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PSI-01: Zero-Knowledge Method for Ventilation Air Methane Destruction Verification under Safeguard Mechanism

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Abstract

This document specifies PSI-01, a zero-knowledge method for proving Ventilation Air Methane (VAM) thermal destruction to satisfy Australia's Carbon Credits (Carbon Farming Initiative—Coal Mine Waste Gas) Methodology Determination 2026, Clause 20A.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on 12 November 2026.

1. Introduction

The Safeguard Mechanism requires coal mines to surrender ACCUs for fugitive VAM emissions. PSI-01 defines a computational standard to prove compliance without data disclosure.

2. Conformance Requirements

A facility conforms to PSI-01 if it produces a valid ZK-SNARK proof attesting: avg_temp > 1000 AND duration > 0.5s. Proof anchored to Bitcoin block header.

3. Security Considerations

The use of zero-knowledge proofs ensures that high-fidelity sensor telemetry remains private while providing cryptographic certainty of the destruction event to the regulator.

4. IANA Considerations

This document has no IANA actions.

5. Intellectual Property Rights

Specification under Apache-2.0 with trademark exclusion. Reference verifiers free under MIT. Commercial implementations exceeding 1,000 proofs per year MUST execute a method-licence deed with Rockyfilms888 Pty Ltd. Royalty: AUD $0.30 per proof. Contact: legal@apex-infrastructure.com

6. Informative References

[CER2026] Clean Energy Regulator, "Carbon Credits (Carbon Farming Initiative-Coal Mine Waste Gas) Methodology Determination 2026", 2026.

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