

Produced Water Project
San Juan Generating Station
ZeroNet Perspective

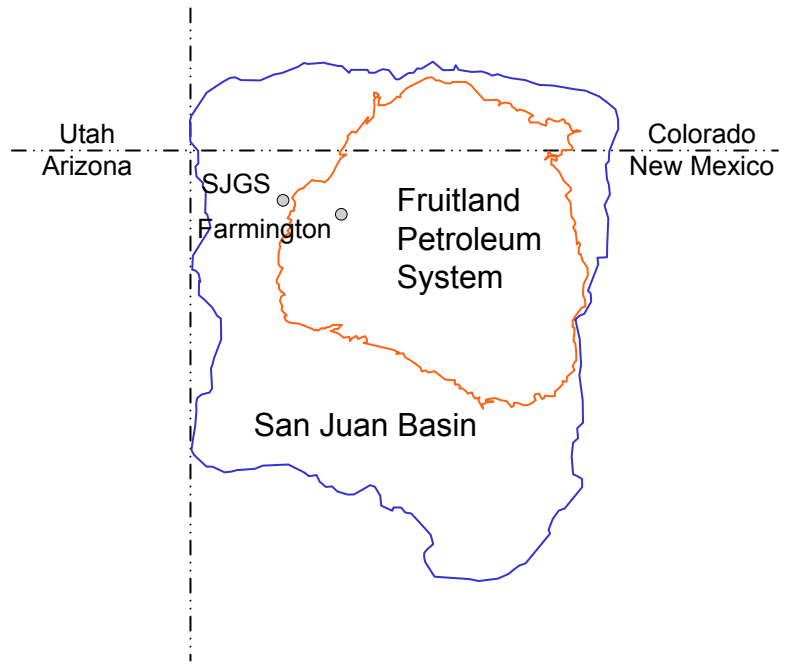


PNM Water Issues in the San Juan Basin.....

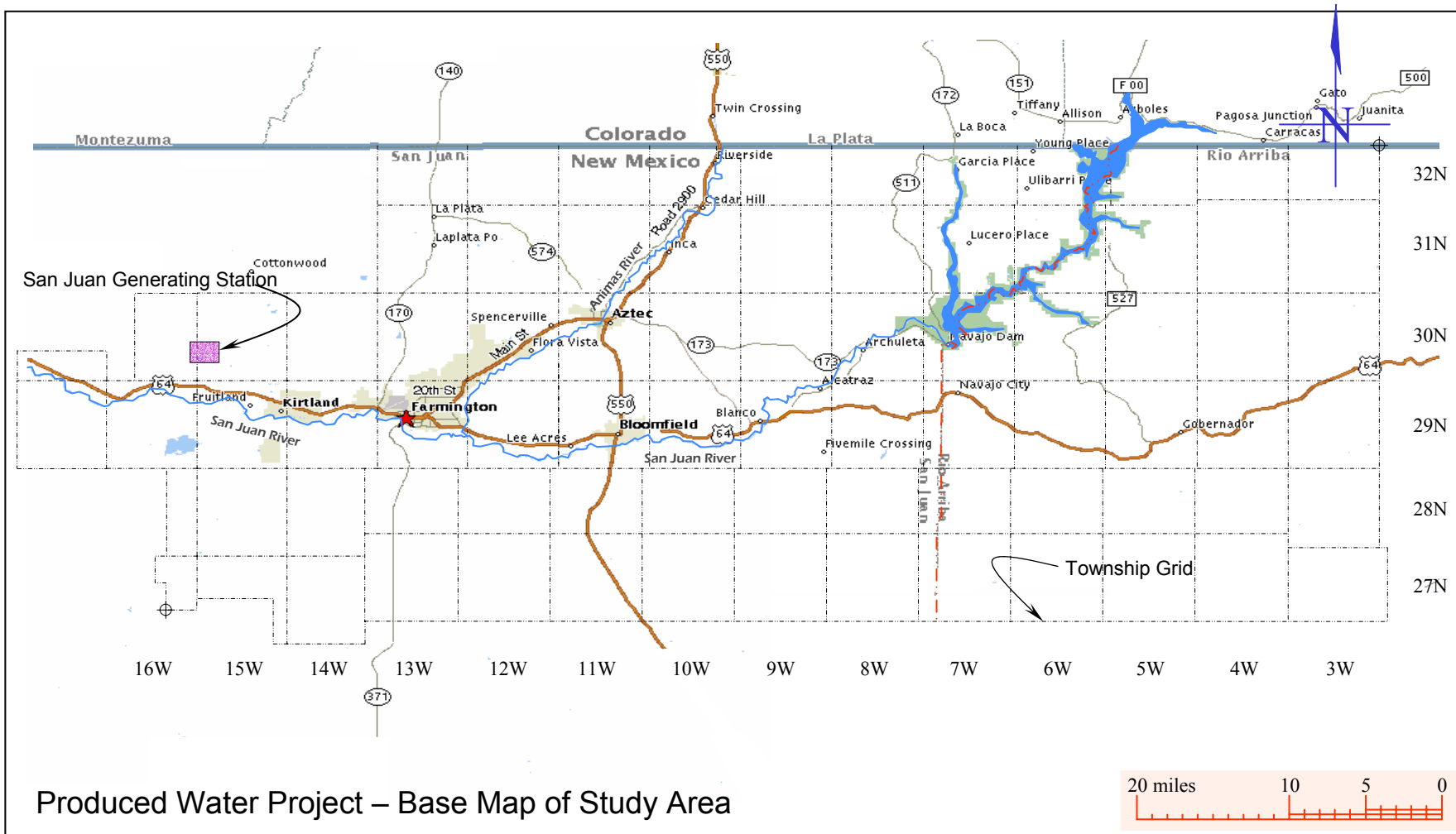
- San Juan Generating Station (SJGS) consumes 22,000 acre-feet of water per year (467,600 BPD or 13,640 gpm).
- SJGS needs a reliable source(s) of water to operate.
- There are continuing political pressures to use less water in New Mexico.
- SJGS is a long-term energy production site – it will be there 25 years from today.
- PNM has negotiated short-term and long-term water contracts to ensure supply.
- Endangered species in the San Juan River will reduce the reliability of water supply.
- If SJGS uses less water through conservation and obtains alternative supplies (e.g. produced water), more water will be available for others in the San Juan Basin.

Project Benefits.....

