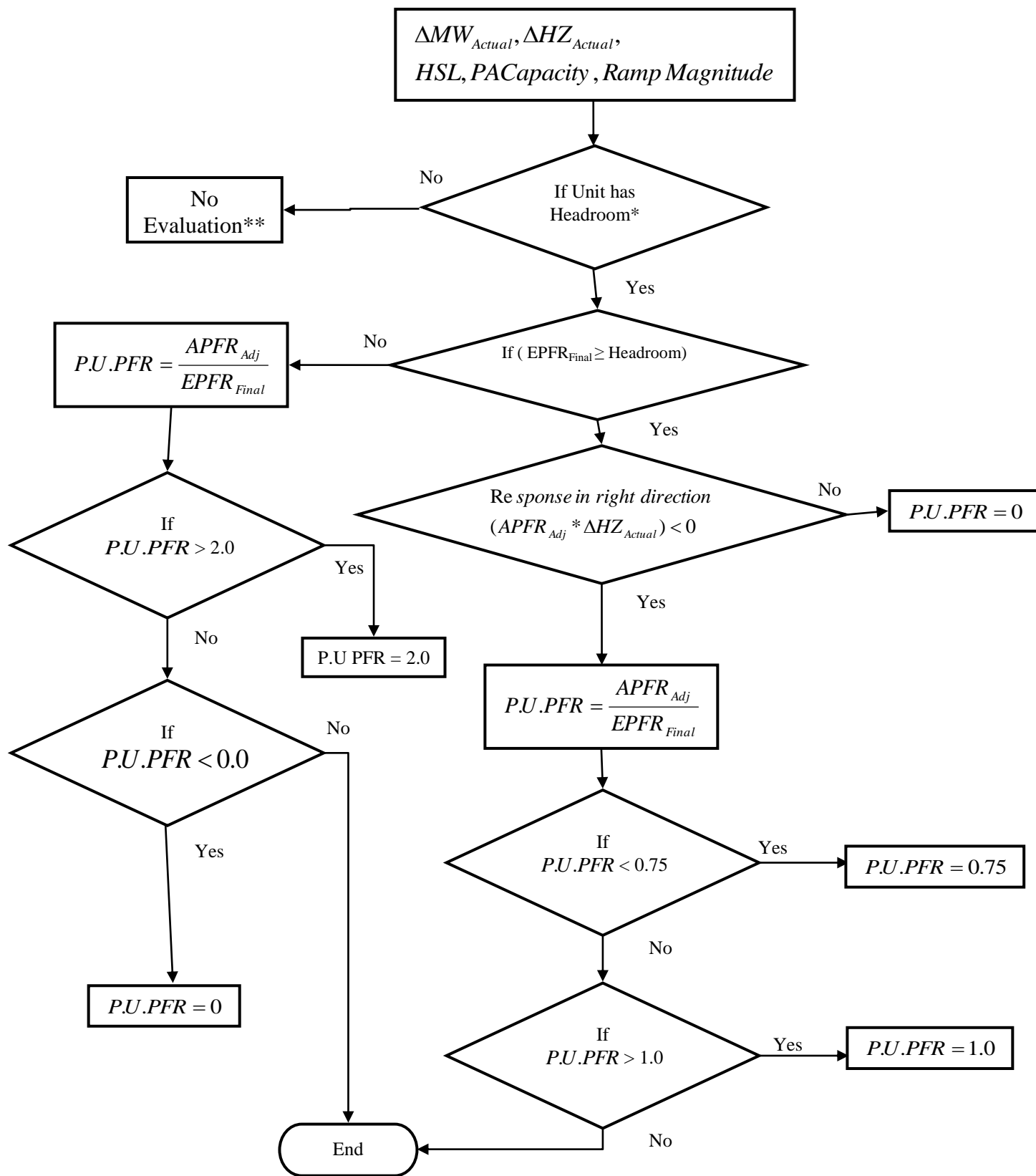


$$*HZ_{\text{Post-Perturbation}} = \frac{\sum_{T+20}^{T+52} HZ_{\text{Actual}}}{\# \text{ of Scans}}$$

This adjustment Factor X will be developed to properly model the delivery of PFR due to known and approved technical limitations of the resource. X may be adjusted by the BA and may be variable across the operating range of a resource.

P.U. Initial Primary Frequency Response Calculation

R9. Initial Primary Frequency Response Measurement



R9. Initial Primary Frequency Response Measurement

*Check for adequate up headroom, low frequency events. Headroom must be greater than either 5MW or 2% of (HSL less PA Capacity), whichever is larger. If a unit does not have adequate up headroom, the unit is considered operating at full capacity and will not be evaluated for low frequency events.

Check for adequate down headroom, high frequency events. Headroom must be greater than either 5MW or 2% of (HSL less PA Capacity), whichever is larger. If a unit does not have adequate down headroom, the unit is considered operating at low capacity and will not be evaluated for high frequency events.

For low frequency events:

$$\text{Headroom} = \text{HSL} - \text{PA Capacity} - \text{MW}_{T-2}$$

For high frequency events:

$$\text{Headroom} = \text{MW}_{T-2} - \text{LSL}$$

**No further evaluation is required for Sustained Primary Frequency Response. This event will not be included in the Rolling Average calculation of either Initial or Sustained Primary Frequency Response.

T = Time in Seconds