

PANAMA CANAL AUTHORITY	VARIATION	PAGE 1 OF 6
1. REQUEST FOR PROPOSAL No.: RFP-76161	2. CONTRACT No.: CMC-221427	3. DATE: January 25, 2012
		4. VARIATION No.: 27

5. ISSUED BY:

PANAMA CANAL AUTHORITY
Employer's Representative
Locks Project Management Division
Building 740, Corozal
Panama, Republic of Panama

6. NAME AND ADDRESS OF CONTRACTOR (INCLUDE PHYSICAL & POSTAL ADDRESS) Grupo Unidos por el Canal, S.A. Building 22B, Brujas Road Cocoli, Republic of Panama	7. CONTRACTOR'S TELEPHONE NUMBER: 507-316-9900
	8. CONTRACTOR'S FACSIMILE NUMBER:

9. VARIATION:

- ☒ The contract referred to in item No. 2 is hereby varied as set forth in item 10, entitled "DESCRIPTION OF VARIATION".
- ☒ YES. ☐ NO. The contractor shall send a copy, duly signed, of this Variation to the Employer's Representative/Contracting Officer.

	9 A. THIS VARIATION IS EXECUTED ON THE BASIS OF: (Specify the legal authority). THE VARIATION DESCRIBED IN ITEM 10 IS HEREBY INCORPORATED AND MADE A PART OF THE CONTRACT.
	9 B. THE CONTRACT REFERRED TO IN ITEM NO. 2, IS VARIED TO INCORPORATE ADMINISTRATIVE CHANGES (such as the paying office, account numbers, etc.).
X	9 C. THIS BILATERAL AGREEMENT IS SIGNED AND INCORPORATED INTO THE CONTRACT REFERRED TO IN ITEM NO. 2 OF THIS FORM, ON THE BASIS OF: (Specify the legal authority) Volume III, Conditions of Contract, Sub-Clause 1.16 [Entire Agreement], 4 th Paragraph
	9 D. OTHER. (Specify manner and the legal authority).
	9 E. ACCOUNT NUMBER (If required):

10. DESCRIPTION OF THE VARIATION (List in accordance with the order of the Contract. If additional space is required, use blank sheets).

See attached

Except for the variation(s) herein specified, all other terms and conditions of the Contract remain unchanged.

11. NAME AND TITLE OF THE PERSON AUTHORIZED TO SIGN (Type or print) Bernardo Gonzalez Contractor's Representative	12. NAME AND TITLE OF THE EMPLOYER'S REPRESENTATIVE/CONTRACTING OFFICER (Type or print) Jorge de la Guardia, Employer's Representative
13. CONTRACTOR  (Authorized signature)	14. DATE: 15. PANAMA CANAL AUTHORITY  (Employer's Representative/Contracting Officer's signature)
	16. DATE: 25/I/2012

Variation No. 27 is issued to incorporate the following changes:

1. **Volume II, Part 2, Section 01 81 36.13 [O&M Bldgs. & Facil.-Space Programming]- Delete Paragraph 1.03 G.1 and replace it with the following:**

"1. At each lock complex, locate the maintenance building [MB] on the I-Side as follows:

- a. Pacific lock complex on the upper-level lock wall.
- b. Atlantic lock complex on the lower-level lock wall." (RFV-103)


2. **Volume II, Part 2, Section 26 50 00 [Lighting Systems]- Delete Paragraph 1.04 C.2 and replace it with the following:**

a. The Contractor shall design and specify an illumination system to provide illumination to the dark pockets that are produced all along both sides of a large wide ship hull (starboard and port) and the walls of the chamber and down to the water level. The illumination shall permit the ship pilot to have a clear visual reference to correctly assess the position of his ship hull in relation to the walls of the locks and the water level. The lighted reference area may be discrete or continuous, along the chamber wall. For the purpose of the required calculations the Contractor shall use the Design Vessel described in Subparagraph 1.02 A. of Section 01 10 00 (General Project Requirements), with zero reflectance from the ship sides.