- Conserve river water for other beneficial uses in New Mexico.
- Reduce the diversion of water from the San Juan River for cooling at San Juan Generating Station.
- Enable the San Juan Generating Station to be more drought resistant.
- Reduce the volume of produced water that must be handled and injected by producers.
- Reduce produced water handling and injection costs.
- Establish an infrastructure to minimize produced water injection in the San Juan Basin.
- Establish area-wide opportunities to reduce produced water handling and injection costs.



San Juan Basin



Total Produced Water = 61,775 BPD

Each circle represents a production well or well cluster

Colorado
New Mexico

SJGS

Kirtland

Farmington

San Juan River

Bloomfield

Aztec

Animas River

San Juan River

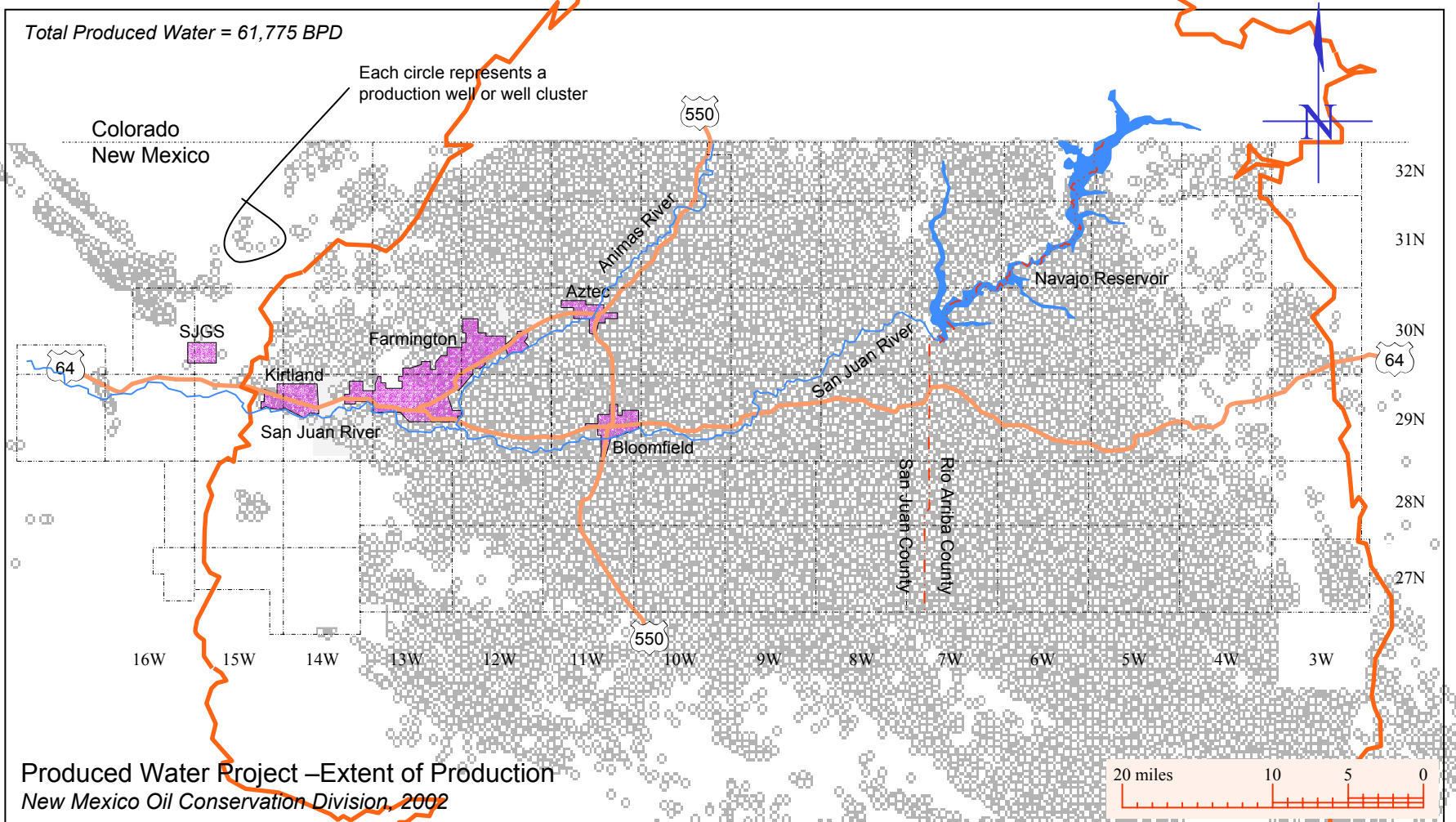
Navajo Reservoir

San Juan County
Rio Arriba County

Produced Water Project –Extent of Production
New Mexico Oil Conservation Division, 2002



