AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 | 21

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0001	See Block 16C		

6. ISSUED BY CODE	7. ADMINISTERED BY *(If other than Item 6)* CODE
NASA Stennis Space Center Office of Procurement Building 1100 Room 251H Stennis Space Center MS 39529-6000	NASA Stennis Space Center Office of Procurement Building 1100 Room 251H Stennis Space Center MS 39529-6000

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and Zip Code)*	(X)	9A. AMENDMENT OF SOLICITATION NO.
		80SSC023R0001
	X	9B. DATED *(SEE ITEM 11)*
		8/11/2023
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED *(SEE ITEM 13)*
CODE FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [X] 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 electronic communication 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 letter or electronic communica ion, provided each letter or electronic communication 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.

CHECK ONE	
[ ]	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 data, 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 not, [ ] is required to sign this document and return _____ copies to issuing office.

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

See continuation pages

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
		Charles J Heim Contracting Officer	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		*(Signature of Contracting Officer)*	

14. DESCRIPTION OF AMENDMENT/MODIFICATION *continued:*

The purpose of this amendment is to incorporate the following changes/updates in response to questions received from the RFP:

SF 1449 and Continuation Pages:

1. Reference Q&A #3: Changed – **Block 8**
   (a) Proposal due date extended from 9/15/2023 to 10/13/2023
   (b) Replace initial SF 1449 with the SF 1449 included with this amendment.
2. Reference Q&A #1 and 10: Change Paragraph – **PERFORMANCE SPECIFICATION**:
   (a) Added Argon requirement
   (b) Replace initial page 4 of 18 with the updated page 4 of 18 included with this amendment
3. **LIST OF ATTACHMENTS**:
   (a) Updated – Attachment 1b, Analysis, page numbers
   (b) Added – Attachment 15, Responses to RFP Questions
   (c) Replace initial page 18 of 18 with the updated page 18 of 18, List of Attachments, included with this amendment

Attachment 1, **SOO**

1. Reference Q&A #1 and 10: Changed – **VII. Interface Assumptions**
   (a) Added Argon requirement
   (b) Replace page 3 of 4 with the updated Attachment 1, SOO, page 3 of 4 included with this amendment

Attachment 1b, **Analysis**

1. Reference Q&A # 8: Added 4 pages
   (a) Added "AB and E Complex Flow Data" to the end of the attachment
   (b) Replace initial 1b attachment with the 1b included with this amendment

Attachment 2, **Pricing Sheet**

1. Reference Q&A # 11: Changed – **Pricing Sheet**:
   (a) Updated Best Estimated Quantities numbers in Tiers 2, 3, and 4
   (b) Replace initial page 2 of 2 with the updated Attachment 2, Pricing Sheet, page 2 of 2 included with this attachment
   (c) Complete and return the updated Attachment 2, Pricing Sheet included with this amendment

Attachment 10, **Responses to Draft RFP Questions**

1. Reference Q&A # 10: Changed – Question #13
   (a) Corrected response to draft RFP question #13
   (b) Replace initial page 2 of 5 from Attachment 10 with the updated page 2 of 5 Attachment 10 included with the amendment.

Attachment 15, **Responses to RFP Questions**

1. Included new attachment to address questions submitted for the RFP
   a. Add Attachment 15, Responses to RFP Questions, to the RFP

SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL PRODUCTS AND COMMERCIAL SERVICES

NOTE: OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, AND 30.

1. REQUISITION NUMBER	PAGE 1 OF 18

2. CONTRACT NUMBER	3. AWARD/ EFFECTIVE DATE	4. ORDER NUMBER	5. SOLICITATION NUMBER	6. SOLICITATION ISSUE DATE
80SSC024DA001	See Block 31c		80SSC023R0001	8/11/2023

7. FOR SOLICITATION INFORMATION CALL:	a. NAME	b. TELEPHONE NUMBER *(No collect calls)*	8. OFFER DUE DATE/ LOCAL TIME
	Melissa Wagner	*228-688-1065*	10/13/2023 3:00 PM CT

9. ISSUED BY — CODE

NASA
Stennis Space Center
Office of Procurement
Building 1100 Room 251H
Stennis Space Center, MS 39529-6000

10. THIS ACQUISITION IS [X] UNRESTRICTED OR [ ] SET ASIDE: % FOR:

- [ ] SMALL BUSINESS
- [ ] HUBZONE SMALL BUSINESS
- [ ] SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS (SDVOSB)
- [ ] WOMEN OWNED SMALL BUSINESS (WOSB)
- [ ] ECONOMICALLY DISADVANTAGED WOMEN-OWNED SMALL BUSINESS (EDWOSB)
- [ ] 8(A)

NORTH AMERICAN INDUSTRY CLASSIFICATION STANDARD (NAICS): 325120

SIZE STANDARD: 1,200

11. DELIVERY FOR FREE ON BOARD (FOB) DESTINATION UNLESS BLOCK IS MARKED	12. DISCOUNT TERMS	13a. THIS CONTRACT IS A RATED ORDER UNDER THE DEFENSE PRIORITIES AND ALLOCATIONS SYSTEM- DPAS (15 CFR 700)	13b. RATING	14. METHOD OF SOLICITATION
[ ] SEE SCHEDULE		[ ]		[ ] REQUEST FOR QUOTE (RFQ) [ ] INVITATION FOR BID (IFB) [X] REQUEST FOR PROPOSAL (RFP)

15. DELIVER TO — CODE

NASA
Stennis Space Center
Stennis Space Center, MS 39529-6000

16. ADMINISTERED BY — CODE

NASA / Stennis Space Center
Office of Procurement
Stennis Space Center, MS 39529-6000

17a. CONTRACTOR/ OFFEROR — CODE — FACILITY CODE

TELEPHONE NUMBER

18a. PAYMENT WILL BE MADE BY — CODE

https://www.nssc.nasa.gov/vendorpayment

NSSC-AccountsPayable@nasa.gov

[ ] 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER

18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED [ ] SEE ADDENDUM

19. ITEM NUMBER	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	See continuation pages *(Use Reverse and/or Attach Additional Sheets as Necessary)*				

