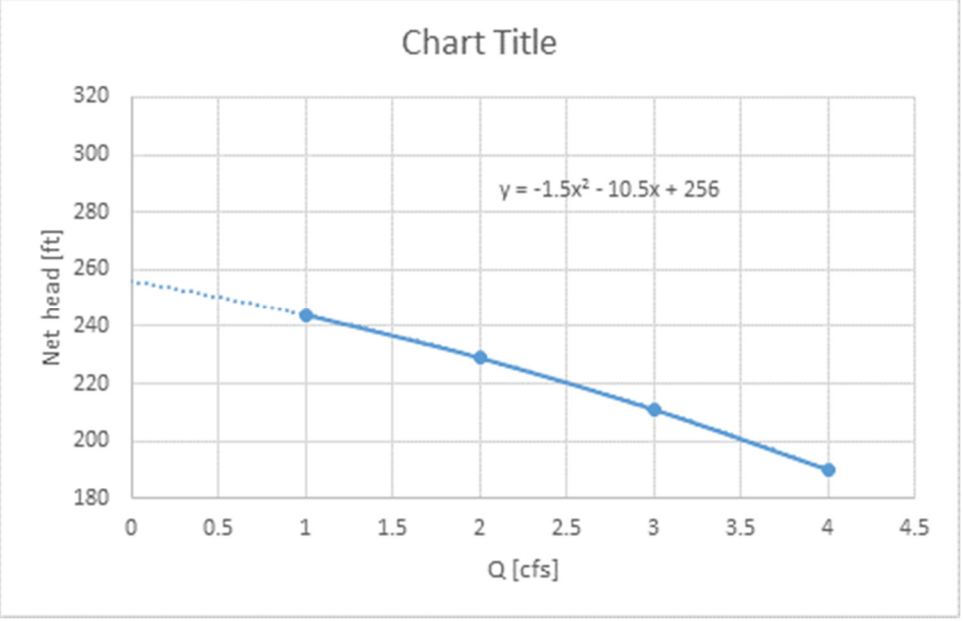
2019 McKenzie Reservoir Hydroelectric Project
Questions and Answers – July 15, 2019

- No drawings were included in the specification documents? Are there project drawings available to assist in answering some of the questions and to gain a better understanding of the projected layout and civil requirements we will be interfacing with? The drawings are posted on the website.

- For the Turgo they give (1.07.B.13 on page 22 of pdf)
  Top elevation 3369
  Bottom elevation 3049.8
  Giving static head of 319.2

  But then in 15200-3 1.04.A (page 149 of pdf) they give maximum static head as 316.6 ft.
  Neither of these ties in well with the values given in (1.07.B.12 on page 22 of pdf)

Net head	Flow
[ft]	[cfs]
	0.00
244.00	1.00
229.00	2.00
211.00	3.00
190.00	4.00



  Which suggest a net head of 256 ft at zero flow, rather than something over 310 ft. Could you please provide some guidance as the static head that should be used and the unit designed for? The friction loss increases as the farmers take more water out of the pressurized line. We are assuming that when the turgo is running at 4 cfs when the farmers are at diverting 100%. That is why the pressure drop is so large due to the friction loss in the pipeline.

- The spec asks for CCH70-3 sheets (which are what our quality sheets are based on), but these are really for castings, and the Francis option will likely be a forged and machined runner. Will this be acceptable as a better and longer lasting product will be achieved utilizing forged and CNC machined components. Yes

- They spec calls out the performance testing being "performed by District using IEC thermodynamic method." For both units. However, the IEC code 60041 states" the range of application of this method is limited and can only be used for specific hydraulic energies in excess of 1000 J.kg-1 (heads in excess of 100 m)." We have heads of 31.1 m and 57m here. What would be your guidance on addressing or implementing a different testing method to prove the performance of the machine? We will cancel the listed specification. The performance efficiency test will involve measuring wicket gate % opening, psi, flow (cfs) and generator output. We will involve the successful supplier in the testing.

- 1.07.B.12 on pages 22 and 41 of pdf file both state "Note: High water level of reservoir is below the tailrace discharge pipe. In order to back pressure the turbine discharge Proposer will need provide the District with specifications for tailrace sump structure.)" But do we want to back pressure the discharge of the machines? Certainly not the Turgo. Not the Turgo. The pressure will drop to atmosphere and gravity feed into tail race. Without the drawings of a potential civil or tailrace structure, we don't know what they have in mind and would like to see something so we can evaluate and provide an acceptable solution. Can these be provided? We do not have drawings for the tailrace. Those will be drawn to accommodate the water to wire supplier.

- 1.07.B.7 asks for "The maximum wear, defined as loss of metal from the runner, caused by cavitation, erosion, or pitting during the first 8000 hours of operation is guaranteed to be not more than _____ pounds of metal". We are not able give erosion guarantees but can provide cavitation/pitting guarantees which is customary for turbine runners. We also do not know the composition of the water but suspect that with there being potential for run-off from Mt. Hood, we would expect glacial silt and debris to be present. Are there any details of the water composition we could evaluate prior to providing pitting guarantees? We do not have water composition analysis on Whychus Creek.

- 1.07.B.2 asks for "graphical curves and tabulations of guaranteed performance covering at a minimum, the range from 25 percent output to maximum output for the turbine." But then for the Francis unit they ask for guarantees down to Q= 5 cfs, which is 12.5% of rated flow, and in 15200-3 they say "Minimum flow for power operation, not more than 5-10 cfs". While the unit can operate at 10 cfs, we cannot give guarantees at this point on a Francis turbine. Also, at 5 cfs the unit probably wouldn't even synchronize. Should we provide a cut-off point in our response or is there a better definition of the proposed operation in terms of minimum flows? Is this section supposed to be for the impulse unit only and not the reaction units? TSID understands that it is hard to set a guaranteed performance at 5 cfs. We are fine starting the guaranteed performance at 10 cfs.

- With the July 4 holidays next week, we have been advised by many suppliers that they are taking extended holidays and will not be able to provide us with offers until the following week, which is when the proposals are requested to be returned. Would it be possible to extend the bid deadline by two further weeks to accommodate this? Bids are now due July 23rd 2 pm.