

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES 1 14	
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE See Block 16C	4. REQUISITION/PURCHASE REQ. NO. 4200507560	5. PROJECT NO. (If applicable) PCN 98898		
6. ISSUED BY CODE OP-ES		7. ADMINISTERED BY (If other than Item 6) CODE Same as block 6			
John F. Kennedy Space Center, NASA Procurement Office, OP-ES-A Kennedy Space Center, FL 32899					

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and Zip Code)		9A. AMENDMENT OF SOLICITATION. X NNK14507560R
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is required to sign this document and return copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

The purpose of Amendment 0004 is to:

- A. Provide Government answers to potential bidder's questions.**
- B. Make Changes to Specification and Drawings**
- C. All other terms and conditions remain unchanged.**

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Robert Glanowski, Contracting Officer	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
<i>(Signature of person authorized to sign)</i>		BY <i>(Signature of Contracting Officer)</i>	

**NNK14507560R – Refurbish Environmental Control System, LC 39B, PCN: 98898
Amendment 4**

A. ANSWERS TO BIDDERS QUESTIONS:

1. **REFERENCE:** Cooling tower thermal acceptance test – Section 23 65 00 pages 403-414 and drawings

QUESTION: How many test runs will be required if heat load will support only 1 of 3 cells in operation?

RESPONSE: Each cell shall be individually tested to ensure new cooling tower performance requirements defined in the specifications and EO-1 sheet M-045 are met. Installed capacity of new equipment expected to require 2 of 3 cells in operation to meet.

2. **REFERENCE:** Cooling tower thermal acceptance test – Section 23 65 00 pages 403-414 and drawings

QUESTION: How many test runs will be required if heat load will support 2 of 3 cells in operation?

RESPONSE: See response to Question #1.

3. **REFERENCE:** Cooling tower thermal acceptance test – Section 23.65.00 pages 403-414 and drawings

QUESTION: Have pitot taps for water flow measurement been installed and if so, where?

RESPONSE: Water flow rates shall be verified using new orifice plate 413 (A503625) shown on the cooling tower supply line to be installed under this contract

4. **REFERENCE:** Drawing M-046 (Pump Schedule); see attached manufacturer information

QUESTION: Shipco Condensate Return Unit Model 120ECD is a USA made unit and meets specification per the above referenced drawing – 3 gpm @ 20 psig discharge. Requesting approval for bid submission.

RESPONSE: Government approval will be provided during the submittal process after contract award. It is the responsibility of the contractor during the bidding process to determine if a product meets all salient features and requirements of the basis of design equipment.

5. **REFERENCE:** Drawing M-039, M-040, Specification Section 23 52 00, Part 2 Products, Section 2.4, subpart 2.4.1.

QUESTION: Please confirm if feed water pumps are required. If yes, please provide model and specification.

RESPONSE: Boiler feed-water pumps are required. The boiler specified includes these pumps.

6. **REFERENCE:** Drawing M-040 (South Boiler Steam Flow Schematic), M-041 (Steam Boiler Schedule Continued), M-045 (Steam Boiler Schedule), M-046 (Valve Schedule)

QUESTION: Please confirm that south electric steam boiler A201383 is to control solenoid valve A201367 and solenoid valve A201368.

RESPONSE: Yes.

7. **REFERENCE:** Drawing M-040 (South Boiler Steam Flow Schematic), M-041 (Steam Boiler Schedule Continued), M-046 (Valve Schedule/Pump Schedule)

QUESTION: Please provide/confirm sequence of control operation between solenoid valve A201369, solenoid valve A201370, condensate pump A201386.

RESPONSE: The solenoid valves provided redundant drain capability from the boiler. Check valve A509096, as shown in the drawings, is incorrectly shown oriented backwards and should be reversed.

8. **REFERENCE:** Drawing M-039 (North Boiler Steam Flow Schematic), M-041 (Steam Boiler Schedule Continued), M-045 (Steam Boiler Schedule), M-046 (Valve Schedule)

QUESTION: Please confirm that north electric steam boiler A201382 is to control solenoid valve A201352 and solenoid valve A201351.

RESPONSE: Yes.

9. **REFERENCE:** Drawing M-039 (North Boiler Steam Flow Schematic), M-041 (Steam Boiler Schedule Continued), M-046 (Valve Schedule/Pump Schedule)

QUESTION: Please provide/confirm sequence of control operation between solenoid valve A201354, solenoid valve A201353, condensate pump A201385 and condensate pump A201384.

RESPONSE: The solenoid valves provided redundant drain capability from the boiler. Check valve A513552, as shown in the drawings, is incorrectly shown oriented backwards and should be reversed.

10. **REFERENCE:** Division 23000, Section 230515 Common Piping for ECS Drawing M-001 Thru M-049

QUESTION: What is the specified requirement for ECS Duct cleaning?