25. ACCOUNTING AND APPROPRIATION DATA

See continuation sheet if applicable

26. TOTAL AWARD AMOUNT *(For Government Use Only)*

[X] 27a. SOLICITATION INCORPORATES BY REFERENCE (FEDERAL ACQUISITION REGULATION) FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA [X] ARE [ ] ARE NOT ATTACHED

[ ] 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA [ ] ARE [ ] ARE NOT ATTACHED

[X] 28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 1 COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED

[ ] 29. AWARD OF CONTRACT: REFERENCE _____ OFFER DATED _____. YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:

30a. SIGNATURE OF OFFEROR/CONTRACTOR		31a. UNITED STATES OF AMERICA *(SIGNATURE OF CONTRACTING OFFICER)*	
30b. NAME AND TITLE OF SIGNER *(Type or print)*	30c. DATE SIGNED	31b. NAME OF CONTRACTING OFFICER *(Type or print)*	31c. DATE SIGNED

This is a 12-year contract with no options. This includes an anticipated 2-year construction/activation period with a 10-year production period. In no instance will the POP exceed 12-years.

PERFORMANCE SPECIFICATION

All requirements delivered under this contract shall be provided in accordance with the following performance specification, available online at the internet address referenced below:

MIL-PRF-27401G, Type I, Grade B, Propellant Pressurizing Agent, Nitrogen http://quicksearch.dla.mil

Product supplied shall fully meet the requirements of the applicable specification except as modified below and elsewhere in this contract.

Modified MIL-PRF-27401G Specification Requirement:

- Water (max ppm): 6 (-64.0° C Dew Point)
- Argon (max ppm): 2,000

52.212-4 -- CONTRACT TERMS AND CONDITIONS—COMMERCIAL PRODUCTS AND COMMERCIAL SERVICES (DEC 2022)

Paragraph (a) thru (v) are incorporated by reference with the following paragraphs (a) and (g) tailored as an addenda to FAR 52.212-4:

Addenda to paragraph (a) is tailored below to add the following paragraphs:

(3) In the event the Contractor is unable to meet its contractual requirements, the Contractor may supply the deficient product from other sources at the price agreed to in the Unit Pricing Section above of this contract.
(4) If deficient product is not supplied, the Government may acquire product from other sources to the level of the quantities deficient and will seek reimbursement from the contractor via short pay on the Contractor's next applicable invoice in the amount equal to the difference between the Contractor's normal price to the Government and the price the Government paid for the product.

Addenda to paragraph (g) is tailored below to add the following paragraphs:

(3) The Contractor shall submit all vouchers and invoices using the steps described at NSSC's Vendor Payment information web site at: https://www.nssc.nasa.gov/vendorpayment. Please contact the NSSC Customer Contact Center at 1-877-NSSC123 (1-877-677-2123) with any additional questions or comments.
(4) Improper invoices. The NSSC Payment Office will notify the Contractor of any apparent error, defect, or impropriety in vouchers/invoices within seven calendar days of receipt by the NSSC Payment Office. Inquiries regarding requests for payment should be directed to the NSSC as specified in paragraph (3) of this Section.
(5) In the event that amounts are withheld from payment in accordance with provisions of this award, a separate payment request for the amount withheld will be required before payment for that amount may be made.

LIST OF ATTACHMENTS

ATTACHMENT NUMBER	ATTACHMENT TITLE	PAGES
1	Statement of Objectives	4
1a	Responsibility Matrix	1
1b	Analysis	12
1c	Draft License Agreement	10
1d	Draft Reimbursable Space Act Agreement	11
2	Pricing Sheet	2
3	List of Applicable References	1
4	Box Instructions	1
5	Provisions	29
6	Past Performance Matrix	1
7	Past Performance Questionnaire	2
8	Quality Assurance Surveillance Plan (Informational Only)	7
9	Incorporated Changes from DRFP	6
10	Responses to Draft RFP Questions	5
11	Geotechnical Report (Informational Only)	102
12	Industry Day Documents	27
13	Utility Drawings	1
14	MS Primary Drinking Water Regulations	39
15	Responses to RFP Questions	1

Contractor shall submit Attachment 2 at the time proposals are due which will become part of the contract.

****In all cases system pressure shall be monitored and maintained above 2,700 psi by the contractor.**

*****On Demand Rate** is the ability to flow additional nitrogen above the mean flow rate in order to meet Stennis Space Center's tenant's variable test times

******The standard deviation amount provided does not include minimum and maximum flows.** Historical minimum and maximum flows are explained in detail in the chart set titled: N2 Generation Information.pptx, included in Attachment 1b. The contractor will be required to indicate how the proposed system can meet SSC's needs.

2. System provider shall provide gaseous nitrogen in compliance with:

   MIL-PRF-27401G, Type I, Grade B, Propellant Pressurizing Agent, Nitrogen

   Modified Specification Requirement:
   - Water (max ppm): 6 (-64.0° C Dew Point)
   - Argon (max ppm): 2,000

VII. Interface Assumptions:

1. The available location for any potential production facility will be near the HPGF, SSC, Mississippi.
2. Current cleared space readily available for the potential facility is approximately 160' X 170'. Up to 350' X 1,000' can be made available with additional negotiation.
3. NASA will purchase electrical power. NASA will provide and install all hardware required for contractor connectivity to those electrical power. However, it is noted that if the contractor exceeds the energy usage in the continuation pages kW table, NASA will require contractor justification documenting the cause of exceeded usage. NASA expects the contractor's justification for exceeded usage to discuss the contractor's adherence to, or lack of adherence, to its processes, procedures, and methods stated in its technical proposal. NASA could potentially seek reimbursement under the Contract Disputes Act, which is a part of the contract, and states the procedure for handling disputes.
4. The contractor shall be responsible for any backup generator needs necessary to ensure constant availability and reliability as needed. (Must maintain a minimum of 2,700 psi at all times.)
5. Makeup cooling water and associated interface piping will be provided by NASA.
6. Interface and tie-in piping to the existing system will be provided by NASA.
7. Additional assumptions are shown in the Responsibility Matrix included in Attachment 1a.

