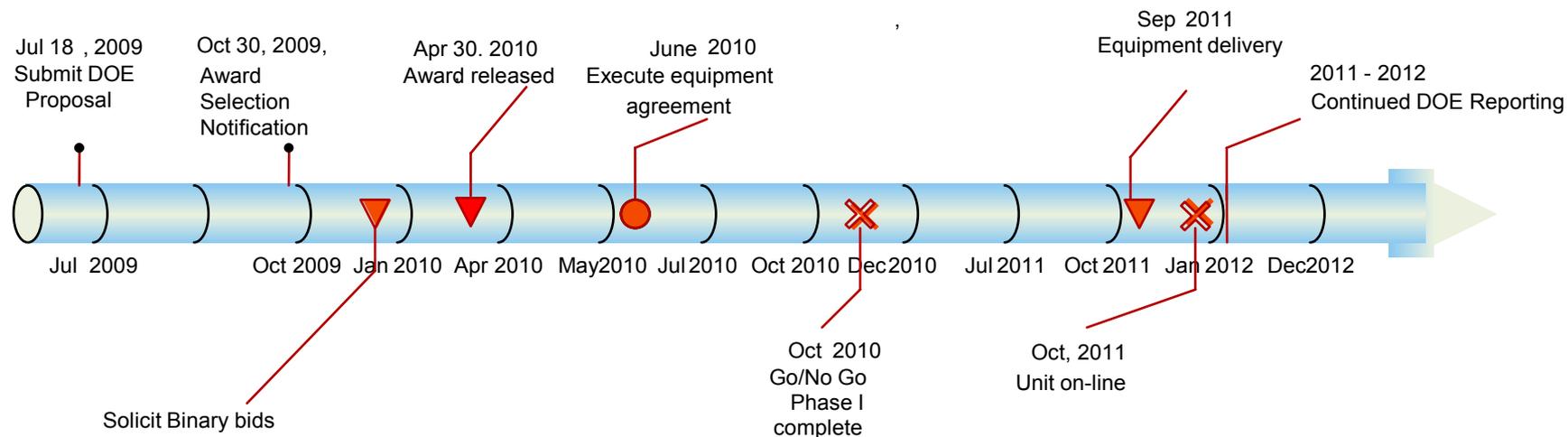




Dixie Valley Bottoming Binary Cycle

May 19, 2010

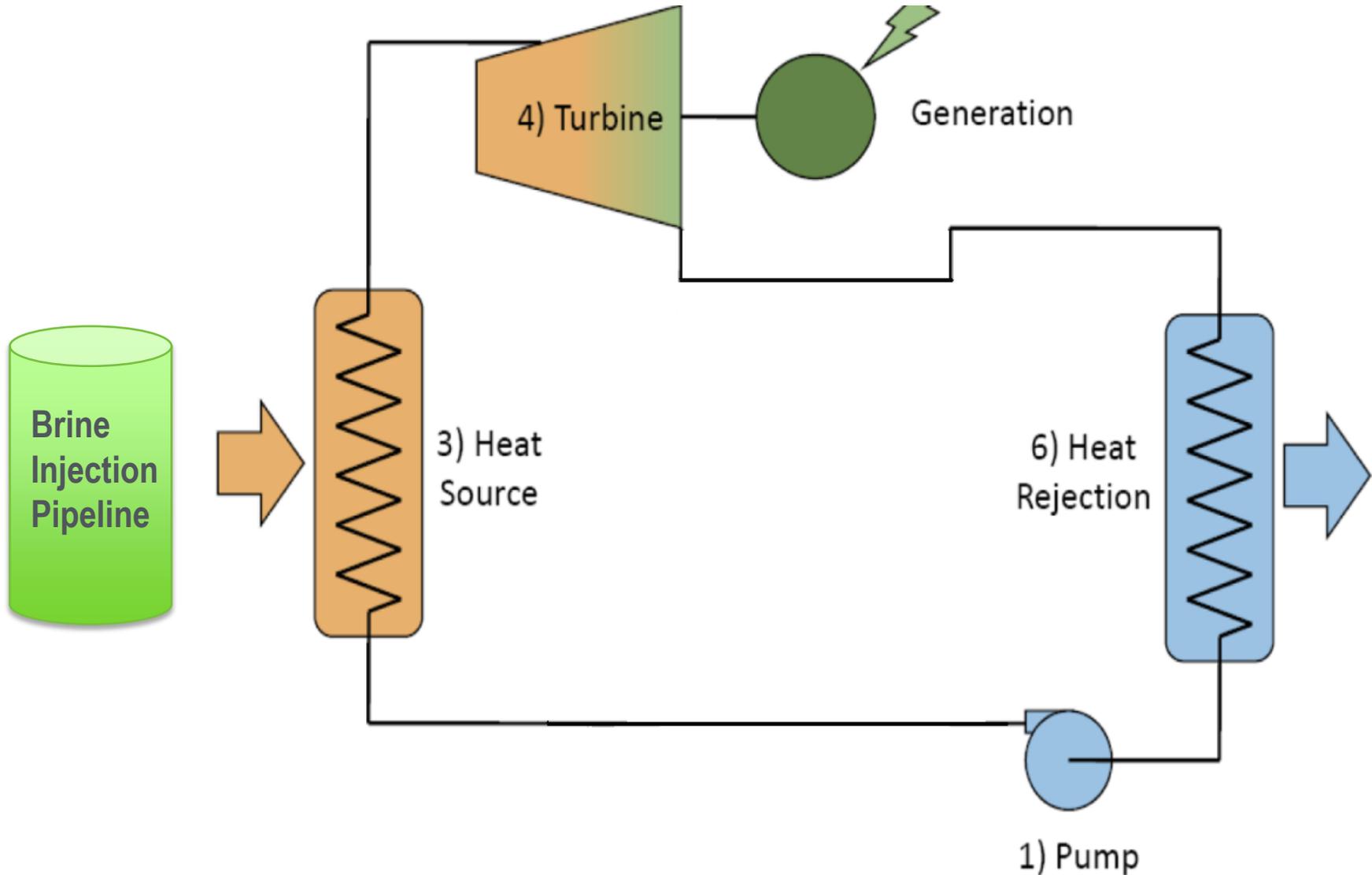
Principal Investigator Dale McDonald
Presenter Name Dale McDonald
Organization Terra-Gen Dixie Valley



