

Large Geothermal Power Plant

Response to clarifying questions

1. What role will BacGen Technologies play in project, other than interconnection application with electrical utility provider on behalf of OIT? Does the proposer need to hire them for any other portion of the project? If so, what is that cost.

BacGen Technologies has no other role and the proposer need not hire them for any other portion of the project.

2. Last bullet on page 2 under Electrical and Construction: We need to obtain copies of the listed System Impact study and Facilities Study outcome by Pacific Power to see if this will impact the design.

Final report will not be available until after the proposal period has closed.

3. Bullet #7 on page 2 under Mechanical Engineering and Construction: How are we to put a cost to design the building ventilation in conjunction with JCI? What is the climate control criteria?

The building ventilation design is in conjunction with JCI. The building ventilation system is JCI provided and contractor installed per RFP page 7 - Ventilation. Ventilation system should be provided to limit the room temperature rise to 15°F over outside ambient taking into account all equipment and piping heat rejection loads with the room. The power plant unit heat rejection is 490,000 Btu/hr. This does not include heat from the geothermal piping system within the room.

4. Site preparation on page 3: The project will be required to go through City Site Plan approval per Erik Nobel in City Planning. Not sure if Dave Ebsen knows this.

The successful proposer will work with OIT and the City of Klamath Falls for site plan approval

5. Bullet #1 on page 5 under Hot Water Supply Piping: What is the 12-inch underground geothermal hot water piping from production well #7 to within 100 feet of the new geothermal Power Plant Building? We are extending the existing 12-inch piping already installed from production well #7 to the new power plant building and will connect the utility corridor pipeline, to be built this summer, to the power plant building as well as the connecting it to the new injection well.

12" insulated fiberglass pipe glued not pressed.

6. There is a lot of dependency on JCI to provide specifications for the design and assist/coordinate with OIT and the Proposer. Who pays JCI to assist the Proposer during design and construction? OIT or Proposer?

Providing specifications, assistance and coordination is included in the JCI Geothermal Electric Power Plant Contract

7. Who is designing the controls? JCI?

JCI will provide the design of the controls

8. It appears that the Proposer is required to install all JCI furnished equipment and mechanical systems under the direction of JCI, please verify that this is correct and that JCI is not installing the equipment they supply.

JCI will provide supervision for the installation of equipment. JCI will not install equipment.

9. Given the complexity of the rotating generating equipment, what specifications are there for the level/flatness of the mounting pad. From the specification, "JCI will provide vibration isolation requirements to the successful proposer", are there any specs available for estimating and design purposes as to the damping requirements? Are the foundations anchored into the pad via: cast in place?, Epoxy?, Grout?

- a. What are the specs for the rotating installation (API is 0.002 per foot)?
- b. Do you have a grout spec for the Rotating Equipment (cementitious or epoxy)?
- c. What types of isolators are going to be used (fixators, chocks, vibatherm chock)?

Two driveline sections will be skid mounted on structural frames. Proposer should level structural frame, anchor frame to foundation, and grout into place. Non-shrinking epoxy grout should be used. JCI recommends that the power plant unit sections be directly anchored to the concrete foundation without vibration isolation. Provisions are being made to component interconnections to allow for hard mounting of unit.

10. Where does the Four Cell Cooling Tower componentry supplied by JCI end and the Contractor supplied material begin, we understand that piping is contractor supplied however control valves are part of the JCI supplied control system? (assume for compatibility with their control scheme), however manual shutoffs, drain, tower pan flush and overflows may or may not be included in the tower assembly. Please Clarify.

Refer to JCI Responsibilities in RFP scope of work. JCI will furnish the cooling towers, materials related to the condenser water piping system (including control valves) and associated electrical materials as indicated on JCI 95% drawings. Proposer is responsible for installation of equipment, piping system, and electrical work as indicated on JCI 95% drawings. Proposer installation should include rigging, assembly, fabrication, and support of equipment, piping, and electrical raceway systems.