b. The water shall be illuminated at a minimum of 5 discrete locations along each chamber wall. The maximum distance between discrete illumination points shall be 100m. An acceptable location is at each stair shaft. At each shaft, niches shall be provided for the installation of two fixtures, one on each side of the ladder. Minimum illumination level shall be 30 lux at low water level in front of the stair's shaft to a distance of 3 meter from the chamber wall to the center of the chamber.

c. The top fenders shall be illuminated by providing a continuous niche along the chamber wall for locating the light fixtures. The maximum distance between fixtures shall be 15 meters, equally spaced. Wiring shall not be installed exposed inside the continuous niche. The span of fender illuminated to the point that the light level reaches 30 luxes, on both side of a fixture, shall not be less the 4 meter. The design shall consider ease and safe accessibility from land for lamp replacement and lens cleaning. Lamp and ballast replacement shall not impact lane availability or cause delays. Equipment/tools required for accessing the fixtures for maintenance purposes shall be provided at each lock complex.

d. At low water level the area where the illumination level is "5" lux or less shall not exceed 2.10 meters, measured from chamber wall towards the center of the chamber. Calculations shall assume a maxim height of 13.04m between the top of wall and the low water level, and can include the contribution from high mast



poles located on the same wall where the lights are located but shall assume no light contribution from the high mast poles located on the opposite wall. High mast poles shall not be located closer than 6 meter from the edge of the chamber.

e. With no ship in the chamber, the illumination inside the chamber, at the water level, shall have an average illumination not less than 30 lux originating from the high mast lighting installation.

f. The operator in the Main Control Building [CB] shall be able to remotely control the illuminated area to on-off. Materials used to construct the chamber lighting fixture housing, shall not produce sparks if contacted or collided with by a vessel or other obstruction. Construction of this system will be by the Employer."
(RFV-093)

3. **Volume II, Part 2, Section 26 50 00 [Lighting Systems]- Delete Paragraph 1.04 C.9.b and replace it with the following:**

"b. Light fixture enclosure shall be classified explosion proof, as Class 1 Division 2, Groups A, B, C, or D, as defined in the NFPA-70. The letters indicate the gas or vapor in the hazardous location. The light fixture type shall be suitable for outdoor installation. Lighting fixtures shall be cast aluminum housing or corrosion-free, high impact, glass-reinforced, UV-stabilized nylon. Lamp source type and wattage shall be coordinated between the Contractor and Employer." (RFV-093)

4. **Volume II, Part 2, Section 33 11 00.13 [Water Utility Main Lines]- Delete Paragraph 1.03.J and replace it with the following:**

"J. At the Atlantic Site, the permanent relocation of the 12-inch water mains that will be disturbed by the work, including the stretches through the Crossunders, shall be accomplished using 16-inch DIP Class 250 pipes. Temporary relocation of the 12-inch water main, passing through the natural Plug at the North Side of the Site, may be accomplished using 12-inch PVC pipe." (RFV-092)

5. **Volume II, Part 2, Section 35 12 00 [Vessel Detection Systems (VDSs)]- Delete Paragraph 1.03.F.4 and replace it with the following:**

"4. Shall be in accordance with Section 40 91 00 (Primary Process Measurement Devices)." (RFV-107)

6. **Volume II, Part 2, Section 40 91 00 [Primary Process Measurement Devices]- Add Paragraph 1.03.B.16.c as follows:**

"c. Unless approved by the Employer's Representative, ingress protection of VDS sensors shall be IP67 or better." (RFV-107)

7. **Volume II, Part 2, Section 40 91 00 [Primary Process Measurement Devices]-**

Delete Paragraph 1.04 B.2. and replace it with the following:

“2. Machinery Sensors for Hydraulic Machinery: Shall include the following as a minimum:

Measurement (each)	Measurement Method
Main 480VAC breaker status	Breaker auxiliary contacts
Motor breaker status	Breaker auxiliary contacts
Phase-loss/ reversal relay alarm	Device alarm output
Control 24VDC distribution CB	Feedback line to I/O rack input
DC power supply temperature	DC power supply analog outputs
DC power supply current	DC power supply analog outputs
DC power supply voltage	DC power supply analog outputs
Redundant 24VDC output	Feedback line to I/O rack input
120VAC TVSS alarm	Device alarm output
Motor:	All control and data available from motor starter or VFD, via CENELEC EN 50325-2 fieldbus, IEC 61158 type 2 fieldbus, or Ethernet/IP
Motor running	Motor auxiliary contacts
Motor temperature	Analog transducer output
Motor bearing temperature (deleted)	Analog transducer output
Pump gpm (if variable)	Pump analog output
Pump output pressure	Adjustable settings, high pressure switch
Pump output filter dirty alarm	Device alarm output
Cylinder rod pressure	Pressure transducer Adjustable settings, high pressure switch
Cylinder bore pressure	Pressure transducer Adjustable settings, high pressure switch
Cylinder position	Absolute analog position transducer output Or absolute encoder using CENELEC EN 50325-2 fieldbus, IEC 61158 type 2 fieldbus, or Ethernet/IP

January 25, 2012

Design and Construction of the Third Set of Locks

<i>Measurement (each)</i>	<i>Measurement Method</i>
	<i>Or resolver using analog transducer output</i>
	<i>Deceleration inductive proximity switch (open)</i>
	<i>Stop inductive proximity switch (open)</i>
	<i>Deceleration inductive proximity switch (close)</i>
	<i>Stop inductive proximity switch (close)</i>
	<i>Shut off valve limit switches</i>
<i>Shut off valve position</i>	<i>Directional valve limit switches</i>
<i>Directional valve position</i>	<i>(Reserved)</i>
<i>Proportional valve position</i>	<i>(Reserved)</i>
<i>Reservoir oil Level</i>	<i>Analog transducer output</i>
<i>Reservoir oil temp</i>	<i>Analog transducer output</i>
<i>Moisture / water in oil</i>	<i>Analog transducer output or PLC compatible protocol</i>
<i>Oil particle counter</i>	
<i>Local gate open alarms</i>	<i>Discrete output</i>
<i>Local gate closure alarms</i>	<i>Discrete output</i>

(RFV-089)

8. **Volume II, Part 2, Section 40 96 45 [Process Control Software]- Delete Paragraph 1.03 A. 6 and replace it with the following:**

"6. PLC programming shall use the most adequate combination of IEC 61131-3 compliant languages and shall support hyperlinks and the latest versions of extensible markup language (XML) and hypertext markup language (HTML)."

(RFI- 394)

9. **Volume II, Part 2, Section 40 96 45.13 [Process Control Software for LMCSS]- Delete Paragraph 1.04 D.7.a and replace it with the following:**

"a. This display shall show in the case of a hydraulic machine, the animated hydraulic schematic represented by pressure lines (red) and connection to tank lines (blue) as well as pilot pressure (light red) and pilot tank lines (light blue). Pump suction lines (yellow) shall also show. Lines shall be light gray or white if excluded from pressure side or tank connection, by valves. One or more pressure gauges shall show the rod side and bore side pressures and the reservoir oil level shall also be animated to reflect the proportional level in relation to cylinder extension. In the case of variable flow pumps, the arrow in the pump symbol shall be animated to reflect real-time pump flow. **In the case of proportional valves, the valve shall have a schematic symbol.** All solenoid valves shall be animated to shift in real-time and pressure / tank lines shall change in color to reflect

January 25, 2012

Design and Construction of the Third Set of Locks

hydraulic circuit state. Pressure and limit switches shall also be animated, see Figure 40 96 45.13-17." (RFV-089)

10. Volume II, Part 3, Section 01 33 00 [Submittal Procedures]- Delete Paragraph 1.04 K and replace it with the following:

"K. **Copies for the Employer's Representative:** Unless otherwise specified, upon the release of the Contractor's Documents for construction, the Contractor shall provide 6 half size (Size C) copies to the Employer's Representative, for Employer use during the Works."

11. There is no time or cost impact to the Locks Contract as a consequence of this Variation.

