



ODYSSEY
MANUFACTURING CO.

FACSIMILE TRANSMITTAL

From: Patrick H. Allman
To: Phil Hyer, Superintendent, City of Pompano Beach Water Plant
Fax #: E-MAILED
Re: POMPANO BEACH WTP CARBON DIOXIDE SYSTEM REPLACEMENT
Date: February 12, 2017
Pages: 7, including this cover sheet.

WORK AUTHORIZATION NO. 1 POMPANO BEACH WTP CARBON DIOXIDE SYSTEM REPLACEMENT

Services rendered pursuant to Work Authorization No. 1 are in accordance with Commission approved Resolution 2016-232 and the terms and conditions of the Service Agreement between the City of Pompano Beach (CITY) and Odyssey Manufacturing Co. executed July 1st, 2016.

As a follow-up to your request and our site visit on Friday, Odyssey is pleased to quote the City of Pompano Beach the following to replace the carbon dioxide system at its Water Plant. The work would be done under the existing chemical systems maintenance agreement with Odyssey.

Description of WTP Operations

The City of Pompano Beach WT plant is permitted for 50-million gallons per day (MGD) (PWS #4061129). The plant average production is about 14.5 MGD and the peak production is about 18.0 MGD depending upon the time of year. The plant is only permitted, however, to treat 30 MGD in order to achieve 4-log removal. The plant has two treatment processes: (1) Nano-filtration (NF); and (2) Lime softening. The plant has five NF skids of 2 MGD each and two 20 MGD each lime softeners. Typically, two or three NF trains are run at a time and one softener is run at a time at a rate of 5 to 12 MGD. The finished water from both processes goes to the blending clear well which is approximately 2 million gallons. The finished water is then pumped from the clear well to two on-site Ground Storage Tanks rated for 5 million each. The plant uses about 1,000 gpd of sodium hypochlorite and 100 ppd of anhydrous ammonia. The plant adds carbon dioxide after the clarifiers to lower pH.

From the desk of...

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General Manager

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The plant currently feeds between 1,000 and 2,000 ppd of carbon dioxide. Typical deliveries are 40,000 lbs. at a time and the plant gets deliveries every month sometimes twice per month. The plant's finished water pH is 8.5. Sodium hypochlorite is normally fed at the blending clear well and at the pre-filters of the lime softening process. During burnouts, sodium hypochlorite is normally added to the Post injection as well. Anhydrous ammonia is currently added at the beginning of the blending clear well.

Current Situation

The existing carbon dioxide system was installed in 1984. The typical life of these systems is thirty (30) years so the system is beyond its expected service life and needs to be replaced. The existing tanks also have deep rust pockets on the surface in several areas that is suspect. The refrigeration systems in both units are a significant maintenance cost. Odyssey proposes to replace the existing carbon dioxide system with a new system which would be relocated to the east side of re-carbonation basin. This would mean we would not need a temporary system and the new system could be placed on-line without interrupting the operation of the existing system. As part of the upgrade, Odyssey also proposes to change the feed equipment from gas diffusers to eductors. Thus, Pompano Beach would inject solution water with carbon dioxide instead of the gas itself. This is a safer system and should result in a significant reduction in carbon dioxide usage and provide a costs saving to the CITY. The carbon dioxide storage and feed equipment would be supplied by TOMCO.

Recommendation

Odyssey proposes the following scope of work:

- FDEP Permitting (as required)
- Pour new concrete pad for storage tanks and feed equipment skid
- Set new CO2 equipment on new concrete pad
- Perform electrical work as required to CO2 equipment
- Perform control wiring as required for new CO2 equipment
- Evaluate if mixers are still required at the injection point
- Run piping from CO2 skid to the injection point
- Provide final As-Built Drawings and O&M manuals for Project
- Remove and Dispose of Existing Carbon Dioxide System

The following equipment would be supplied by Odyssey:

- 2 – 26-ton storage units
- 2 – Refrigeration Units
- 2 – Vaporizer/Vapor Heater/Pressure Regulator Units
- 1 – Skid-mounted carbonic acid feed systems (a.k.a. eductor units) (0 - 2,640 ppd)
- Lot – Instrumentation for gas/water feed rates
- Lot – Piping from Tanks to Skid and from Skid to injection point
- Lot – Electrical, Controls and Water Supply Requirements for Skid

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The City of Pompano Beach would be responsible for any required SCADA reprogramming and terminations of any additional I/O above and beyond what is currently available on the carbon dioxide system.