RESPONSE: See Specification Section 23 00 00 - Paragraphs 1.6 and 3.13

11. **REFERENCE:** Sheet M-046; A # A201166, A201167 & A201168

QUESTION: Is a single compressor screw machine acceptable? The unit would have a single refrigerant circuit.

RESPONSE: No. A single compressor screw machine is not acceptable.

12. **REFERENCE:** Sheet M-046; A # A201166, A201167 & A201168

QUESTION: The single chiller power connection is 447 MCA and 800 MOP. Is that acceptable?

RESPONSE: No. See response to question 11 above.

13. **REFERENCE:** Sheet M-046; A # A201166, A201167 & A201168

QUESTION: The chiller KW is 260 vs the scheduled 247.1. Is that acceptable?

RESPONSE: No. See response to question 11 above.

14. **REFERENCE:** Sheet M-046; A # A201166, A201167 & A201168

QUESTION: Where is the metering control valve (A201214, 15, 16) shown on the schematic drawings? Does it come mounted on the chiller? Is it used for condenser head pressure control?

RESPONSE: The metering control valves are shown of Drawing M-029 inlet of each chiller condenser. Not mounted on the chiller - shipped loose and installed by contractor. Yes, it is used for condenser head pressure control.

15. **REFERENCE:** Drawings V-003 and V-004, Note 5

QUESTION: Will new insulation be a requirement of this contract where asbestos containing materials are abated as identified on drawings V-003 and V-004? If yes, what type and thickness of material will be required?

RESPONSE: Yes. For equipment to remain where asbestos containing materials are to be abated; new insulation, jacketing and coatings shall be provided that follow requirements for similar equipment in the same coating zone per drawings and specifications.

16. **REFERENCE:** Drawing Sheets M-001 thru M-049 and Division 23, Spec Section 23 05 15 Common Piping for ECS

QUESTION: What is the Specified Requirement for ECS Duct Cleaning?

RESPONSE: See Specification Section 23 00 00 - Paragraphs 1.6 and 3.13.

17. **REFERENCE:** 79K39603 Specification Ø Section 23 05 15 Ø Pages 296 – 297 Ø Part 2.1.1 Type BCS, Black Carbon Steel

QUESTION: Is a hybrid grooved / welded pipe system acceptable?

RESPONSE: A hybrid grooved / welded system is acceptable for the chilled and condenser water systems assuming all manufacturer's recommendations for groove and flare dimensions and coupling bolt torques are followed, recorded and submitted to the Government for approval.

18. **REFERENCE:** 79K39602 Drawing Ø Sheet M-017

QUESTION: The contractors were not allowed to enter the ECS tunnel during the site visit. Can NASA provide a second Site Visit to view the existing conditions and accessibility in the ECS tunnel?

RESPONSE: Another walk down will not be provided. Representative photos of the tunnel are provided below:







19. **REFERENCE:** 79K39602 Drawing Ø Sheet M-044 79K39603 Specification Ø Section 22 15 13.16 40 Ø Page 247 Ø Part 2.1.1 Type SS-350

QUESTION: Please confirm that the new 8" GN2 supply line on drawing sheet M-044 needs to be fabricated out of schedule 40 stainless steel pipe and fittings?

RESPONSE: Yes. The new 8" GN2 supply line on drawing sheet M-044 needs to be fabricated out of schedule 40 stainless steel pipe and fittings

20. **REFERENCE:** 79K39602 Drawing Ø Sheet M-028 Note 6 and Sheet M-29 Note 7

QUESTION: During the site visit the existing pumps did not appear to have inertia bases; are new inertia bases required for the new pumps?

RESPONSE: No.

21. **REFERENCE:** 79K39602 Drawing Ø Sheet M-028

QUESTION: Please provide material type for potable water piping.

RESPONSE: See Specification Section 23 05 15 - Paragraph 2.1 Pipe and Fittings.

22. **REFERENCE:** 79K39602 Drawing Ø Sheet M-028

QUESTION: Please provide material type for cooling tower drain lines.

RESPONSE: See Specification Section 23 05 15 - Paragraph 2.1 Pipe and Fittings.

23. **REFERENCE:** 79K39603 Specification Ø Section 40 95 00 Ø Pages 504 – 506 Ø Part 1.3 ECS Refurbishment Description

QUESTION: Please clarify the software programming on the project. The Specification describes how the HMI and PLC for this project will be supplied to run independent of the existing HMI and PLC. For programming purposes, will copies of the existing HMI and PLC software be provided to the contractor for modification and loading onto the new HMI/PLC for testing? Or will the contractor be creating a new sequence of operations and code for the whole system?

