Here's the instantiated safety case for the Generic Patient-Controlled Analgesia (GPCA) system derived from the given safety case pattern. Each placeholder is replaced with the system-specific information, and the hierarchical tree structure is displayed using dashes (-) to denote different levels:

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G1: Operational safety is verified in GPCA system

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

- C1: All specs are given by spec.allInstances()

- G2: All operational hazards are mitigated

- S3: Argument over operational hazards

- C2: Operational hazards are given by operational hazard.allInstances()

- G3: Overinfusion is mitigated

- S4: Argument over the applied scenarios of Overinfusion

- C3: All related scenarios are given by Overinfusion

- G4.1: Overinfusion is mitigated under Flow rate mismatch

- S5: Argument over all specs related to Flow rate mismatch

- C4: All related specs are given by Flow rate mismatch.spec.allInstances()

- G5: Flow rate sensor is appropriate for Flow rate mismatch

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

- C5: Properties are given by Flow rate sensor.property.allInstances()

- G6.1: "Flow rate sensor is equipped" is appropriate for Flow rate sensor

- S7: Argument over the source of the "Flow rate sensor is equipped" definition

- C6: Source is given by "Flow rate sensor is equipped".source

- G7: FDA standard is appropriate and trustworthy

- Sn1: FDA standard

- G8: "Flow rate sensor is equipped" definition is sufficient

- Sn2: "Flow rate sensor is equipped"

- G6.2: "Period is 15 minutes" is appropriate for Flow rate sensor (undeveloped)

- G6.3: "Flow rate less than 90% of programmed rate setting" is appropriate for Flow rate sensor (undeveloped)

- G4.2: Overinfusion is mitigated under Dose limit exceeded (undeveloped)

- G4.3: Overinfusion is mitigated under Bolus volume too high (undeveloped)

- G3.1: Underinfusion is mitigated (undeveloped)

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