Work Details

- 1) Pour 41' x 21' x 10" concrete pad with 4,000 psi concrete with #5 rebar in bottom on 18" centers. Will cut in stress relief cracks to form pad into quadrants. Concrete will north south in the 41' direction approximately 3' off of re-carbonation chamber and on edge of asphalt where it meets grass. Each skid is approximately 8' x 35' and the intent is to leave a 6' space on the end of the concrete pad which would be the refrigerant end of the carbon dioxide skid.
- 2) Furnish and Install a 3" Schedule 80 PVC water supply line from the 6" water main across the roadway from the proposed carbon dioxide location. This involves saw-cutting the roadway, installing the new line and compacting and re-asphalting the roadway. Odyssey will also install two spare Schedule 40 PVC 4" road crossings as well since the roadway will be cut open. We assume that the proposed installation will provide the required 85 gpm@55 psig. If for some reason the water capacity in this line is not strong enough we will have to install a Booster Pump which would be an additional \$1,500.
- 3) Furnish and Install two 26-ton capacity liquid CO2 storage receivers model 2675CAND (4 HP Refrigeration, 480 Volt, 3 phase 60 Hz). The skids will be set in place on the new concrete pad by a crane. Odyssey will hookup the required 480 VAC three-phase power to each of the skids.
 - Storage Capacity 52,000 pounds each
 - ASME pressure vessel with MAWP of 350 psig
 - 4" Polyurethane insulation with pre-painted aluminum wrapped skin and dished heads
 - Front end enclosure (cabinet) over refrigeration unit, vaporizer, vapor heater, first stage regulator
 - Oversized cabinet access doors with lockable handle
 - Skid mounted with single (480 volt, 3 phase) electrical connection and single CO2 process connection
 - Dual ASME Safety relief valves and dual bleeder relief valves with 3-way switching valves
 - CGA fill connections piped outside the cabinet
 - Stainless steel nozzles and piping
 - High and Low Pressure alarms and contacts
 - 6-inch Dia. Liquid level and pressure gauges
 - NEMA-4X stainless steel electrical panels
 - Liquid level transmitter
 - Two additional valved outlets for tank connection
 - One Model M-259CI electric vaporizer pre-installed in each tank cabinet, (12 kW, 480 volt, 3 phase, 60 hz)
 - One CVH-4SS vapor heater with thru-the-door disconnect, pre-installed in each tank cabinet - (4 kW, 480 volt, single phase)
 - One first stage pressure regulator pre-installed in each tank cabinet

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- 4) Furnish and install one 110 lb/hr PSF Carbonic Acid feed panel (85 gpm clean carrier water at a DP of 55 psig required). The panel measures approximately 48" x 60" and will be mounted on SS316 strut adjacent to the CO₂ storage tanks. Each PSF feed panel contains:
- 120 VAC power connection
 - 1/2 inch Schedule 80 threaded, type 304 stainless steel CO₂ piping
 - 3 inch Schedule 10, welded type 304 carrier water piping
 - Enclosed-style, free-standing panel – type 304 stainless steel
 - NEMA-4X type 304 stainless steel control enclosure mounted on the panel door
 - Second stage pressure regulator.
 - Dual static mixers – PVC
 - Pneumatic (ATO) CO₂ control valve with I/P transducer using CO₂ as pneumatic source.
 - Valve position feedback (4-20 mA)
 - Signal generator and potentiometer for valve by-pass manual control
 - pH controller with pH electrode and mounting hardware
 - One manual control valve by-pass valve - s.s.
 - y-strainer, check valve, safety relief, isolation valves, drain valve, pressure gauges, etc. - s.s.
 - CO₂ electronic flow meter – Coriolis with lb/hr display and 4-20 mA output
 - Carrier water low pressure alarm and contact
 - CO₂ electric solenoid valve
 - Panel heater
- 5) Furnish and install interconnecting piping between the CO₂ storage tanks and the PSF panel. This piping will be 3/4" carbon steel.
- 6) Furnish and Install 3" Schedule 80 CPVC line from PSF panel to injection point. We will relocate injection point from the second mixer box to the first mixer box so it is upstream of both mixers. Currently, the injection point is downstream of the first mixer and thus it does no good to run the first mixer. We believe it is still necessary to run one of the two mixers but it is not necessary to run both mixers. We will valve off the line so that it can feed the existing diffuser assembly in the second mixer box for a backup. The end of the injection line will contain one (1) 3 inch carbonic acid solution diffuser assemblies rated for 85 gpm from TOMCO. The diffuser is constructed of Type 304SS and is flanged on the end. We will install a pipe support for the connection in the first mixing chamber using a floating boat.
- 7) Odyssey will run a new 120 VAC line from a spare 20-Amp breaker in the Building immediately to the east of the proposed CO₂ system location to the PSF panel. The conduit will be 1" PVC coated rigid and we will run 3/C #8 AWG.
- 8) Odyssey will run 4/C 480 VAC three phase 1/0 from a spare bucket in an existing 600-Amp electrical service panel which has only two 5 HP breakers for the mixers. The City of Pompano Beach will upgrade the bucket so that it has a 150-Amp breaker and Odyssey will run the conductor inside a 1 1/2" PVC coated rigid conduit to a new local NEMA 4X panel containing two 50-Amp breakers with room for additional breakers. The two breakers will then in turn feed each of the CO₂ storage units. The total run is approximately 275'. Along the same path we will also run two 1" PVC coated rigid conduits, one for the digital wiring and one for the analog wiring between the new CO₂ system and the SCADA RTU located inside the Control Room on the east side of the filters. The work includes
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core drilling the north wall of this building. All conduit pipe supports shall be 316SS. The piping will run along the north end of the filters and re-carbonation chamber building around to the new CO₂ system.