VIII. Logistics Objectives:

1. Activation and certification of the system will be required prior to production. Activation and certification will be coordinated with the contractor to verify compliance with pressure, flow and MIL-PRF-27401G requirements (as specified above).
2. The onsite production shall begin within 2 years after selection and award of the contract.
3. The contractor shall provide labor and material required to perform routine maintenance and repair of the nitrogen generation in accordance with contractor standard operating procedures.
4. Scheduled maintenance by the contractor will be on a non-interference basis with major Test Complex operations (ex: Hot-Fire Tests, Wet Dress Rehearsals, Tank Tuning, etc.) and coordinated in advance with NASA.

Stennis Space Center Test Complex Nitrogen System Analysis

Formal Analysis Review
July 14, 2022

Agenda

Stennis Space Center

N2 Generation

- Overview
- Stakeholders
- Data Sources
- Analysis Development
- Analysis Process
- Barriers to Analysis of Data
- Assumptions
- Data Presentation
- Conclusions

Overview

Stennis Space Center

N2 Generation

- Purpose of Analysis
  - Provide sufficient detail about current site nitrogen flow requirements for vendors to design a replacement system
- Method of Analysis
  - Utilizing turbine flowmeter data on the liquid discharge of the high pressure pumps measures just what flows "to site" and over time gives the best measure of average utilization.

Data Sources / Analysis Development

Stennis Space Center

N2 Generation

- Initial analysis looked at liquid deliveries
  - Relatively good starting point
  - System overestimates by as much as 29% compared to liquid flow at high pressure pump
- Second analysis looked at pressure change and calculated flows based on Ideal Gas Law Calculation
  - Accurate for determining flows during depressurization events (i.e. LOX Run Tank pressurizations)
  - Inaccurate 30% of time when used during pressurization events (i.e. HPGF LN Pump operation)
- Third attempt utilized Flexim Flowmeter Data
  - High confidence in data
  - Initial placement of meters at T-Split turned out to be problematic due to line size and flow
    - 2" line size going to E-Complex forces AB complex to discharge to E when HPGF not pressurizing – causes data skewing
    - Large steady state assumptions required to estimate Cal Lab
    - Only have limited time available beginning in December 2021
- This analysis uses primarily the High Pressure Liquid Nitrogen Pump downstream flowmeter
  - Pros
    - Captures all liquid flow going to vaporizers
    - Captures nitrogen going to cal and sampling labs
    - Data analysis tool is designed for accurate measurement analysis
  - Cons
    - Tedious to assemble usable data
    - Very tedious (and error prone) to assemble multiple sets of data (any time period greater than 11 hours)

Analysis Development

Stennis Space Center — N2 Generation

- Analysis requires an annual review in order to capture system behavior during all seasons
- Need to be able to review daily and weekly flows in order to best define system operation
- Timeslice selection
  - Analysis Steering Committee met and discussed options
    - Concluded:
      - 1 week per month from April 2021 – May 2022
      - Would use first full week of each month for which data existed
      - Would treat holiday weeks as regular weeks
      - Would include high-consumption test weeks
      - Would include low-consumption weeks (such as hurricane recovery)
    - Provides a reasonable representative sample for a year of operation

Time Periods Analyzed

Stennis Space Center — N2 Generation

Other analyses:
- ✓ Feb 11-19, 2021 – Ice Storm
- ✓ Sept 5-11, 2021 – Hurricane Ida Low Flow
- ✓ Aug 3-11, 2021 – RS-25 Test Usage
- ✓ Dec 7-13, 2021 –RS-25 Test Usage (scrub)
- ✓ Dec 13-21, 2021 – RS-25 Test Usage
- ✓ Feb 6-12, 2022 – RS-25 Test Usage

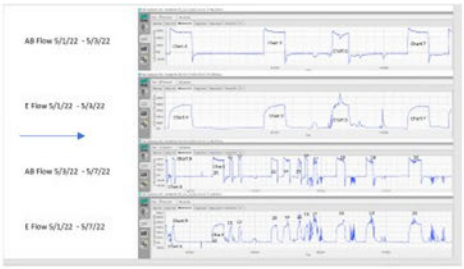
RS-25 Test Dates:

Date	Planned Duration	Actual Duration
1/28/21	500	500
4/6/21	500	500
4/28/21	650	650
5/20/21	500	500
7/14/21	500	500
8/5/21	500	500
9/30/21	500	500
12/9/21	0	0
12/15/21	500	500
1/19/22	500	500
2/3/22	0	0
2/8/22	500	500
2/24/22	500	500
3/30/22	500	500

Simplified Analysis Process

Stennis Space Center — N2 Generation

1. Assemble data for week to be reviewed
2. Create a Flexim strip chart for week to determine where pumping events are occurring. Assemble strip chart with Winplot data if time period is before 12/5/21

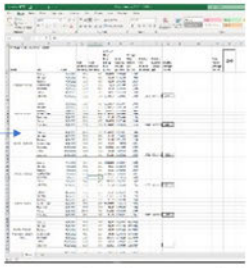


3. Measure daily flow with Winplot tools

4. Record daily flow into spreadsheet

5. Roll up daily flows into a week

6. Roll up weekly flows into a summary spreadsheet



7. Plot and analyze

Reference: SSC Nitrogen System Flow Analysis Process.docx (Desktop Procedure) for additional details regarding process

Files are located in DDMS at the following location: Products > N2GENSYS, SSC NASA > Mechanical Systems > Analysis > Nitrogen Usage at SSC

Barriers to Analysis of Data

Stennis Space Center — N2 Generation

- Gas house strategies skew understanding of flows
  - Weekend preparation/recovery
  - Holiday preparation/recovery
  - Pre-test (pre-drying) liquid packing
- Strategies required for good management of providing GN to site are counter-productive for analyzing GN consumption