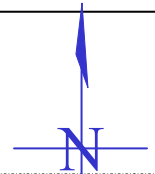
Fruitland Petroleum System



Total Produced Water = 42,934 BPD
 High Volume Townships = 34,963 BPD

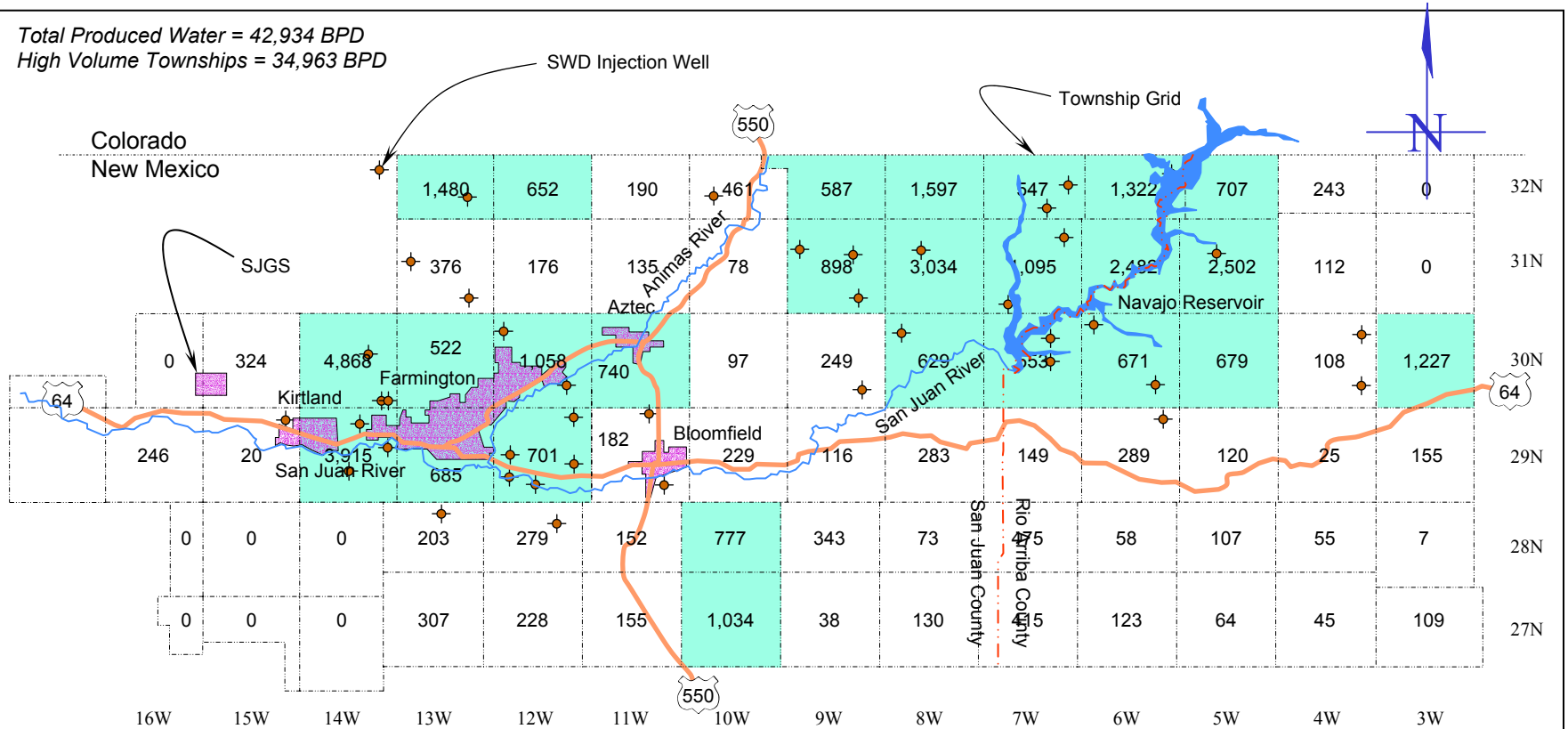
SWD Injection Well

Township Grid



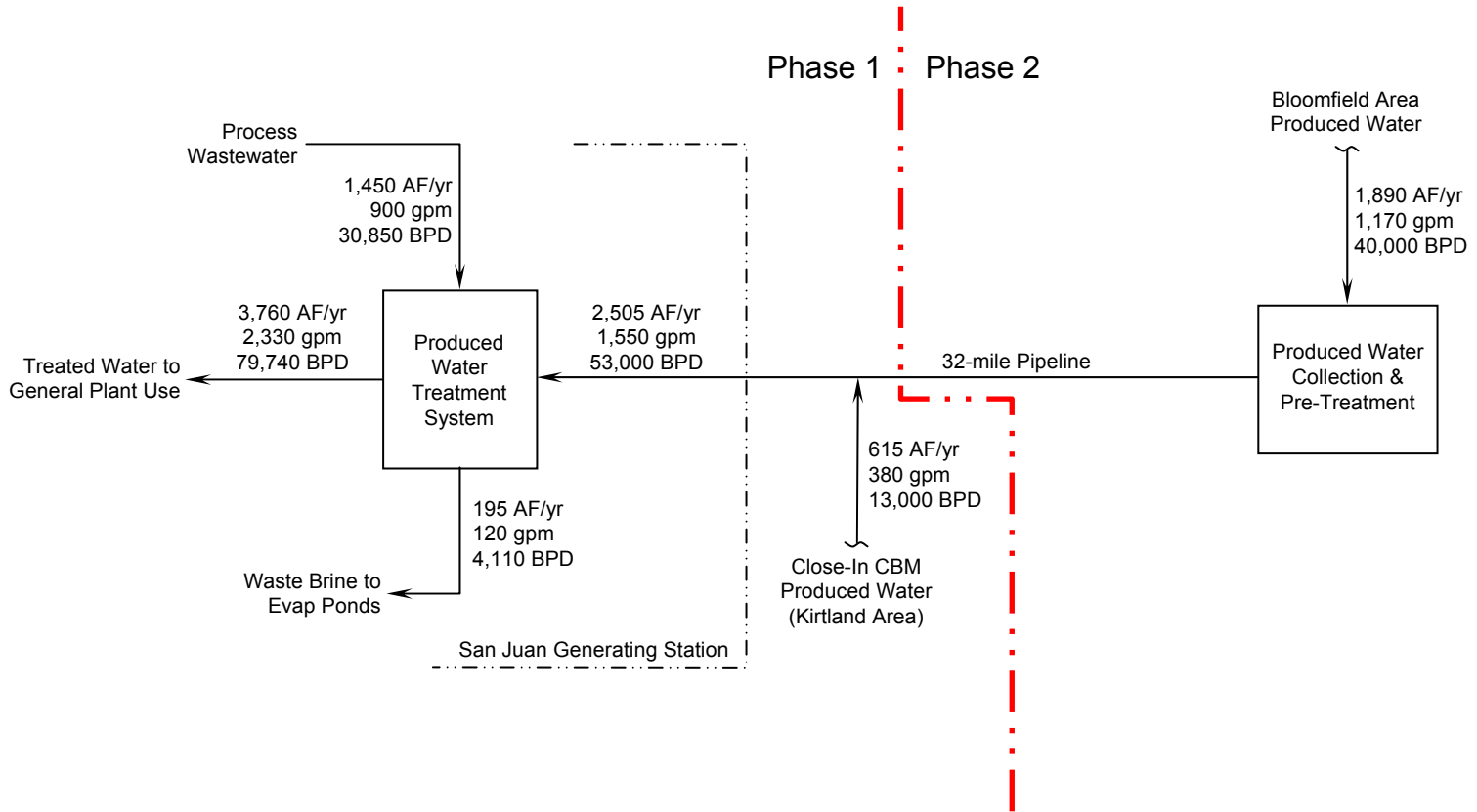
Colorado
 New Mexico

SJGS



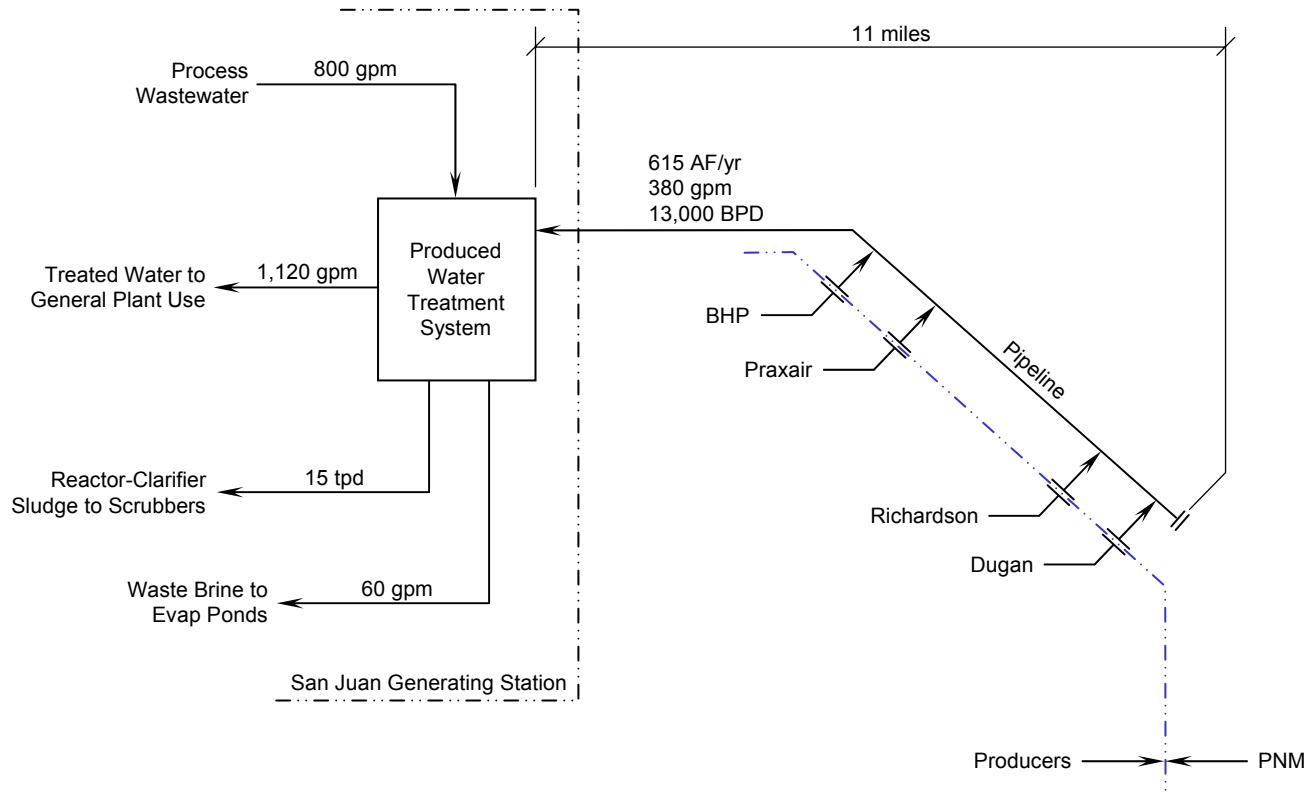
Produced Water Daily Volume (BPD) – All Producers
 High Volume Townships (highlighted blue)
 New Mexico Oil Conservation Division, 2002





