Appendix D: Adaptive Memory Gate (Optional System Layer)

Purpose:

To enable Co-Aegis to modulate its activation thresholds and behavioral sensitivity in response to recent environmental history and fault-state exposure—without altering its defined role or core containment structure.

Context:

Biological systems shift. Fixed thresholds, no matter how well-calibrated, may become misaligned under prolonged edge-case conditions. This gate introduces bounded short-term learning without long-term adaptation. It is shallow, decay-based, and fully reversible.

Core Logic:

- If `Pfault` was triggered within a rolling memory window → raise activation thresholds temporarily
- If quorum signal remains marginal but sub-faulting → gradually re-enable standard sensitivity
- If metagenomic collapse is sustained without recovery → extend dormancy window until microbial equilibrium is partially restored

Possible Implementations:

- Time-decay memory molecule that accumulates on fault events and clears under baseline quorum/pH conditions
- Inhibitory peptide gate linked to quorum molecule clearance
- Toehold RNA loop requiring repeated agreement conditions before gating opens

Design Constraints:

- Cannot override `Abort`, `Silent`, `Trace`, or `Failsafe` states
- Memory decay is time-bound (e.g., half-life ≤ 4h); no permanent modulation
- Gate may delay/stagger activation but cannot create novel behavior

Justification:

This layer grants Co-Aegis the ability to wait—not in hesitation, but in discernment. It remembers just enough to avoid repetition of misfiring. It adapts only when context is uncertain, and forgets once coherence returns.

Activation of this layer is optional.
Inclusion must be explicitly stated in the system's deployment manifest.