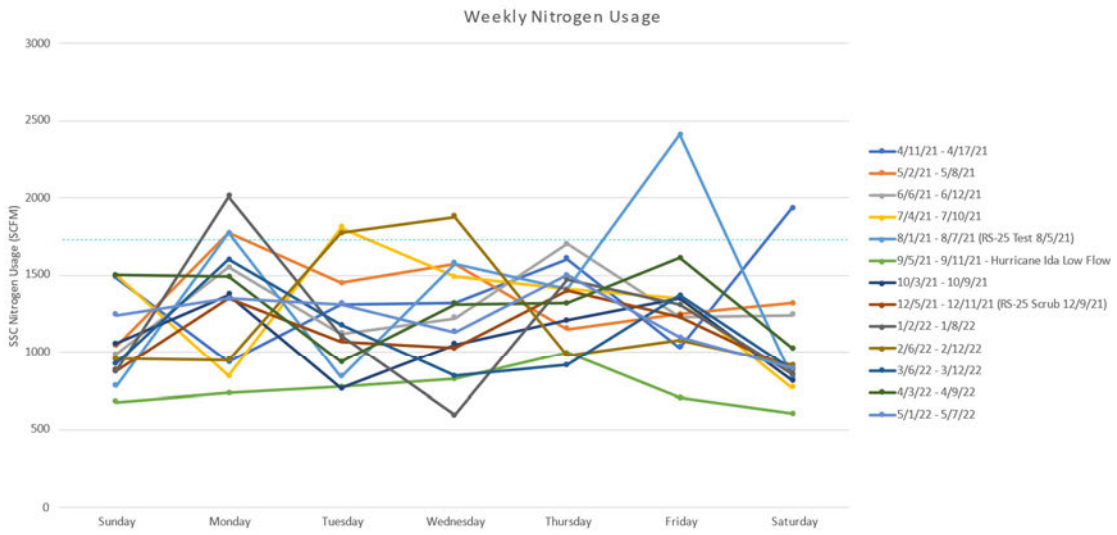
Assumptions

Stennis Space Center — N2 Generation

- Flow rates do not vary based on time of month
- Flow rate is being accurately measured by the turbine flow meter
  - Fixed cylinder volume
  - Fixed speed motor driving pump
  - High confidence in measurement
- Regulators downstream have not been changed significantly
- Analysis only looks at current (past) consumption. It does not make assumptions about future use (increases nor decreases)
- Calculations use a standard conversion factor of 93.11 standard cubic feet per gallon