- 9) Odyssey has included two days of TOMCO Systems Factory Startup and Training for the new CO₂ system.
- 10) Odyssey agrees to disconnect and remove the two existing carbon dioxide skids as well as all of the existing carbon dioxide piping located on top of the re-carbonation basin. At this time we are assuming the scrap value of the two skids equals the cost to transport it off-site. Additionally, we are assuming we can feed or use up all of the existing carbon dioxide in some manner.

SCADA Interface

● Odyssey proposes to run two separate 1" conduits from the system to the SCADA RTU located in the Filter Control Building. We will run the conduits along the ceiling to the north and then down and alongside the filter and re-carbonation chamber buildings. The following I/O will be provided:

From the CO₂ storage tank to the plant control system:

- CO₂ tank #1 low pressure alarm
- CO₂ tank #1 high pressure alarm
- CO₂ tank #1 level (4-20 mA)
- CO₂ tank #2 low pressure alarm
- CO₂ tank #2 high pressure alarm
- CO₂ tank #2 level (4-20 mA)

From the plant control system to the PSF control panel:

- PSF panel selected (on/off)
- Control valve position (4-20 mA)
- pH (4-20 mA)

From the PSF control panel to the plant control system:

- Carrier water low pressure alarm
- CO₂ flow rate (lb/hr) (4-20 mA)
- Control valve position (4-20 mA)
- pH (4-20 mA)

Warranty

One year parts and labor warranty from Odyssey upon system acceptance. One year limited parts only warranty from TOMCO from the date of acceptance.

Pricing

The work is expected to take 12 – 15 days. It will require an FDEP construction permit with the Broward County Health Department. The cost breakdown of the work is as follows:

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Lot – Carbon Dioxide Equipment	\$ 478,500
Lot - Schedule 80 CPVC Materials	\$ 2,900
Lot – Water Line Supplies	\$ 2,100
Lot – CO ₂ Carbon Steel/SS304 Piping	\$ 3,750
Lot - SS316 Pipe Supports	\$ 5,400
Lot – Electrical Components/Conduit	\$ 15,500
Dumpsters	\$ 1,600
Concrete	\$ 5,400
Rebar/Forms	\$ 1,500
Concrete Subcontractor Labor	\$ 4,500
Asphalt Subcontractor	\$ 1,200
Core Drill Subcontractor (electric conduits)	\$ 900
Crane Rental (to set new CO ₂ Skids)	\$ 600
Crane Rental (to remove old CO ₂ Skids)	\$ 600
Man-Lift Rental	\$ 600
Rental Compactor	\$ 125
Rental Saw-cutter	\$ 350
FDEP Permit Fee (Broward Cty Health Dept)	\$ 1,100
390 hrs – Technician@\$80/hr	\$ 31,200
260 hrs – Helper@\$35/hr	\$ 9,100
60 hrs – Engineering@\$90/hr	\$ 5,400
Contingency	\$ 25,000
Total	\$ 597,325

Please issue Odyssey two purchase orders. One for the CO₂ system equipment in the amount of \$478,500 and one in the amount of \$118,825 for the installation and project contingency.

