Here is the instantiated safety case for the Generic Patient-Controlled Analgesia (GPCA) system derived from the provided safety case pattern in a hierarchical tree format:

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- G1: Operational safety is verified in GPCA system

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

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

- G2: All operational hazards are mitigated

- S3: Argument over operational hazards

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

- G3: Overinfusion hazard is mitigated

- S4: Argument over the applied scenarios of Overinfusion hazard

- C3: All related scenarios are given by Overinfusion hazard

- G4: Overinfusion hazard is mitigated under "Flow rate monitoring" scenario

- S5: Argument over all specs related to "Flow rate monitoring" scenario

- C4: All related specs are given by scenario.spec.allinstances()

- G5: Flow rate sensor spec is appropriate for "Flow rate monitoring" scenario

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

- C5: Properties are given by spec.property.allinstances()

- G6: Flow rate sensor property "Flow rate sensor is equipped" is appropriate for Flow rate sensor spec

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

- C6: Source is given by property.source

- G7: Source "FDA standard" is appropriate and trustworthy

- Sn1: Source: FDA standard

- G8: Flow rate sensor property definition is sufficient

- Sn2: Property: Flow rate sensor is equipped

- G3: Underinfusion hazard is mitigated

- S4: Argument over the applied scenarios of Underinfusion hazard

- C3: All related scenarios are given by Underinfusion hazard

- G4: Underinfusion hazard is mitigated under "Alarm triggering" scenario

- S5: Argument over all specs related to "Alarm triggering" scenario

- C4: All related specs are given by scenario.spec.allinstances()

- G5: Alarm period spec is appropriate for "Alarm triggering" scenario

- S6: Argument the appropriateness of Alarm period spec over properties

- C5: Properties are given by spec.property.allinstances()

- G6: Alarm period property "Period (to trigger the underinfusion alarm) is 15 minutes" is appropriate for Alarm period spec

- S7: Argument over the source of the "Period (to trigger the underinfusion alarm) is 15 minutes" property definition

- C6: Source is given by property.source

- G7: Source "Expertise opinion" is appropriate and trustworthy

- Sn1: Source: Expertise opinion

- G8: Alarm period property definition is sufficient

- Sn2: Property: Period (to trigger the underinfusion alarm) is 15 minutes

- G6: Flow rate property "Flow rate is less than 90% of the programmed rate setting" is appropriate for Flow rate spec

- S7: Argument over the source of the "Flow rate is less than 90% of the programmed rate setting" property definition

- C6: Source is given by property.source

- G7: Source "Previous knowledge" is appropriate and trustworthy

- Sn1: Source: Previous knowledge

- G8: Flow rate property definition is sufficient

- Sn2: Property: Flow rate is less than 90% of the programmed rate setting

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In this instantiation, all placeholders have been replaced with specific system details relevant to the GPCA system, and both the undeveloped goals and the multiplicity relationships have been addressed accordingly.