Weekly Nitrogen Usage 4/11/21 – 5/7/22

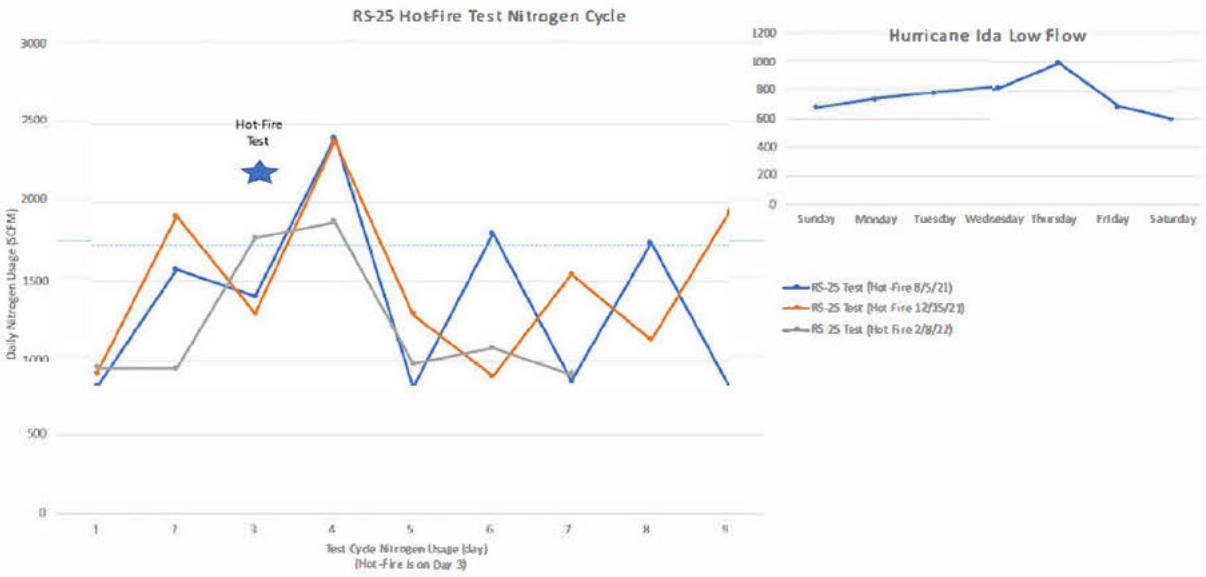
Stennis Space Center — N2 Generation



Other Flows Analyzed

Stennis Space Center

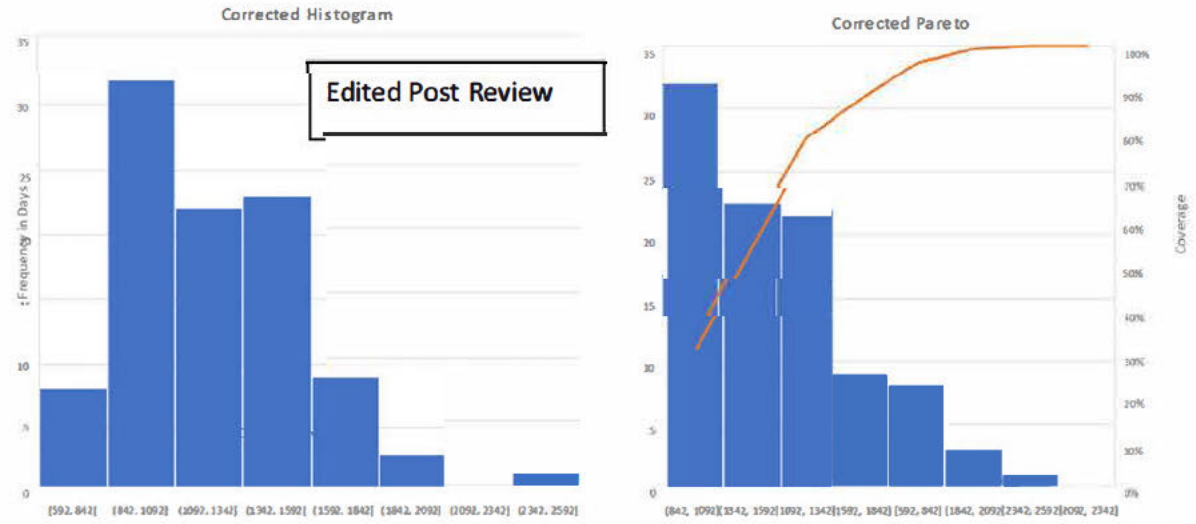
N2 Generation



Usage Statistics – Corrected Daily Statistics

Stennis Space Center

N2 Generation



Actual Mean	1263
Actual Standard Deviation	383

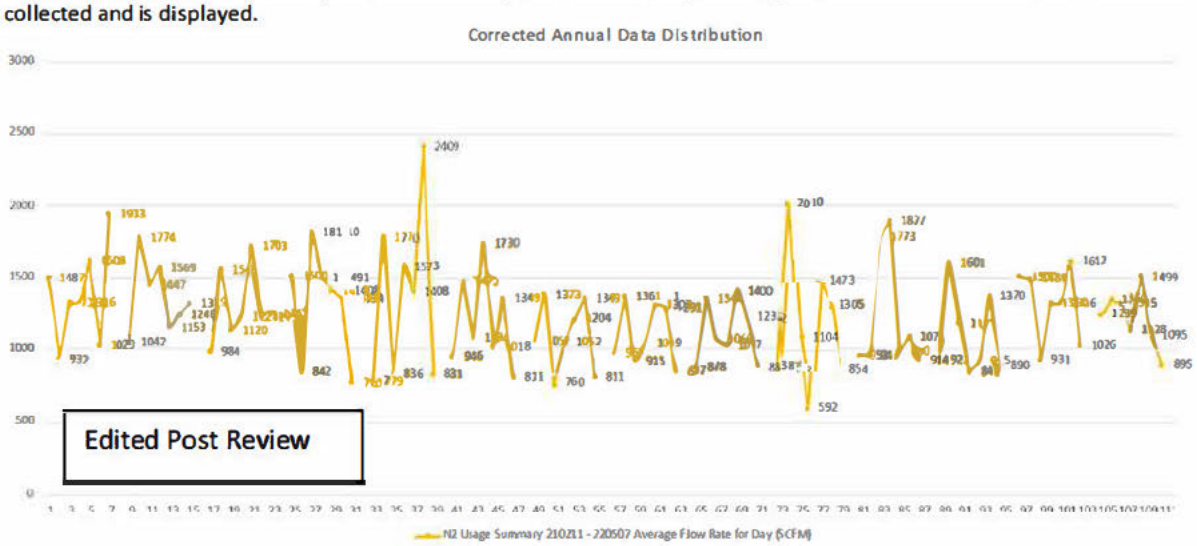
This data set displayed removes Conservation Mode period as well as Liquid Packing occurrences that would not occur with a Nitrogen Generation System. Each bin represents the number of occurrences of a particular day of nitrogen use

Corrected Demand for SSC Nitrogen Use - Daily

Stennis Space Center

N2 Generation

This data set removes Conservation Mode period as well as Liquid Packing occurrences that would not occur with a Nitrogen Generation System. Each point represents the average demand for a day of nitrogen use. The first week of each month was collected and is displayed.

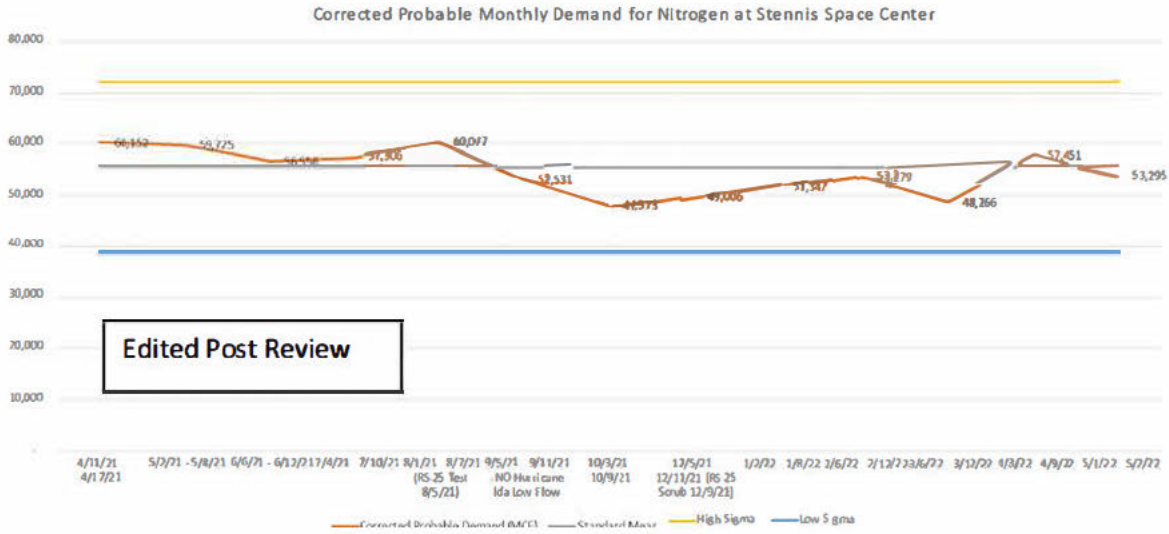


Corrected Demand for SSC Nitrogen Use - Monthly

Stennis Space Center

N2 Generation

This data set removes Conservation Mode period as well as Liquid Packing occurrences that would not occur with a Nitrogen Generation System. Each point represents the average demand for a month of nitrogen use



