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May 1, 2018

Jody Hooks
Public Works Director
City of League City
703 N. Wisconsin
League City, Texas 77575

Subject: City of League City, TX
Southwest Water Reclamation Facility (SWWRF)
Recommendation of Sole Source and Pre-Procurement of Howden Blowers

Dear Mr. Hooks:

CDM Smith recommends that the City of League City move forward with the pre-procurement of sole-sourced Howden geared, single stage blowers to replace the existing failed Siemens air-bearing blowers at the Southwest Water Reclamation Facility (SWWRF). These Howden blowers are the same model as the two geared, single-stage blowers currently installed at Dallas Salmon WWTP (DSWTTP), although the Turblex brand that those blowers were installed under has been acquired by Howden as of 2017. The commonality of equipment across the two facilities will allow for ease in operation, training, and maintenance. This recommendation is consistent with previous memoranda developed by CDM Smith, which chronicle the blower issues at SWWRF and available options for blower replacement and provide CDM Smith's recommendation for the selected blower technology. The most recent memorandum from February 23, 2018 is included as Attachment A to this letter for further reference as to the reasons in support of this Howden line.

Furthermore, CDM Smith is recommending that the City proceed with pre-procurement of the new blowers, primarily to allow the replacement blowers to be placed into service as quickly as possible. Reasons for this recommendation are as follows:

- SWWRF is currently operating with limited redundancy. Of the original three Siemens blowers at SWWRF, all have failed once, of which only one was rebuilt and placed back into service. A temporary multi-stage blower relocated from DSWWTP is serving as the back-up to the active Siemens blower. The service life of the rebuilt blower is approaching 10,000 hours, which is near the runtime that the failures have occurred on all three blowers previously. Should this repaired blower fail, then the relocated blower from DSWWTP would become the only service blower in operation and would not satisfy state requirements for redundancy, not to mention put the facility at risk of not being able to meet effluent permit

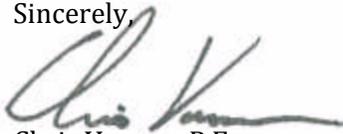


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requirements. For these reasons, it is imperative that the new blowers be purchased and brought online as quickly as feasible.

- Pre-procurement of the blowers will accelerate in-service availability of the blowers by as many as 6 months (April 2019 vs. October 2019) since ordering/review of blower submittals would be possible prior to the contractor being selected.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Varnon".

Chris Varnon, P.E.

CDM Smith Inc.
TBPE Firm Registration No. F-3043

Attachments:

- A. Siemens SC50 Blower Replacement Follow-Up Memo, dated February 23, 2018

cc: Jacques Gilbert, City of League City
Amber Batson, CDM Smith



Memorandum

*To: Jody Hooks, Public Works Director
City of League City*

From: Christopher K. Varnon, P.E.

Date: February 23, 2018

*Subject: City of League City, TX
Southwest Water Reclamation Facility (SWWRF)
Post Warranty Phase Assistance Request
Siemens SC50 Blower Replacement Follow-Up Memo*

Memo Purpose

This memorandum is intended to summarize activities since previous update documentation of the blower issues experienced at the SWWRF and evaluation of blower replacement alternatives, which was provided in June of 2017.

Updates to and Evaluation of Alternatives for Path Forward

In October of 2017, Howden purchased the Turblex line of blowers from Siemens. After the acquisition, the new Howden management reached out to CDM Smith and the City to discuss this project and whether or not an updated proposal with some added long-term benefits might be considered. A meeting was held with all parties to discuss the history of the project and what sort of additional scope items the City would require to consider an updated proposal and to compare favorably to alternative technologies, primarily multi-stage blowers with motorized inlet throttling valves. The additional scope items discussed included:

- 1) Reduced voltage soft starters for each blower
- 2) Integration with the existing master control panel (previously provided by Siemens) to avoid the City having to pay a third party integrator
- 3) A five year extended warranty with annual service
- 4) Inclusion of previously quoted material upgrades to the blower impellers to avoid future corrosion issues

In January of 2018, Howden submitted their revised proposal to include the items mentioned above, which is included as an attachment to this memo. CDM Smith reviewed this updated proposal and is recommending this as the least cost and most favorable alternative for the City to

move forward with to replace the existing failed Siemens blowers. The following factors contribute to this recommendation:

- 1) The updated proposal with additional scope items would result in a roughly equivalent total construction cost relative to the multi-stage blower alternative, due to the inclusion of the starters and the master control panel integration
- 2) The blower technology is the same as currently utilized at the Dallas Salmon WWTP and is the highest efficiency alternative considered
- 3) Howden maintains a Houston service center, which provides local service capability not previously provided by Siemens
- 4) The inclusion of the material upgrades and five-year warranty provide piece of mind for long term successful operation

Attachments:

1 – Updated Table 1 from June 30th memo

cc: Brent Nicholas – CDM Smith
Amber Batson – CDM Smith

Table 1: Comparison of Blower Costs (Updated with Revised Howden Quote and alternative PD and Multi-Stage Blower Options)

Comparative Quote/PO	Blower Type	Total Cost	\$/Blower	Notes
Howden Proposal (January 2018) - 3,280 SCFM - 7.8 PSIG - 200 HP - 2018	Single Stage Geared Turbo	\$452,567	\$150,856	Includes soft starters, impeller material upgrades, integration with existing MCP, and 5 year warranty with annual service visit.
Siemens Proposal (May 2017) - 3,280 SCFM - 7.8 PSIG - 200 HP - 2017	Single Stage Geared Turbo	\$397,500	\$132,500	Blowers and local controls only. \$17,000 adder for soft starts required for each blower.
Original PO for SWWRF - 3,280 SCFM - 7.8 PSIG - 200 HP - 2010	Single Stage Air-Bearing Turbo	\$524,762	Approx. \$150,000	Includes MCP, valves, flow meters, and DO probes for master control system (estimated at approximately \$75,000 for calculating per blower cost)
Weslaco North WWTP (2 blowers) - 4,450 SCFM - 8.7 PSIG - 250 HP - 2009	Single Stage, one Geared and one Air-Bearing Turbo	\$650,000 (bid price, not from PO)	Approx. \$287,500	Includes MCP, valves, flow meters, and DO probes for master control system (estimated at approximately \$75,000 for calculating per blower cost) – originally bid as one geared unit and one multi-stage back-up, but installed as one geared unit and one air-bearing unit
Alvin WWTP (2 blowers) - 4,500 SCFM - 8.7 PSIG - 250 HP - 2008	Single Stage, one Geared and one Air-Bearing Turbo	\$750,000 (verbally from contractor as mid-\$700k)	Approx. \$337,500	Includes MCP, valves, flow meters, and DO probes for master control system (estimated at approximately \$75,000 for calculating per blower cost) – originally sold as two KA-5 blowers, but installed with one geared and one air-bearing unit – third blower quoted in 2012 for \$272k.

Table 1 (Continued): Comparison of Blower Costs

Comparative Quote/PO	Blower Type	Total Cost	\$/Blower	Notes
Howden-Roots - 2,925 SCFM - 8.84 PSIG - 200 HP - 2017	Single Stage Geared Turbo	\$1,050,000	\$350,000	Blowers and local controls only, comparable to Siemens quote. \$17,000 adder for soft starts required for each blower.
Piller - 2,925 SCFM - 8.84 PSIG - 200 HP - 2017	Single Stage Magnetic Bearing Turbo	\$390,000	\$130,000	Magnetic bearing blower packages, which include VFDs and local controls – anticipate ABS could provide quote competitive for this one as another mag-bearing manufacturer
Aerzen - 2,925 SCFM - 8.84 PSIG - 200 HP - 2017	Hybrid PD	\$380,415	\$126,805	“Hybrid” Positive Displacement blower, which compresses air within the rotary lobes. More efficient (and more expensive) than standard PD and about as efficient as multi-stage. Includes shipped loose VFD. Would want to modify scope to include VFD inside package for ease of installation, possibly increasing cost slightly.
Continental - 2,925 SCFM - 8.84 PSIG - 200 HP - 2017	Multi-Stage w/ throttling inlet valve	\$390,000	\$130,000	Multi-stage blower operating with modulating inlet valve. PD or multi-stage operating with VFD would be more efficient throughout turndown. Could be quoted with VFD.
Gardner-Denver - 2,925 SCFM - 8.84 PSIG - 200 HP - 2017	Multi-Stage w/ throttling inlet valve	\$432,282	\$144,094	Multi-stage blower operating with a modulating inlet valve. Quote for controls is rough budget quote based on other installations. Can firm up numbers with more time.
Gardner-Denver - 2,925 SCFM - 8.84 PSIG - 200 HP - 2017	Multi-Stage w/ VFD	\$501,282	\$167,094	Multi-stage blower operating with a VFD. Will be somewhat more efficient than with modulating valve through turndown. VFD in local control panel in blower room.