11. Cooling tower support is written up as 6 ft clearance above floor, shown on drawing M1-3 as 8' please correct ambiguity and provide information on mounting arrangement with unit loads for the tower.

Drawing M1-3 is correct – 8 feet clearance above building finish floor elevation.

12. Ventilation requirements, the power generation unit shall have a significant ambient heat rejection which must be dealt with an HVAC to maintain the 15 deg F rise (over outside ambient?) please clarify this requirement and provide some order of magnitude of heat input to

the space by the generating equipment in order to estimate size of ventilation equipment required.

The HVAC system design to maintain the 15 deg F rise above ambient. The power plant unit heat rejection is 490,000 Btu/hr. This does not include heat from the geothermal piping system within the room. The building ventilation design is in conjunction with JCI. The building ventilation system is JCI provided and contractor installed per RFP page 7 - Ventilation.

13. Refrigerant storage, are these cylinders stored in racks provided by JCI or are there concrete pad and containment with vertical safety restraints required.

JCI is not furnishing container racks. They will be one ton cylinders so tip over is not a problem, just an enclosed area is needed (chain link fence and concrete floor).

14. Are there any foundation provisions for containment of refrigerant spills (prior to flash evaporation) either at the base of the cooling tower (also for untreated cooling water spills) or for prevention of refrigerant entering the floor drains?

No foundation provisions needed. No refrigerant will be in the cooling tower modules. The refrigerant closed loop system is only located in the power plant module. The cooling tower water will have a non chemical treatment.

15. Under ventilation requirements says 13,100 cfm refrigerant removal, drawing M1-1 shows 9,000 cfm which is correct?

Drawing M1-1 is correct. Refrigerant removal ventilation system is sized for 9,000 cfm.

16. Drawing M0.1 – Cooling tower Schedule: Performance of cooling tower is based on design wet bulb temperature. Scheduled wet temperature is 40°F to cool water from 60°F to 50°F. The 40°F wet bulb is a “normal” winter condition. The summer design wet bulb temperature in Klamath Falls is 61°F (ASHRAE 1% condition). If the system is run during the summer, the cooling tower will not deliver the rated cooling capacity when the ambient wet bulb temperature is greater than 40°F (approximately 6 months of the year). Please clarify cooling tower selection and duration of use.

Cooling Tower has been sized for average wet bulb conditions. Original Power Plant RFP indicated summer design conditions were 75 deg-F db at 40% rh (59.6 deg-F wb). At these conditions, the tower will meet the power plant heat rejection requirements. Cooling tower will be used year around.

17. Drawing of all equipment foundations, supports (hard shim, jack bolts, sole plates, chocks, isolators), and anchors?

JCI will furnish Power Plant equipment drawings at a later time.

18. Are the Motors, Fans, Sheaves, and belts on the Fin Fans being shipped assembled or separate and need installing?

No Fin Fan Modules required. If this is referring to the cooling tower modules please refer to the last page of the Baltimore Aircoil Company spec sheet.

19. Do you have a drawing of the Fin Fan Modules will be shipped showing how much is assembled and how much will need assembled?

No Fin Fan Modules required.

20. Are the Pumps and Motors being shipped completely assembled on the pump bases with the couplings spacing and alignment done?

Pump and motor may be shipped separately since these are large vertically mounted pumps with motor over the pump. Proposer to assemble and perform alignment as required. See material data included in RFP.

21. Do you have a list of hardware and materials that will need to be supplied for the foundation connections and Fin Fan Module connections?

Proposer to design and furnish equipment anchorage.

22. Are they supplying all lubricants (oil and grease) and if not what are the specs?

JCI will provide lubricants and oil for power plant unit. Proposer to provide all lubricants for ancillary equipment per manufacturers recommendations.

23. Where is the facility emergency panel located?

Coordinate with OIT requirements and location of a plant emergency panel. The power plant unit control panel will have an E-stop button for the unit only. Both drawings E1.0 and E2.0 indicate the locations of the Exterior Utility Disconnect and the Schweitzer Engineering Laboratory (SEL) Relay. The relay is shown as a Schweitzer but not specified at this time.