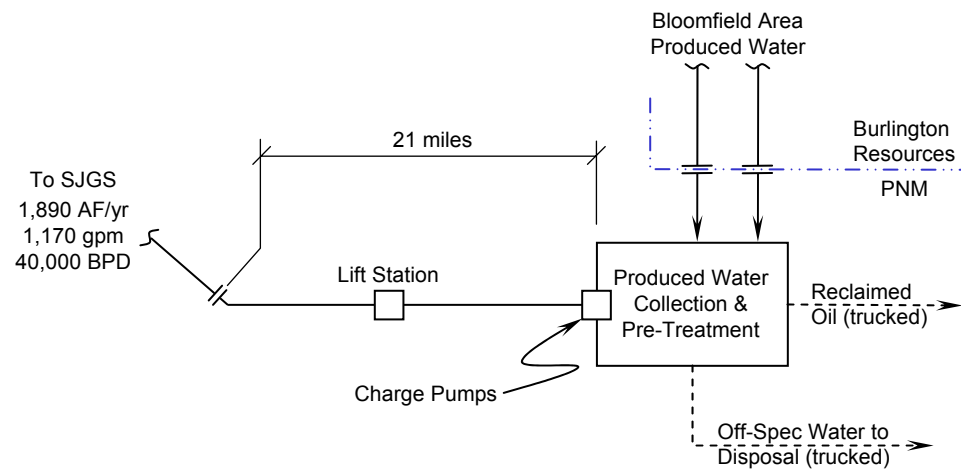
Produced Water Project –Phases 1 & 2

PNM – San Juan Generating Station



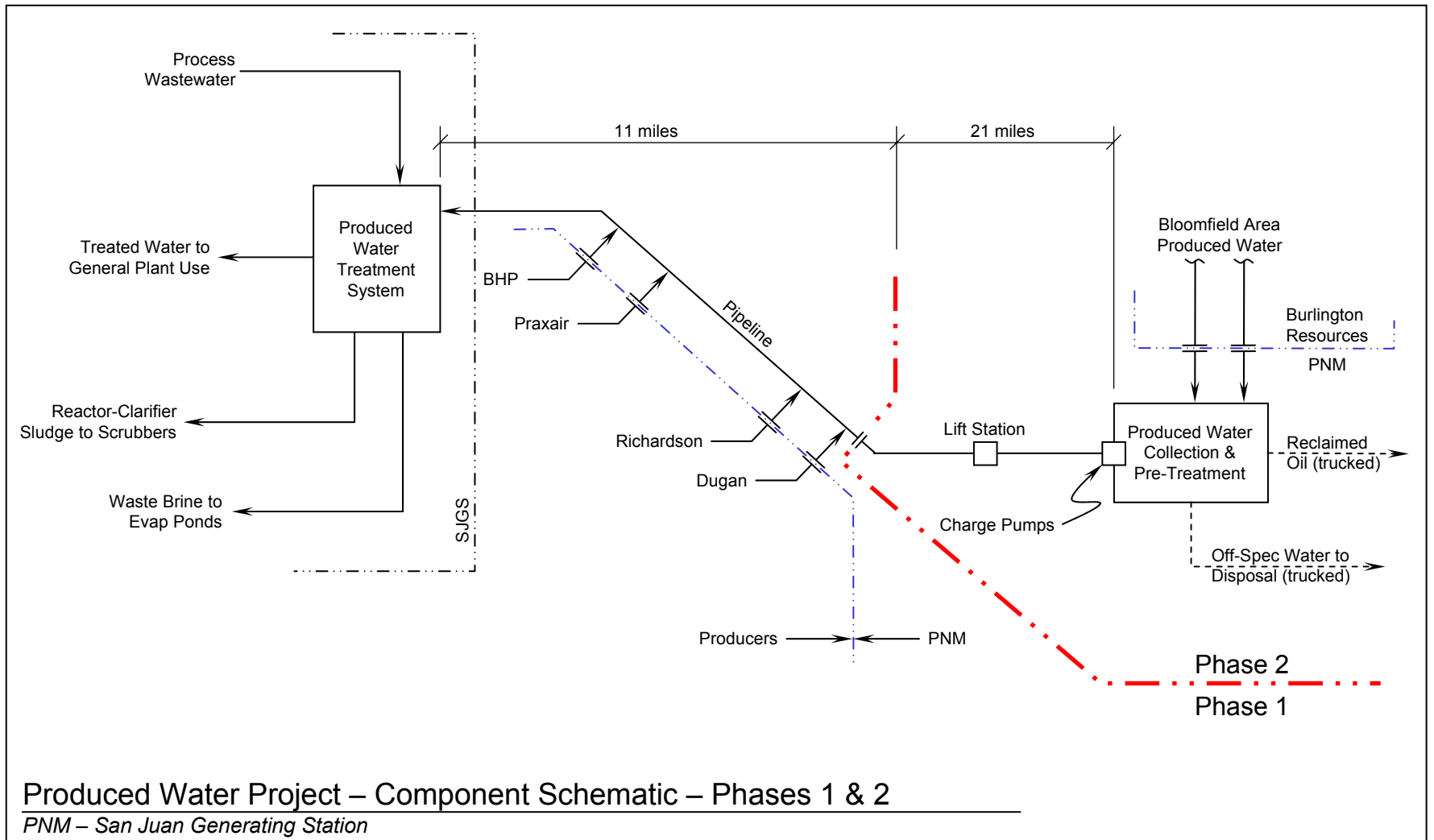
Produced Water Project – Component Schematic – Phase 1

PNM – San Juan Generating Station



Produced Water Project – Component Schematic – Phase 2

PNM – San Juan Generating Station



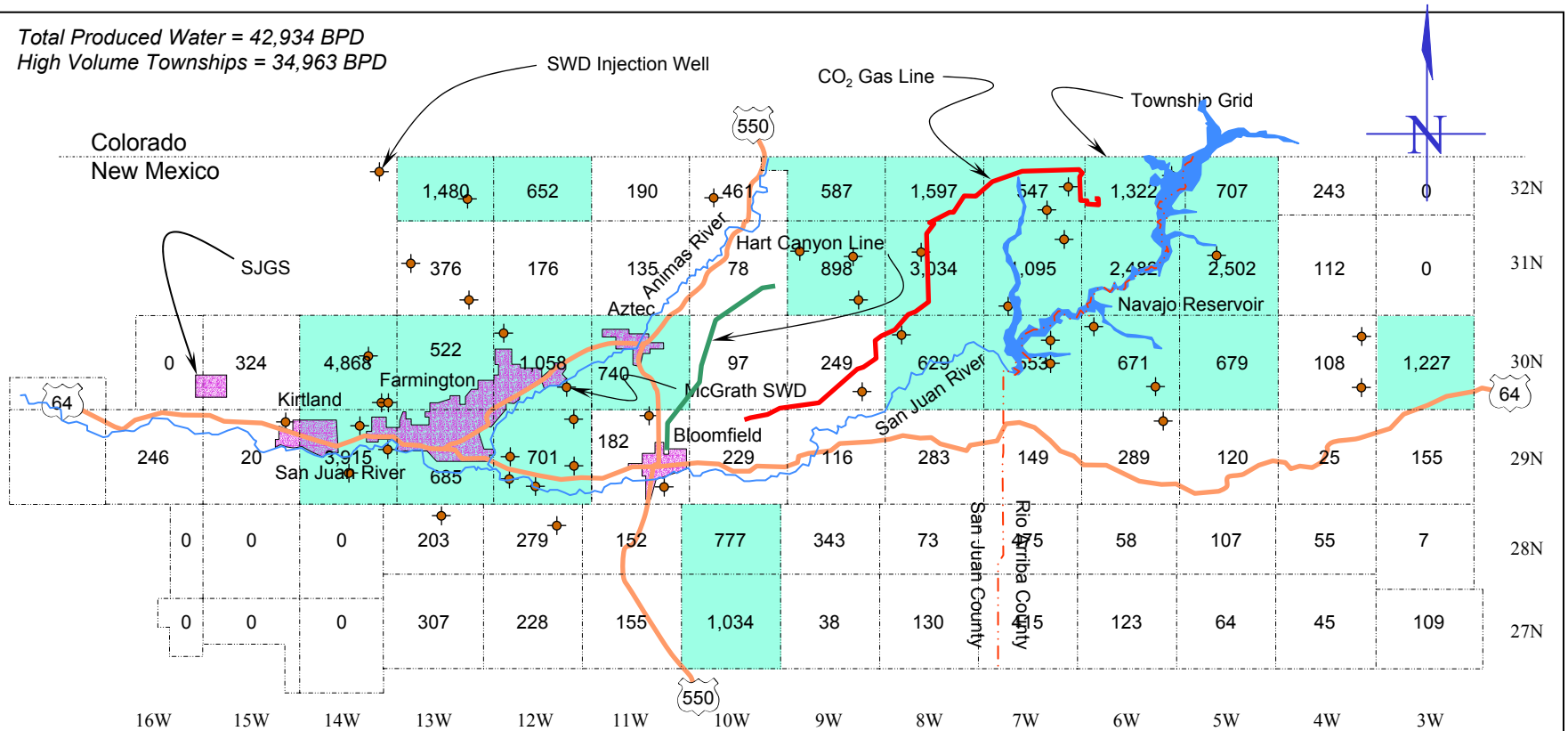
Produced Water Project – Component Schematic – Phases 1 & 2

