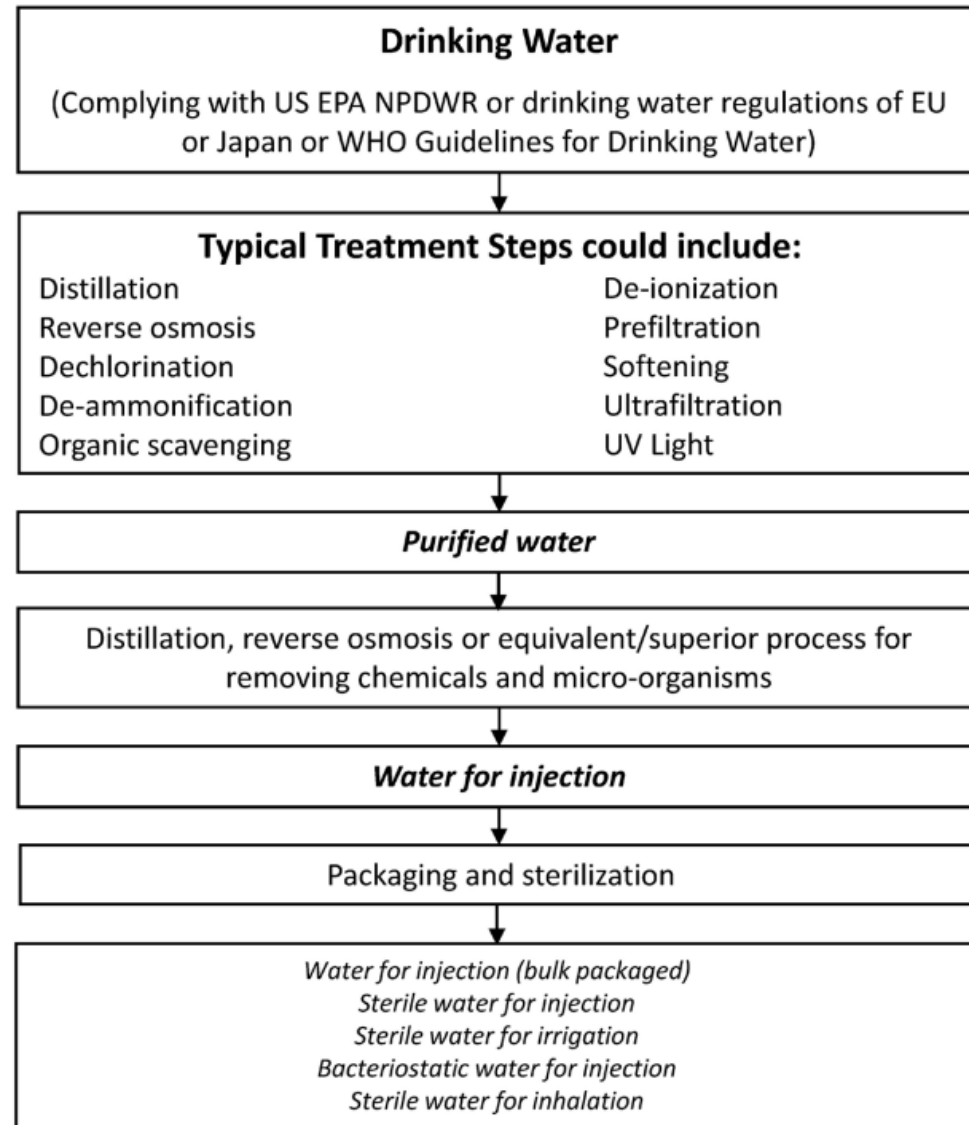


Portable IV Fluid Generation

Designing a way to purify drinking water
and turn it into an IV Saline Solution.