- ~10% Complete
- Budget
 - \$15.5MM total project
 - Proposed \$2.0MM DOE award, \$13.5 recipient share
 - \$0 funding FY '09, \$2.0MM FY '10
- Partners - none

- Barriers
 - Access to transmission – none since it's tied in to existing plant, however modification to the interconnection agreement most likely required
 - Lack of Reliable Resource Information – above-ground nature of project reduces resource risk, but impacts to resource enthalpy unknown
 - Siting, Leasing & Permitting – although minimal modifications to existing permits required, project schedule could be impacted by BLM NEPA review and new Chemical Action Plan (CAP) permit

- Use of waste heat from low temperature brine otherwise lost
- Produces additional renewable energy without using additional geothermal resource
- Cost effective
 - additional well drilling is not required
 - existing plant infrastructure and space available
- Improves overall plant efficiency, since additional geothermal resource is not required
- Use of 100% air cooling eliminates dependence on water supply
- Minimal impacts on existing plant
- Operational testing of scaling potential of lower brine temperatures beneficial to other similar facilities
- Provides operational database of a geothermal bottoming binary plant



- **Solicit Proposals**
 - Supply: specified available brine and ambient conditions
 - BOP Engineering: identified plant tie-in requirements
 - Construction: use defined scope of work with supply and BOP drawings
- **Analysis**
 - Effect on brine scaling potential
 - Generation voltage level
 - Makeup water requirements
 - Permit Impacts
 - Space requirements
- **Phase 1 Go/No-Go – October 2010**
 - Obtain Permits
 - Complete Engineering
 - Prove Economic Feasibility

•Binary Plant Equipment Supply

- RFP was released and response proposals were reviewed and evaluated
- Supplier has been selected
- Contract negotiations to commence
- COD expected 15-18 months from NTP

•Permits – In process

- BLM NEPA review required, expectation is a DNI due to installation on pre-disturbed area
- Chemical Action Plan (CAP) required due to fluid selection
- Modification required to air permit prior to install, building/pressure vessel permits during/post construction
- Modification required to County Special Use Permit

•BOP Engineering

- Award for BOP engineering has been made
- Contract negotiation is proceeding

- **Project Management Plan**
 - Phase 1 – Feasibility Study, Permitting and BOP Engineering Design
 - Phase 2 – Procurement, Installation, and Commissioning of Equipment
 - Phase 3 – Operation and Maintenance
- **Schedule**
 - Phase 1 – Oct 2010
 - Phase 2 – COD expected 15-18 months from NTP
 - Phase 3 – Perform O&M, Report Non-Proprietary Data for 2 Years
- **Spending Plan**
 - Phase 1 - \$359,900
 - Phase 2 - \$14,974,728
 - Phase 3 - \$150,000

- Execute Supply Contract – June 2010
- Award BOP Engineering Contract – June 2010
- Award Construction Contract – September 2010
- Perform Mechanical/Electrical Plant Tie-ins – October 2010 Outage
- Complete Foundations – July 2011
- Equipment Delivered to Site – September 2011
- Complete Construction, Commission, and Test – October 2011
- Ongoing O&M, DOE Reporting, and Brine Chemistry Monitoring – thru October 2013

- Extraction of Waste Heat From 223F Geothermal Brine
- New Injection Temperature 170F With No Scaling Expected
- 5.6 MW Renewable Energy Added With No Additional Geothermal Resource
- No Water Needed; 100% Air Cooled
- Minimal Impact on Air Permit