PNM – San Juan Generating Station

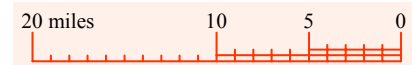
McGrath SWD



Total Produced Water = 42,934 BPD
 High Volume Townships = 34,963 BPD

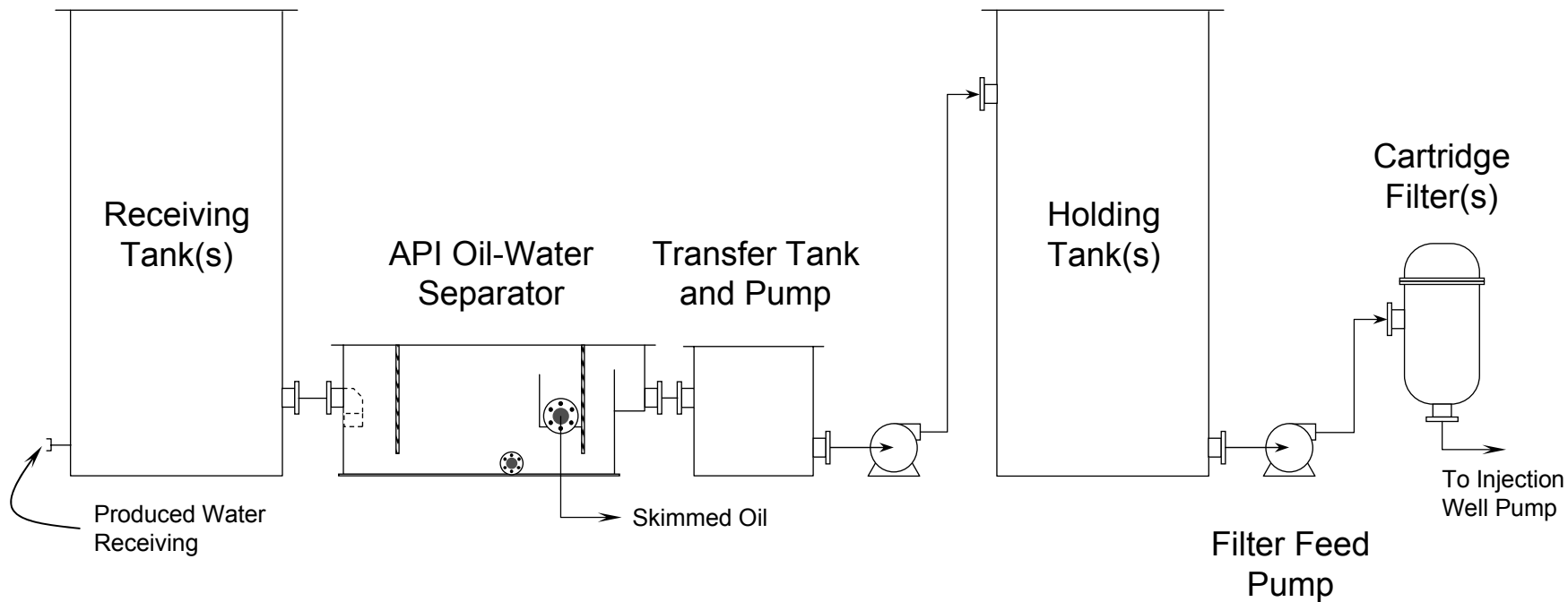


Produced Water Daily Volume (BPD) – All Producers
 High Volume Townships (highlighted blue)
 New Mexico Oil Conservation Division, 2002