Conclusions

Stennis Space Center

N2 Generation

- Sample mean flow rate: 1,263 SCFM
- Sample standard deviation: 383 SCFM
- Sample demand data results not including LN -shortage events:
  - Maximum measured:2,409 SCFM
  - Maximum credible: 2,010 SCFM
  - Minimum: 592 SCFM

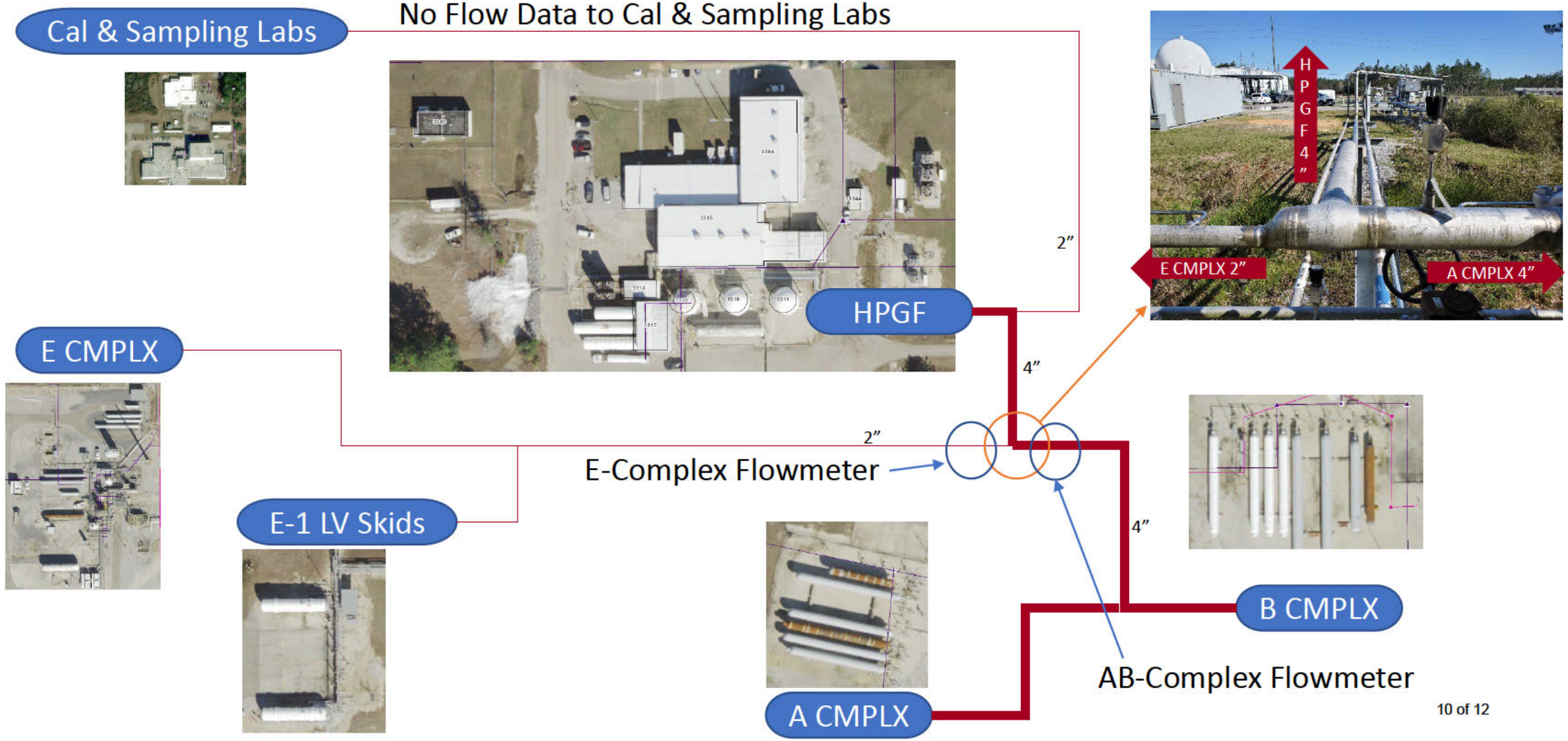
Edited Post Review

This analysis provides a snapshot of Stennis Space Center's usage of nitrogen from April 2021 through May 2022. Increases and decreases to system are estimates, only, and are not included in this document.

