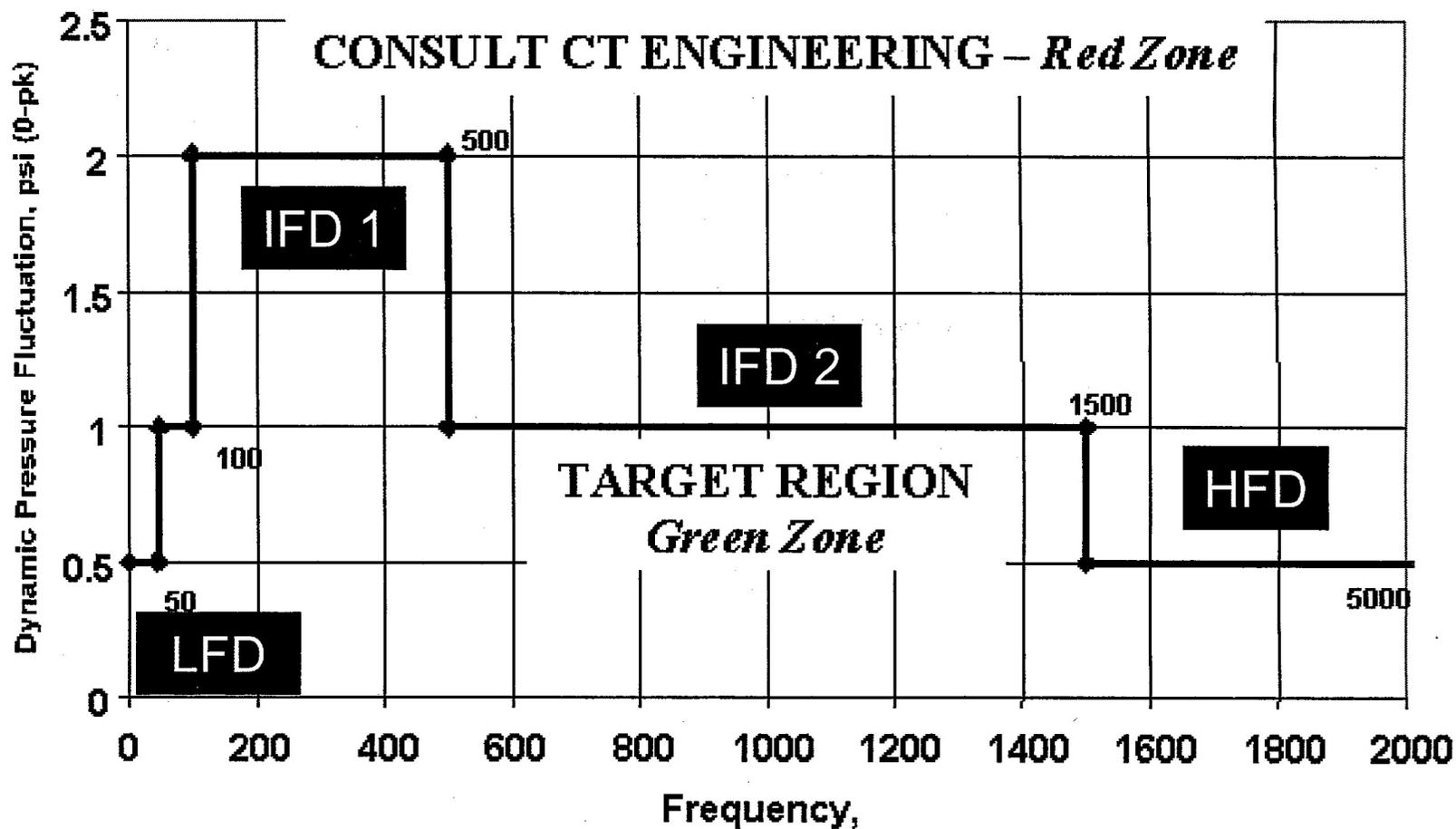


# Combustor Dynamic Operating Guidelines

**SIEMENS**  
Westinghouse



# Combustor Dynamic Matrix



Description	Frequency Range Hz.	Amplitude (Alarm) psi	Component Risks	Potential Causes	Mitigation Strategies
LFD (Low Frequency Dynamics)	0 to 25  25 to 100	0.5  1.0	Swirler Damage  Basket Damage  Nozzle Damage	Flashback Indications  Lean Blowout Damaged Swirler(s)  Air flow restriction  High injection flow rates	Increase Pilot-Stage fuel fraction  Increase C-stage fuel fraction  Repair / replace basket  Remove air side obstructions  Reduce injection flow
IFD1 (Intermediate Frequency Dynamics)	100 to 500	2.0	Transition Panels Transition Seals  Fretting  Wear	Pilot nozzle distress Fuel composition  Fuel splits  Bypass valve distress	Combustion Tuning  Active Tuning
IFD2 (Intermediate Frequency Dynamics)	500 to 1500	1.0	Downstream Components  Fretting  Wear	Equipment Distress	Inspect & repair combustor components
HFD (High Frequency Dynamics)	1500 to 5000	0.5	Baskets  Cross Flame Tubes  Flashback T/C's	Overfiring  IGV Position Error  Fuel composition  Damping	Helmholtz resonators Adjust IGV position  Increase steam injection  Fuel heating

Basket Distress