Appendix B – Interdependent Containment Logic (v2.6 upgrade)

Traditional multi-layer containment systems rely on parallel redundancy: failure in one layer is offset by functionality in others. However, Co-Aegis introduces an optional interdependent architecture in which containment decisions emerge from the agreement of layers, not their isolation.

This quorum-based model improves resilience in ambiguous contexts (e.g., fluctuating hypoxia, necrotic non-tumour tissue, or immune-invisible terrain) by requiring mutual confirmation of system state before activating irreversible functions.

B1 Quorum-Gated Activation

All major output modules (germination, exposure, payload execution) are now optionally gated by a shared checkpoint that verifies:

- Environmental hypoxia meets persistence threshold

- Quorum signal density is below host-microbiome baseline (e.g., < 5 µM AHL equivalents)

- Core transcripts (spo0A, dapA, Cas9) are intact and unmodified

- No cross-layer contradictions are present (e.g., germination logic active while integrity flag also active)

Only when these conditions are co-confirmed does the system proceed. If quorum logic is not met, the system remains inert, even in low-oxygen conditions.

B2 Metagenomic Feedback (optional layer)

For deployments involving gut, mucosal, or polymicrobial zones, Co-Aegis optionally incorporates a passive environmental sensor for microbiome diversity collapse:

- Abnormal taxonomic narrowing (e.g., < 15 genera via conserved 16S probe expression)

- Detection of known dysbiosis-associated fragments (e.g., overexpression of Escherichia, loss of Bacteroides)

- Collapse triggers gating hold or reduced aggression threshold

This module functions as a structural context check, not a therapeutic target. It prevents false-positive behavior in ecologies that may appear hypoxic or damaged but are otherwise in repair.

B3 System Interaction Map

Condition	Germination	Pfault	Cas9 Payload	Harmonizer
Hypoxia only	Held	Off	Inert	On
Hypoxia + quorum collapse	Held	Off	Inert	On
Full quorum + transcript intact	Ready	Off	Dormant	Off
Transcript failure + quorum met	Blocked	On	Inert	Off
Hypoxia + metagenome collapse + intact	Held	Off	Inert	On
Germination active + quorum rescinded	Exposure	Conditional	Off	Off

B4 Philosophical Note

This containment layer is not designed to prevent failure. It is designed to require agreement before power is exercised. Co-Aegis does not act alone — it listens to itself before it speaks.