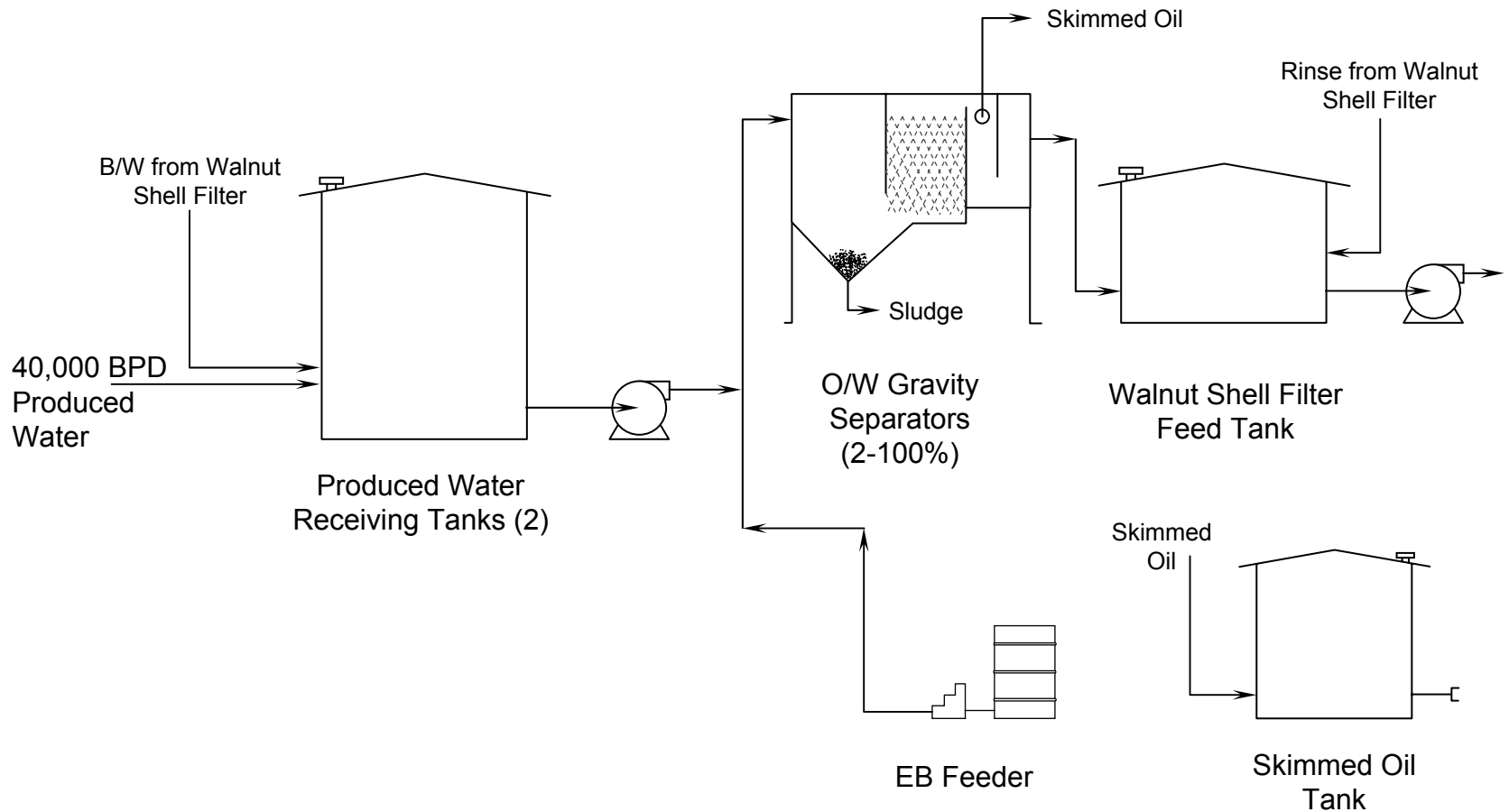
Produced Water Treatment

Process Schematics



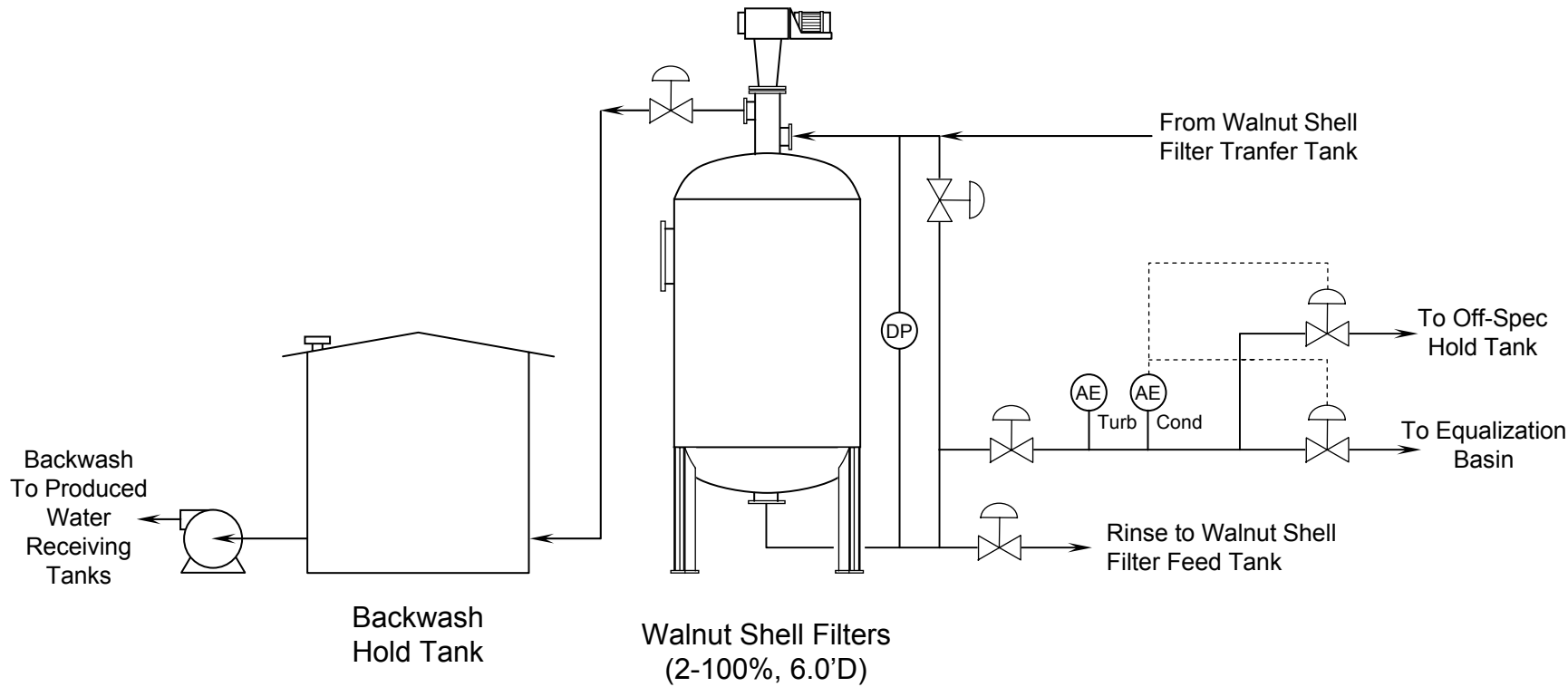
