

REQUEST FOR INFORMATION ORO HONDO SHAFT & IMPELLER

RFI Posted:	May 1, 2017
Questions Submitted	May 12, 2017 2:00 p.m. (Mountain Standard Time, MST)
Questions Posted	May 19, 2017
Information Due Date:	May 26, 2017 2:00 p.m. (MST Time)

The South Dakota Science and Technology Authority is seeking information/interest for the fabrication of a large impeller and shaft assembly for centrifugal fan currently powered by a 3000 Hp synchronous motor. The fan is currently running at flows and speeds significantly less than the original design. The assembly will need to be shipped to SDSTA so it can be installed when the exhaust fan is rebuilt in August of 2018. The details for this project are broken down into the following sections below:

- A. Request for Information (RFI)
- B. Motor Dimensions
- C. Fan Dimensions

1.0 Background

The primary exhaust ventilation for the Sanford Underground Research Facility is provided by an American Davidson centrifugal, direct drive, variable speed fan currently powered by a 3000 Hp synchronous motor. The fan is currently running at flows and speeds significantly less than the original design. A photo of the Oro Honda fan complex is shown in Figure 1 below.

The fan was installed new by Homestake Mining Company in 1986. Since then, it has been shut down, the rotor has been cleaned, coated, balanced, bearings replaced, seal rings replaced, and ceramic coatings placed to preserve the integrity of the steel. This being done roughly every 8 or 9 years until mine closure in 2002. Prior to starting the fan again in 2010, the fan underwent a significant rebuild. The motor was sent out to be cleaned and checked plus bearings were replaced. The fan itself was also taken apart with the rotor cleaned, ceramic coated, and balanced. It was reassembled and has been running ever since.

A significant rebuild of American Davidson fan is planned for August 2018. During this time, all the rebuild items stated above will be performed along with the installation of a new 3,000 hp drive and the removal of the old impeller/shaft and installation of the new impeller/shaft. Significant lead time is allowed for procurement of the drive and impeller/shaft assembly to ensure they are on-site for the rebuild. Once all the rebuild items are on site a contractor will install and re-commission the Fan for use.



Figure 1. Oro Hondo Fan Complex

2.0 Deliverables

This RFI is intended to gather necessary information for the future procurement of a fan impeller and shaft as well as budgetary information for this work. We are soliciting input on the following items:

- 2.1. How would your company complete this project and guarantee that fitment match the original impeller/shaft assembly?
- 2.2. Approximately what fan efficiency % can your company deliver and how will you guarantee that efficiency is met once the impeller is built.
- 2.2. What is the estimated lead time for fan impeller/shaft assembly delivered to SDSTA?
- 2.3. Will your company be able to provide detailed impeller/shaft drawings upon completion of the project?
- 2.4. Do you have any special requirements for this project?

3.0 Fan Operating Point & Dimensions

SDSTA has the original drawings for the American Davidson fan housing and motor/shaft assembly. These drawings have been included in this RFI appendix to provide general information about the size of the fan including the motor shaft, fan housing, and impeller diameter. However, technical drawings for the fan impeller were never provided when the fan was installed in 1986. Developing a new impeller geometry (or copying the old

geometry) will be the responsibility of the awarded bidder and can include visits to SDSTA to measure the fan.

Based on the ventilation modeling and a design study, a fan specification was developed for the Oro Hondo Fan installation. The fan specification is based on the anticipated operating point of the fan with a second operating point comprising a 20% increase in airflow as a contingency. Table 1 below lists the anticipated operating range of the fan.

Table 1. Anticipated Fan Operating Range

Scenario (Phase)	Operating Range				Air Density (lb./ft³)
	Low		High		
	Pressure* (in. w.g.)	Airflow (cfm)	Pressure* (in. w.g.)	Airflow (cfm)	
1	9.0	400,000	11.0	500,000	0.062

4.0 Fan Operational Efficiency

The American-Davidson is an extremely efficient fan beating the efficiencies of similarly quoted modern fans. A reputable third party has measured the total operational efficiency of the American-Davidson fan at the anticipated future operating point and found it to be more than 80% efficient. Installing a new impeller/shaft assembly with even 10% less efficiency will result in an electrical cost increase of \$65,000 per year and is something SDSTA wants to avoid. SDSTA is interested in the most efficient impeller designs possible and is very interested in hearing the steps that will be taken to guarantee fan efficiency.

5.0 Submission Requirements

Responses to this RFI will be used to move forward with the process of procuring these services. Responding to this RFI does not affect your company's ability to participate in the future procurement for the Oro Hondo Shaft & Impeller Project, nor will it affect how your bid or proposal is considered. All information included in this RFI is subject to change in the future, and is provided for informational purposes only.

Questions about this RFI must be submitted in writing by email no later than 2:00 p.m. MDT May 5, 2017, to mbaumann@sanfordlab.org. Answers will be emailed to all prospective individuals and posted to the sanfordlab.org website no later than May 12, 2017. The information period may be extended at the discretion of SDSTA based on the quantity and/or complexity of questions. Any notices of extension of time to respond will be distributed to all prospective proposers by SDSTA.

All responses are requested via email (.pdf format) of the information no later than 2:00 p.m. May 19, 2017, to: mbaumann@sanfordlab.org. Responses should address the deliverables noted in section 2.0. We appreciate your input!

All communications regarding this procurement between RFI release and contract award shall be directed by email to mbaumann@sanfordlab.org. Communications with other SDSTA staff regarding this procurement in advance of the contract award are not allowed.