To instantiate the safety case pattern for a Generic Patient-Controlled Analgesia (GPCA) system given the predicate rules, we will replace the generic placeholders with concrete system-specific information. Here we are considering operational hazards "Overinfusion" and "Underinfusion" and multiple safety requirements to construct the safety case. Here's the instantiated safety case:

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G1: Operational safety is verified in GPCA system

C1: All specs are given by specific operational requirements from safety standards

- S1: Argument over the satisfaction of all specs over GPCA system

- G2: All operational hazards are mitigated

- C2: Operational hazards are given by a list of all possible operational hazards including Overinfusion and Underinfusion

- S3: Argument over operational hazards

- G3: Overinfusion is mitigated

- S4: Argument over the applied scenarios of Overinfusion

- G4: Overinfusion is mitigated under excessive patient request scenarios

- C3: All related scenarios are given by excessive patient demand as identified through safety analysis

- S5: Argument over all specs related to excessive patient request scenarios

- G5: Flow rate sensor is appropriate for excessive patient request scenarios

- C4: All related specs are given by scenario-based expert guidelines

- S6: Argument the appropriateness of flow rate sensor over properties

- G6: Period trigger for Underinfusion alarm (15 minutes) is appropriate for flow rate sensor

- C5: Properties are given by the properties related to sensors and alarms

- S7: Argument over the source of the property definition

- G7: FDA standard is appropriate and trustworthy for flow rate sensor properties

- C6: Source is given by the references to FDA standards on medical safety

- Sn1: Reference to FDA medical safety standards

- G8: Period definition is sufficient for Underinfusion detection

- Sn2: Technical documentation supporting the 15-minute period setting

- G3.X: Underinfusion is mitigated (Undeveloped)

- S4.X: Argument over the applied scenarios of Underinfusion (Undeveloped)

- G4.X: Underinfusion is mitigated under reduced demand scenarios (Undeveloped)

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This hierarchical tree represents the detailed instantiation of the assurance case pattern with decomposition and linkage to specific safety requirements and scenarios of the GPCA system. Each goal and strategy is supported by either lower-level goals, strategies, or specific evidence and takes into account specific contexts which align with distinct system characteristics and requirements.

Notice how the pattern's structure accommodates a systematic breakdown from the verification of operational safety down to the mitigation and specification appropriateness for specific operational hazards, backed by external standards (like FDA standards) and technical documentation.