RESPONSE: Contractor will be responsible for creating a new fully functional sequence of operations for the whole system that meets drawing and specifications, allowing a complete checkout and commissioning of the entire ECS system in this contract. Sample existing screens of the KGCS Health Monitoring system can be provided for reference after award, but new development is required to meet the overall PLC coding and screen requirements set forth in the drawings and specifications.

24. **REFERENCE:** 79K39603 Specification Ø Section 01 91 00.00 98 Commissioning

QUESTION: Will the start-up and commissioning be on the new points only or the whole system?

RESPONSE: See section 1.2.1 - The whole system including all points will be commissioned.

25. **REFERENCE:** 79K39602 Drawing Ø Sheets M-007 through M-010 and M-030

QUESTION: The above drawings reflect drains from Cooling Chambers and Instrument Tees. Sheet M-30 Flag Note 10 states “See Drawing M-007 & M-010 for condensate drain lines”. Sheets M-007 & M-010 does not show routing of drains. Where are the drains to be routed to? Also, what is the material of construction required?

RESPONSE: Drain lines shall be field routed to the nearest floor drain and shall not pose a tripping hazard to personnel by routing along walls or other vertical surfaces. Any trip hazards that can't be avoided shall be marked per OSHA § 1910.144 (a), (iii), (3) Safety color code for marking physical hazards. Material - see specification SECTION 23 05 15 para 2.1 PIPE AND FITTINGS.

26. **REFERENCE:** 79K39602 Drawing Ø Sheets M-007 through M-010 and M-030 79K39603 Specification Ø Section 40 95 00 Ø Pages 530 & 531 Ø Part 2.7 Pneumatic Power Supply and Tubing

QUESTION: During the site visit it appears that all control devices were mounted on Unistrut racks, panels and/or brackets off of equipment supports. Also, there is an existing tubing rack of approximately 24 stainless steel tubes running from and to devices in the upper duct work. Please clarify the following:

a.) Can these tubing runs be reused?

RESPONSE: No. All new stainless steel tubing shall be fabricated and installed from the control / sensing device in the duct or pipe to the appropriate rack as determined by the contractor's final coordination layout of the duct and piping. The specifications has been revised to delete Specification Section 40 95 00, Paragraph 2.7 Pneumatic Power Supply.

b.) Is the new control tubing to run in copper from point of connection on the duct to the control device?

RESPONSE: No. Control tubing to be stainless.

c.) Is it the responsibility of the contractor to fabricate and install supports for devices or use existing?

RESPONSE: Contractor may reutilize the existing instrument rack #4 Unistrut. New devices shall be fully secured to the racks or panels via off the shelf or custom fabricated brackets as required by contractor's final device/component selection.

27. **REFERENCE:** 79K39603 Specification Ø Section 23 65 00 Cooling Towers

QUESTION: Please provide Cooling Tower capacity.

RESPONSE: Per Drawing M-045 E0-1-79K39602 and specification section 23 65 00, cooling tower requires capacity modifications to meet updated performance requirements shown on Note 3.

28. **REFERENCE:** 79K39603 Specification Ø Section 23 65 00 Ø Page 403 Ø Part 1.7.1 Capacity Testing

QUESTION: Please provide answers to the below questions regarding the CTI capacity testing:

a.) Objective of Test?

RESPONSE: See CTI capacity testing document referenced in Specification Section 23 65 00 Paragraph 3.3(g)

b.) Please provide number of flow measurement locations required.

RESPONSE: See CTI capacity testing document referenced in Specification Section 23 65 00 Paragraph 3.3(g)

c.) Does the cooling tower have a common basin?

RESPONSE: Yes.

d.) Please provide height of the air inlets and length of each cell.

RESPONSE: Height of the basin wall is 10' – 6" from the basin slab, the mid-section (i.e. ceramic tiles, water distribution sys and drift eliminators) height is 14' – 2" from the top of basin grating (or top of basin wall) to top of the roof deck, the fan stack is 6' - 6" from the top of the roof deck and the diameter is 9' – 2". The width of each individual cells is 12' form inner wall to inner wall and the same for the length.

29. **REFERENCE:** Section 23 00 00, Para 2.10, Sheet M-045 Humidifier Schedule

QUESTION: Please provide the following for our quotation calculations:

- Steam Pressure
- Airflow in CFM
- Entering Air Conditions
- Design Air Conditions
- Leaving Duct Temperature
- Air Tunnel Or Duct Dimensions Where Dispersion Tubes Are To Be Installed

RESPONSE: Units shall be sized to provide an additional 10% capacity from the details provided in the response below.