AB and E Complex Flow Data

2/4/22 – 5/3/22

Nitrogen Simplified System Layout



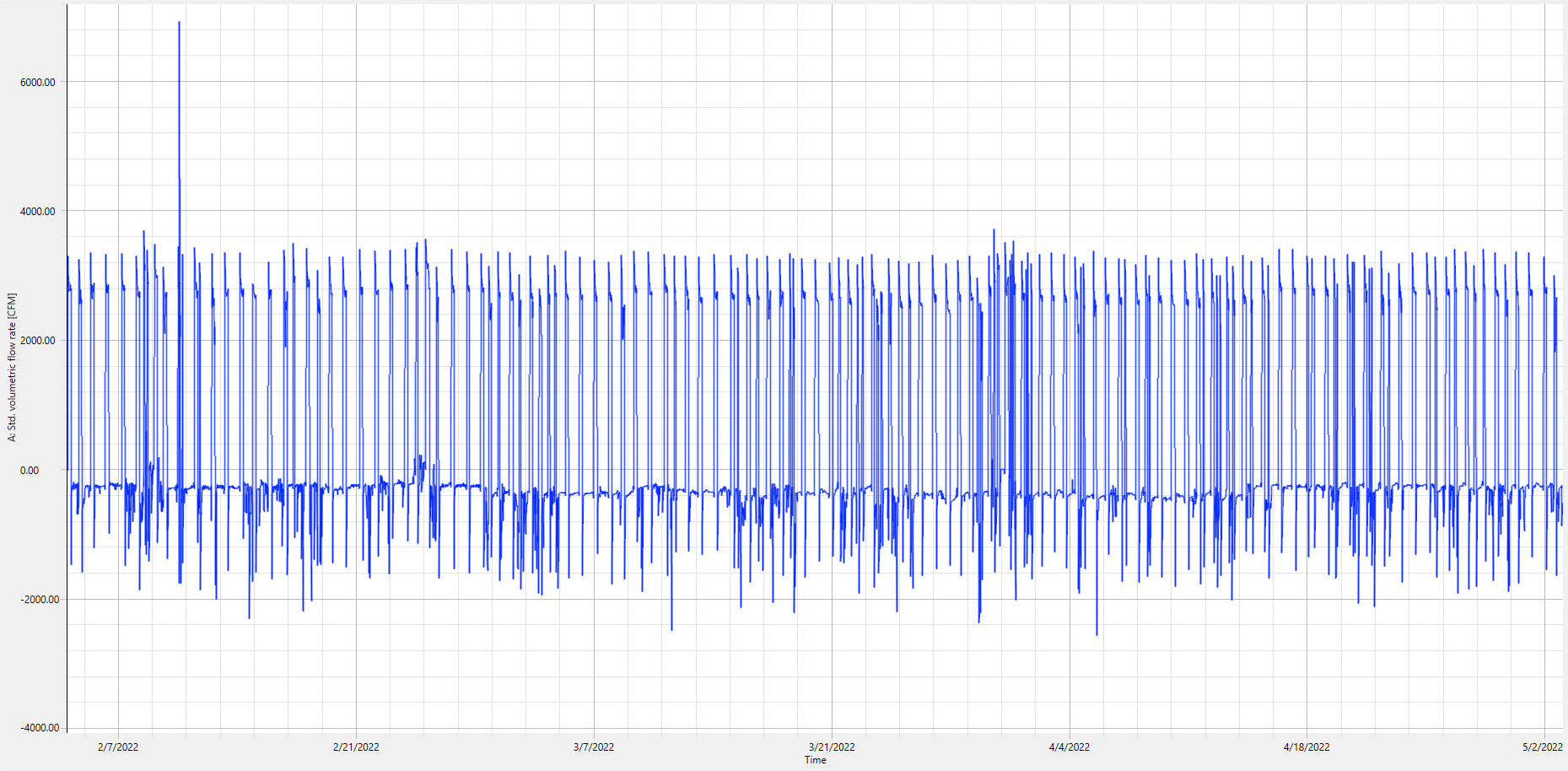
FluxDiag 2.20.0 - Activated file: 2022_05_13_10_49_FLUXUS x2x TCP AB_GN.fluxus

Filter: Channel A | All channels

Moving average: 0 s

Data view | Totalizers | Status view | Measurement | Diagnostics I | Diagnostics II | **Normal flow** | All | Add

Reset diagrams



Channel	Physical quantity	Quality	Average	Std. dev.	Unit
A	Std. volumetric flow rate		433.08	1418.44	CFM

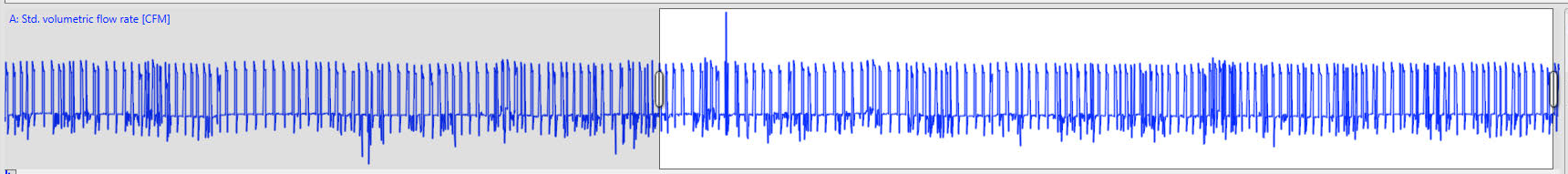
Export as CSV

Diagram 2: A: Volumetric flow rate — Not available: B,C,D,Y,Z: Volumetric flow rate

Diagram 3: A: Flow velocity — Not available: B,C,D,Y,Z: Flow velocity

Diagram 4: A: Fluid temp. — Not available: B,C,D: Fluid temp.

Diagram 5: A: Fluid press. — Not available: B,C,D: Fluid press.



Start: 2/4/2022 12:00:00 AM End: 5/3/2022 12:00:00 AM

Days: 88 Hours: 0 Minutes: 0 Seconds: 0

Create copy from selection

No.	Date	Points	Comparison
Setup			
1	5/3/2022 3:10:19 PM	84126	
2	12/1/2021 12:38:45 PM	22048	