Schedule

Notice to Proceed	0 Weeks
Submittals for Approval	8 Weeks ARO
Submittal Approval	9 Weeks ARO
Submit FDEP Permit	10 Weeks ARO
FDEP Permit Approval	14 Weeks ARO
Pour Equipment Pad	15 Weeks ARO
Electrical Work Conduit Work	16 Weeks ARO
New Water Line	17 Weeks ARO
Equipment On-site	22 Weeks ARO
Equipment Installation Starts	22 Weeks ARO
Equipment Installation Ends	24 Weeks ARO
Equipment Startup	25 Weeks ARO
Equipment Demolition	26 Weeks ARO

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Odyssey is a licensed plumbing and general contractor who specializes in chemical system design, permitting, equipment supply and installation and service work. This work would be done under the existing maintenance services agreement with the City of Pompano Beach. This proposal is good through December 31, 2017. Thanks for your consideration. Pat.

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"CONTRACTOR"

ODYSSEY MANUFACTURING CO.,
a Delaware corporation

Witnesses:

David C. Perez
DAVID C. PEREZ
(Print or Type Name)

By: *Patrick H. Allman*
Patrick H. Allman, General Manager

Business License No. _____

Chris Matthews
Chris Matthews
(Print or Type Name)

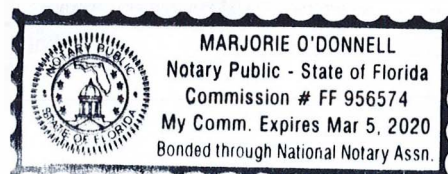
STATE OF FLORIDA

COUNTY OF HILLSBOROUGH

The foregoing instrument was acknowledged before me this 3 day of March, 2017, by PATRICK H. ALLMAN, General Manager of ODYSSEY MANUFACTURING CO., a Delaware corporation authorized to do business in the State of Florida on behalf of the corporation. He is personally known to me or who has produced _____ (type of identification) as identification.

NOTARY'S SEAL:

Marjorie O'Donnell
NOTARY PUBLIC, STATE OF FLORIDA
Marjorie O'Donnell
(Name of Acknowledger Typed, Printed or Stamped)
FF956574
Commission Number



"CITY":

Witnesses:

CITY OF POMPAÑO BEACH

By: _____
LAMAR FISHER, MAYOR

By: _____
GREGORY P. HARRISON, CITY MANAGER

Attest:

ASCELETA HAMMOND, CITY CLERK

(SEAL)

Approved As To Form:

MARK E. BERMAN, CITY ATTORNEY

STATE OF FLORIDA
COUNTY OF BROWARD

The foregoing instrument was acknowledged before me this _____ day of _____, 2017 by **LAMAR FISHER** as Mayor, **GREGORY P. HARRISON** as City Manager and **ASCELETA HAMMOND** as City Clerk of the City of Pompano Beach, Florida, a municipal corporation, on behalf of the municipal corporation, who are personally known to me.

NOTARY'S SEAL:

NOTARY PUBLIC, STATE OF FLORIDA

(Name of Acknowledger Typed, Printed or Stamped)

Commission Number



March 1, 2016

Re: **CORPORATE RESOLUTION FOR AUTHORITY TO SIGN BIDS, BID FORMS
AND CONTRACTS ON BEHALF OF ODYSSEY MANUFACTURING CO.**

To Whom It May Concern,

WHEREAS, the Board of Directors of Odyssey Manufacturing Co. has determined it to be in the best interest of the Corporation to establish a Corporate Resolution. Be it: RESOLVED, The undersigned hereby certifies that Patrick H. Allman, its General Manager, is authorized to sign bids and all bid forms and to execute agreements and any documents associated with these agreements on behalf of Odyssey Manufacturing Co. Additionally, the undersigned is the duly elected and qualified Secretary and the custodian of the books and records and seal of Odyssey Manufacturing Co., a corporation duly formed pursuant to the laws of the state of Delaware and that the foregoing is a true record of a resolution duly adopted at a meeting of the Board of Directors and that said meeting was held in accordance with state law and the Bylaws of the above-named Corporation on March 1, 2016, and that said resolution is now in full force and effect without modification or rescission.

IN WITNESS WHEREOF, I have executed my name as Secretary and have hereunto affixed the corporate seal of the above-named Corporation this 1st day of March, 2016.

Stephen Sidelko, Secretary

CORPORATE SEAL

Marvin T. Rakes, President