Steam Pressure: Per Spec Section 23 52 00 paragraph 2.2.2, new boilers shall supply 15psig

Airflow in CFM (Converted from lbm/min "Pad 39-B ECS Purge Air Requirements and Bid Options" chart on Sheet M-002):

- o Circuit 1-North (SM): 2620 CFM
- o Circuit 2-North (CS/FS): 2620 CFM
- o Circuit 7-North (CS/AFT): 3930 CFM
- o Circuit 8-South (CS/ENG): 3275 CFM
- o Circuit 3-L (ICPS): 2293 CFM

Entering Air Conditions: Entering Winter Condition - 24 grains/lbm

Design Air Conditions: Required Absolute Humidity For Identified Circuits - 39 grains/lbm

Leaving Duct Temperature: Defined on "Pad 39-B ECS Purge Air Requirements and Bid Options" chart on Sheet M-002

Air Tunnel Or Duct Dimensions Where Dispersion Tubes Are To Be Installed: Dispersions tubes to be installed in custom fabricated humidifier chambers as shown on M-023. Final sizing, coordination, and fabrication of the humidifier chambers are the responsibility of the contractor to determine and coordinate with the humidifier dispersion tube provider.

30. **REFERENCE:** 79K39602, M-046, Pump Schedule

QUESTION: Pumps P-617, 637, and 647 The Model # scheduled (W4222GD) is not available in a duplex configuration. Model # W4122GD is a duplex configuration. The difference in the two pumps is that the W4222GD has a cast iron receiver and the W4122GD has a steel receiver. Is pump Model # W4122GD acceptable?

RESPONSE: Yes.

31. **REFERENCE:** EO #1 Drawings Ø Sheet M-046,
WYATI VENTURI MODEL LVM WITH 150#
FLANGED END CONNECTIONS CONSTRUCTED FROM FRP,
CARBON STEEL AND 304L STAINLESS STEEL OR APPROVED EQUAL

QUESTION: The materials of construction would imply an insert type meter, the LVM-IL, however, the inclusion of the "...flanged end connections" would point to a pressure vessel type meter, model LVM-U. Which Wyati Venturi style should we price for this project? Attached are the data sheets of the two different styles. The PMT-IP is included because it has a clearer view of the -IL style.

RESPONSE: Flanged style Wyatt LVM model is the correct basis of design as shown on Sheet M-046.

32. **REFERENCE:** Drawing E-0019. The schedule only goes to CA, but CB, CC, CD, CE, and CF are shown on the Single line.

QUESTION: What is the Demolition Conduit and Cable schedule information for these Items?

RESPONSE: Information for Cables CB, CC, CD, CE, and CF shown on EO-1 Sheet E-019.

33. **REFERENCE:** Drawing E-0020. The schedule only goes to 92, but 93, 94, 95, and 96 are shown on the Single line

QUESTION: What is the Installation Conduit and Cable schedule information for these Items?

RESPONSE: Information for Cables 93, 94, 95, and 96 shown on EO-1 Sheet E-020.

34. **REFERENCE:** Drawing E-0020. The schedule shows cable number 28, 66, and 67 but they are shown on E-007

QUESTION: What is the Installation Conduit and Cable schedule information for these Items?

RESPONSE: Information for Cables 28, 66, and 67 shown on EO-1 Sheet E-020.

35. **REFERENCE:** Drawing E-005 Tubaxial Fn

QUESTION: Where is it located on the drawings? Please show detail or provide conduit and wire size and distance for bidding purposes.

RESPONSE: Tubaxial Fan and cable information shown on EO-1 Sheet E-006 and E-007 in zone F/G-3.

B. Article C.2, Contract Drawings, Maps, Specifications, and/or Statements of Work, paragraph (b) is revised to add the following addenda items:

Drawings M-040, M-041, and M-046 are revised as follows:

Check valves A509096 and A513552 are incorrectly shown oriented backwards. The drawings are revised to reverse both valves.

Specification 79K39603, Rev. A – Section 40 95 00, ECS Controls and Instrumentation is revised as follows:

Paragraph 2.7, Pneumatic Power Supply is deleted.

ADD To Paragraph 1.4 Submittals SD-02 Shop Drawings: “Software Data Dictionary; G”

ADD: Paragraph 2.8 “Software Data Dictionary

Provide completed software data dictionary in Microsoft Excel format. Sample software data dictionary will be provided during construction. Data dictionary scope includes logging the following information from the control system design into Excel rows for each control point.

- I/O Tag Name Alias
- Point Type (AI/AO/DI/DO)
- Redundant End Item (Yes / No)
- Raw Min – Max - Units
- Range Min – Max - Units
- Op Min – Max - Units
- Binary Low - High
- Sample Rate (per second)
- Controller Location - Rack - Chassis - Slot
- I/O Rack – Slot – Channel – Module
- Advisory High – Low
- Caution High – Low
- Warning High – Low
- Emergency High – Low
- “Trigger Count”

C. All other terms and conditions remain unchanged.