SWD Flow Schematic

SJGS Produced Water Reuse



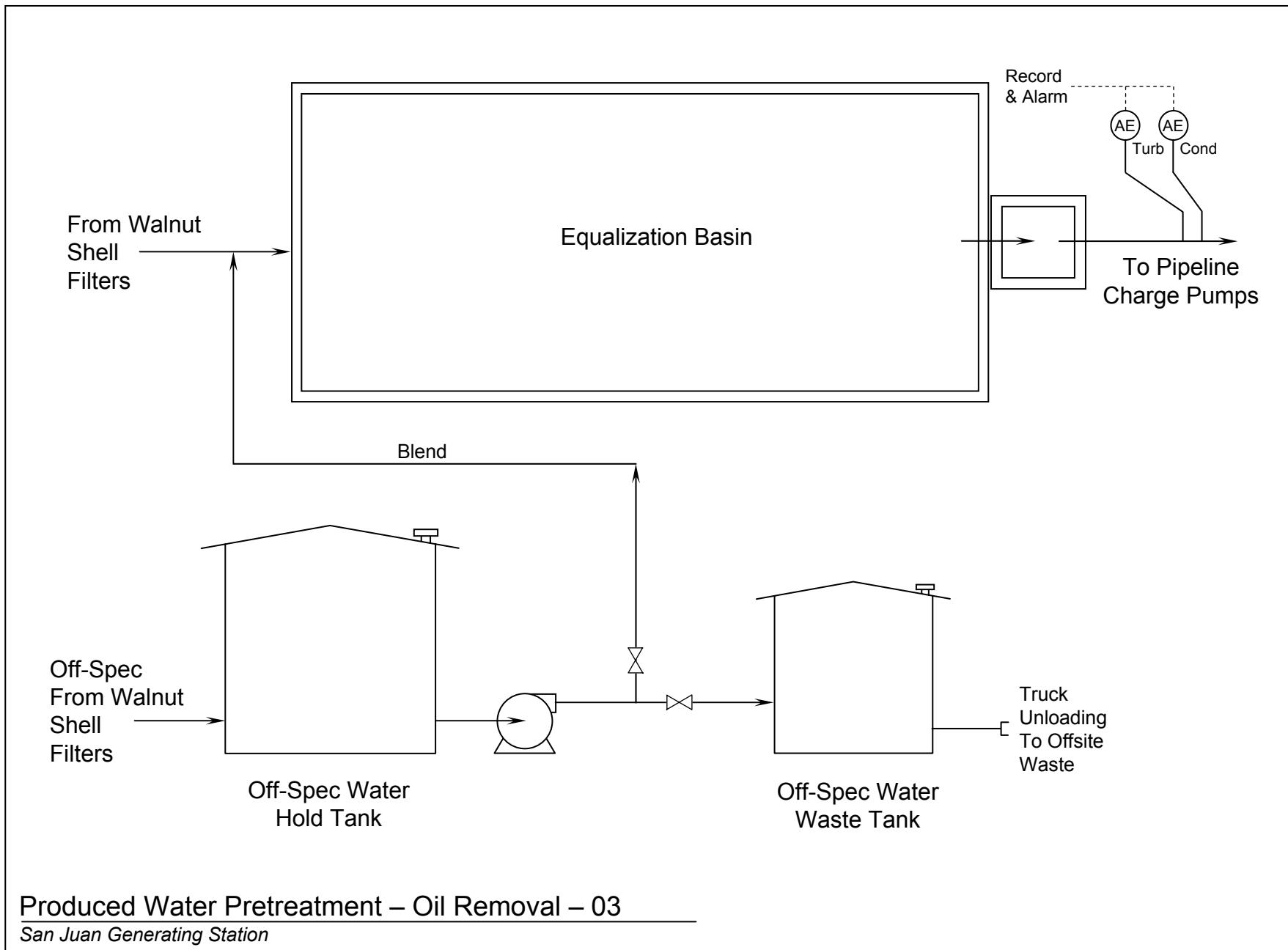
Produced Water Pretreatment – Oil Removal – 01

