

STRATEGIC DECISION MATRIX

Here is a **strategic decision matrix** Designed specifically for the evaluation and management of mature deposits (*Brownfields*). It integrates the use of the **RSS-NMR technology complex** at each key stage of the asset lifecycle, from the pre-acquisition phase to tertiary recovery (**EOR**).

This matrix serves as a decision support tool to arbitrate between interventions (Sidetrack , Recompletion , EOR) or abandonment, maximizing the energy return on investment (**EROI**).

Decision Matrix: Brownfield Optimization using RSS-NMR

Stage Operational	Scenario / Observation Initial	Technological Action (RSS-NMR Scan)	Scan Results & Decision Criteria	Option Strategic Detention	Impact on the Network & EROI
1. Pre-Acquisition Audit <i>(Due Diligence)</i>	Declining field offered for sale with outdated seismic data (2D 60s / 3D 80s).	Rapid spectral scan (4-5 months) over the entire block to detect the signature of hydrogen.	A. Major anomalies detected outside the drilled areas. B. Weak mobile fluid signal or absence of porosity.	A. Validate the buyback at the price of a field at the end of its life (information asymmetry). B. Abandon negotiations (<i>Bad Deal</i>).	Maximum EROI: Exploration risk eliminated. Capital preserved Before signature .
2. Re-exploration of Hidden Reservoirs	Existing production is declining. There are geological "shadow zones" or wedges on old maps.	Precision satellite delineation (2-3 months) to map residual fluids.	A. Isolated "Bypassed" pocket detected in the immediate vicinity of an active well. B. Unknown extension or fault block detected at the permit scale.	A. Perforation / Refilling higher up in the existing casing. B. Drilling a Sidetrack (offset well) or C. Campaign for new targeted wells .	Network change: Immediate reconnection to the existing collector (manifold). Zero new pipelines. We optimize the existing network .
3. Pre-EOR Characterization <i>(Tertiary Recovery)</i>	The field has exhausted its mobile reserves by traditional methods (primary/secondary water sweeping).	Continuous NMR analysis of pore size to measure residual saturation ($\$S_{\text{or}}\$$).	A. High saturation with residual oil trapped in a matrix with favorable porosity.	A. Launch the "Smart EOR" program (polymer, CO ₂ or thermal injection) on this compartment.	EOR efficiency: Avoids wasting expensive chemicals by targeting only profitable areas.

STRATEGIC DECISION MATRIX

Stage Operational	Scenario / Observation Initial	Technological Action (RSS-NMR Scan)	Scan Results & Decision Criteria	Option Strategic Detention	Impact on the Network & EROI
			B. Heavy, non-mobile fluid or excessively fractured reservoir.	B. Prepare for the final abandonment of the well.	

Specific Arbitration Logic: "Hidden Reservoirs" vs. "EOR"

To optimize investments, RSS-NMR allows the approach to be segmented according to the physical state of the oil in the subsoil:

Case A: Oil is Mobile but Invisible (Hidden/Bypassed Tanks)

- **Reservoir physics:** Oil can flow naturally, but engineers in the 60s/80s did not see it because of poor seismic resolution.
- **Decision Matrix:** Priority is given to **traditional, low-cost methods** (Replenishment / Short Sidetrack). This high-margin oil is extracted first by simply modifying the existing surface network.

Case B: The oil is visible but stationary (EOR target)

- **Reservoir physics:** The structure is known, but the oil is stuck to the pore walls or too viscous to escape by natural pressure.
- **Matrix Decision:** Wait until the end of the optimized traditional production phase, then use NMR to design the **tertiary EOR injection** .

Summary of the Economic Model of the Matrix

Using this matrix guarantees two major indirect benefits:

1. **The Regulatory Bypass:** Each decision validated by the matrix (Sidetrack , Replenishment , Injection) is administratively classified as an **optimization or modification of the existing production network** . You avoid the 12 to 24 month delays for obtaining new exploration permits and the cumbersome Environmental Impact Assessments (EIAs).
2. **EROI Protection:** By reinvesting only in a block already equipped and connected to export ports to major markets, each additional barrel of oil discovered by RSS-NMR has a negligible implementation cost compared to a new *Greenfield project*.