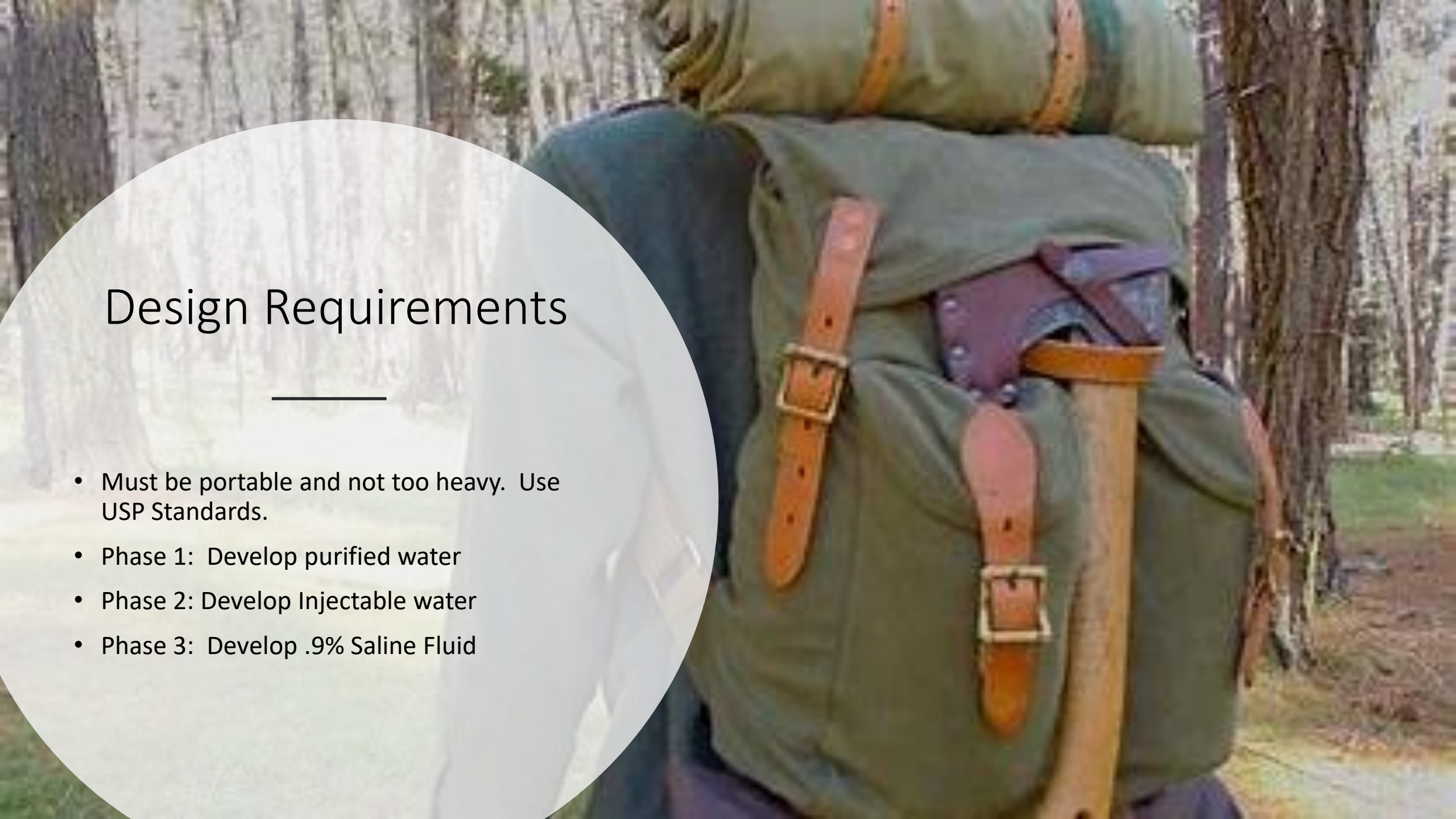
Flow Chart of IV fluid Generation



Water Purification

- The USP specifies distillation and Reverse Osmosis (RO) are the “acceptable” methods to produce Sterile Water for Injection (SWI); however, provisions are included that other processes may be utilized, provided that these processes deliver water of equivalent quality. Common water purification processes and their descriptions include:
- **Distillation** - The process of separating substances from water by a phase change using selective boiling and condensation collection.
- **Reverse Osmosis** – A filtration process that involves using a semipermeable membrane to remove ions, molecules, and larger particles from water. A solvent diffuses across the membrane from a region of low concentration to a region of higher concentration
- **Absorption** - Impurities are chemically absorbed onto a packing material.
- **Ultrafiltration** - Water is forced through a semipermeable membrane with very small pore diameters that physically block the passage of impurities.
- **Deionization** - Cation and anion resin beads exchange unwanted ions with pure hydrogen and hydroxide molecules to form pure water. The ion-exchange resin binds with unwanted mineral salts such as sodium, potassium, chloride, fluoride, etc.





Design Requirements

- Must be portable and not too heavy. Use USP Standards.
- Phase 1: Develop purified water
- Phase 2: Develop Injectable water
- Phase 3: Develop .9% Saline Fluid

Multi-year project potential

- **This project has three phases as listed in the previous slide. This may indeed be a project that becomes a multiyear project. You and your team can decide how far you want to go into the process and keeping it portable and a contained system. Creativity and design is key.**

Astronaut working with the IV Gen system