San Juan Generating Station



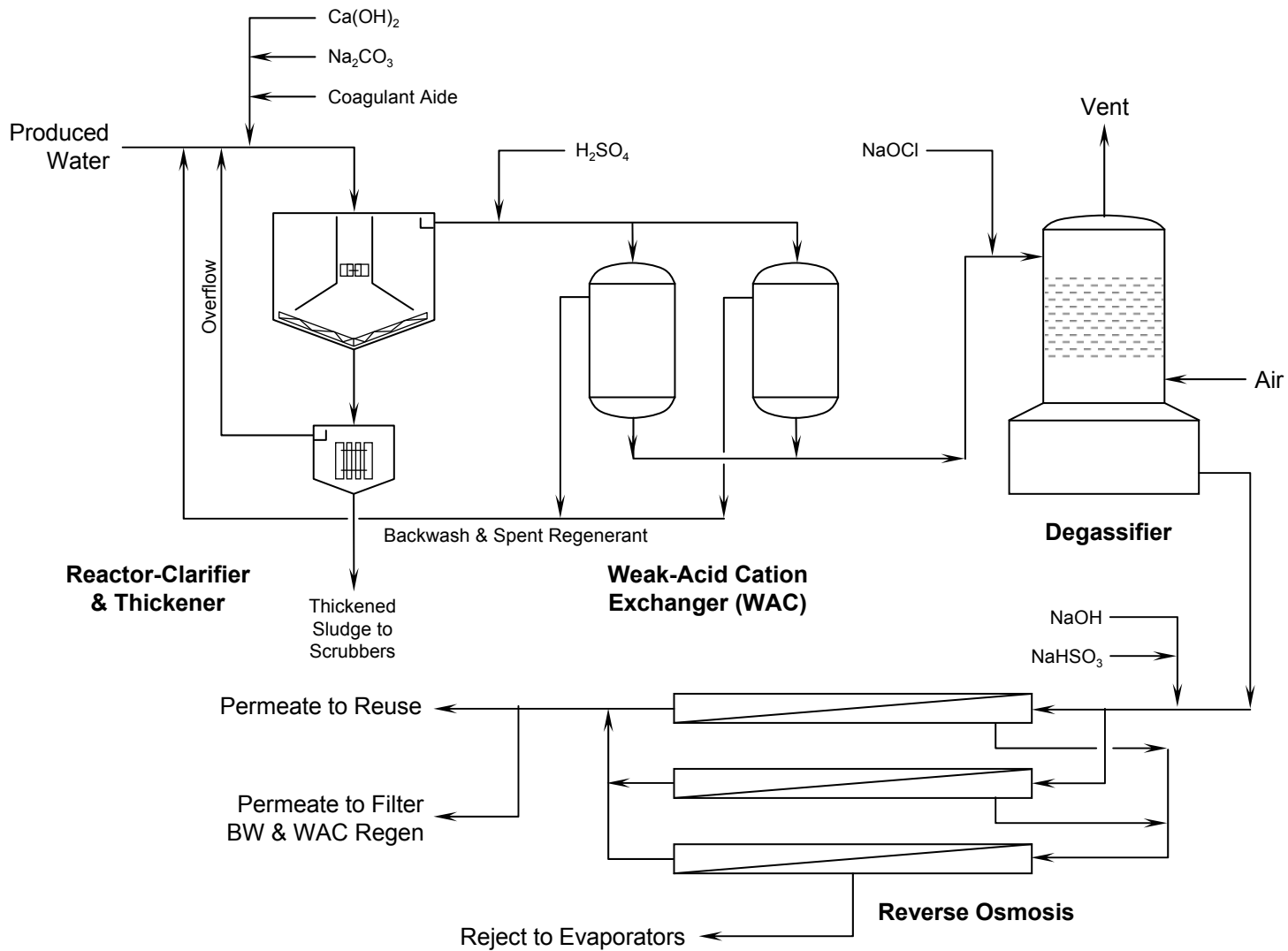
Produced Water Pretreatment – Oil Removal – 02

San Juan Generating Station



Produced Water Pretreatment – Oil Removal – 03

San Juan Generating Station



HERO System – Process Schematic

San Juan Generating Station

Wet Surface Air Cooler

① Air is induced downward over tube bundles

② Water flows downward along with the air

③ Heat from the process stream is released to the cascading water

④ Heat is transferred from the cascading water to the air stream via vaporization

⑤ Air stream forced to turn 180° providing maximum free water removal

⑥ Fans discharge air vertically at a high velocity preventing recirculation

