OCC Canonical Addendum — Nuclear Domain Expansion (v1.2.0)

Marker: **NUCLEAR-LOCK-PACKAGE-V1.2.0**
Date: 2026-02-16
Scope: Formal integration of nuclear-domain locks, MRD module, and prediction anchor.

1. Canonical alignment (J0-J3 preserved)

This addendum does **not** introduce a new foundational J-judge. Foundational judges remain J0–J3 (ISAAC/PA/IO/RFS), as defined in Documento A+. Nuclear integration is implemented as a domain lock package NUC* under the same operational semantics: evaluability first, then consistency and evidence anchors.

2. Lock classes and equations

Class C (consistency / evaluability in Ω_I): declare energy window, isotope set, reaction channel, and detector set. Missing declarations imply NO-EVAL(NUC*). Malformed numerical declarations imply FAIL(NUC*).

```
Eq. (1): 0 <= E_min < E_max (MeV)
```

Class E (evidence anchor): compare model prediction against declared observable anchor with uncertainty and source provenance (dataset reference + URL/DOI locator).

```
Eq. (2): z = |sigma_pred - sigma_obs| / sigma_obs_err

PASS(E) iff z <= z_max; FAIL(NUC12E) iff z > z_max.
```

3. Operational semantics of violations

- NO-EVAL: claim is not operationally compilable (missing domain/evidence declarations).
- FAIL: claim is compilable but inconsistent with declared consistency/evidence locks.
- PASS: claim satisfies declared lock set inside Ω_I, with explicit witness values.

4. MRD implementation and reproducibility

Extension module: **ILSC_MRD_suite_extensions/mrd_nuclear_guard**
Cases: PASS, NO-EVAL(NUC6), FAIL(NUC12E)
Prediction anchor extension: registry entry P-0004.

```
CLI judge profile:
occ judge examples/claim_specs/nuclear_pass.yaml --profile nuclear

MRD execution:
occ verify --suite extensions --strict --timeout 60
```

Anexo ES — Integración nuclear formal (resumen)

Este anexo integra candados nucleares NUC* compatibles con la arquitectura OCC y conserva la jerarquía canónica: J0-J3 como jueces fundacionales, candados por frontend/dominio para consistencia y evidencia.

Clase C (consistencia): energía, isótopos, canal de reacción, detectores.
Clase E (evidencia): anclaje observable con incertidumbre, contraste z-score y metadatos de procedencia (referencia + URL/DOI).

```
z = |sigma_pred - sigma_obs| / sigma_obs_err <= z_max
```

Si faltan anclajes: NO-EVAL. Si hay contradicción cuantitativa: FAIL(NUC12E).

Files covered: occ/judges/nuclear_guard.py, ILSC_MRD_suite_extensions/mrd_nuclear_guard/, examples/claim_specs/nuclear_*.yaml, predictions/registry.yaml (P-0004).