FluxDiag 2.20.0 - Activated file: 2022_05_13_10_28_FLUXUS x2x TCP E_GN.fluxus

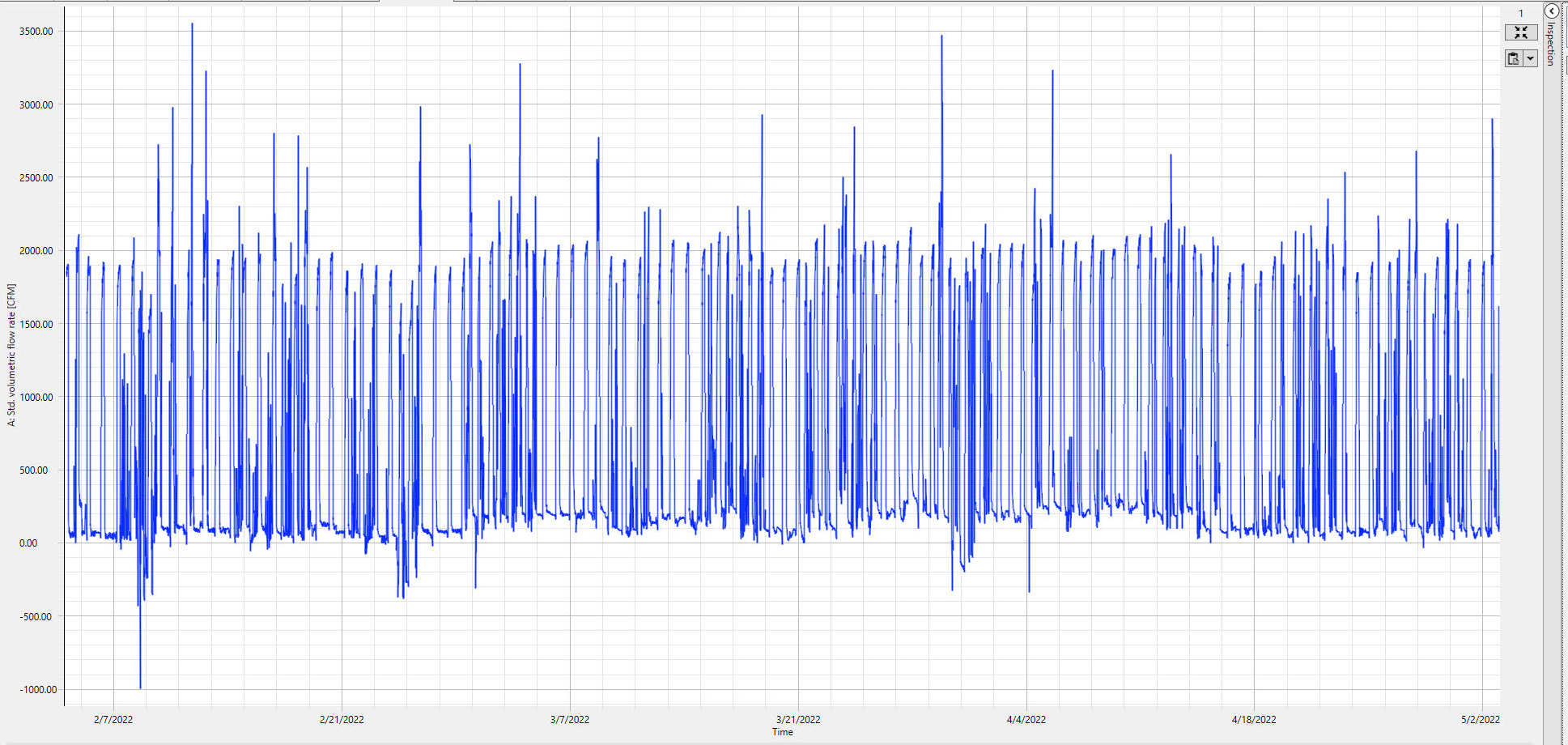
FLEXIM

Filter: Channel A All channels

Moving average: 0 s

Data view | Totalizers | Status view | Measurement | Diagnostics I | Diagnostics II | **Normal flow** | All | Add

Reset diagrams



Inspection

Channel	Physical quantity	Quality	Average	Std. dev.	Unit
A	Std. volumetric flow rate		626.35	743.22	CFM

Export as CSV

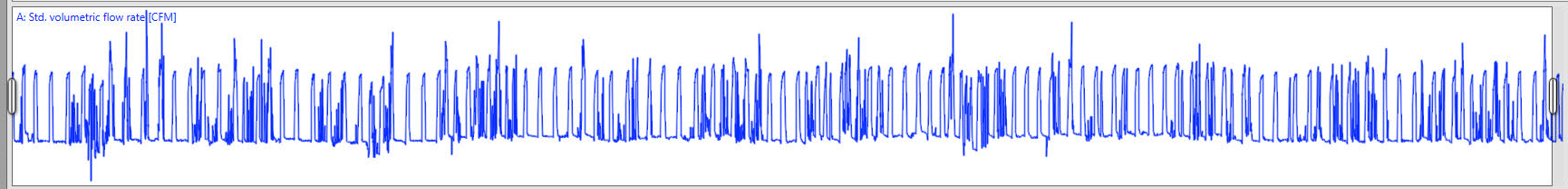
Diagnostic values | Configuration | Export

Diagram 2: A: Volumetric flow rate Not available: B,C,D,Y,Z: Volumetric flow rate

Diagram 3: A: Flow velocity Not available: B,C,D,Y,Z: Flow velocity

Diagram 4: A: Fluid temp. Not available: B,C,D: Fluid temp.

Diagram 5: A: Fluid press. Not available: B,C,D: Fluid press.



Start: 2/4/2022 12:00:00 AM End: 5/3/2022 12:00:00 AM

Days: 88 Hours: 0 Minutes: 0 Seconds: 0

Create copy from selection

Time range

No.	Date	Points	Comparison
Setup			
1	5/3/2022 2:53:07 PM	84050	
2	2/4/2022 2:24:22 AM	127466	

Select series

CLIN	Sub-CLINs	Monthly Total Low (mcf)	Monthly Total High (mcf)	Potential Monthly Usage (mcf)	Best Estimated Quantity / MCF (all 10 years)	Proposed Contract Unit Price (all 10 years)	Fixed Monthly Price (all 10 years)	Total Estimated Price (all 10 years)
0001	Base	Guaranteed		65,700	7,884,000		$ -	$ -
	Tier 1	65,701	93,995	28,294	1,382,328			$ -
	Tier 2	93,996	110,771	16,775	496,368			$ -
	Tier 3	110,772	127,547	16,775	165,456			$ -
	Tier 4	127,548	144,323	16,775	55,152			$ -
CLIN		Description					Unit of Measure	Proposed Price
0002		Conclusion of the contract (reference SOO Logistics Objective #VIII, para 7)					job	
Not to Exceed Total Contract Value (Total Evaluated Price (TEP))								$0.00

Used as a placeholder

Offerors shall submit completed Attachment 2 Pricing Sheet in excel format whem submitting proposals. Instructions are included in Attachment 5 - Provisions.

13	*Gaseous Nitrogen Generation Solution Industry Day PDF; page 14, Table 1, "Grade limits for nitrogen."*	If all other quality requirements for Grade B nitrogen per MIL-PRF-27401G are met, is up to 1 4% argon acceptable?"	The specification does not mandate Argon requirements unless identified per the contract The initial RFP (contract) did not include a requirement for Argon as required in Note "e" from Table 1 in the milspec The RFP (contract) is being updated to include requirements for Argon to max ppm of 2,000	Updated Perfomance Specification in the Continuation Pages, page 4 of 18 and SOO, Attachment 1, Section VI Paragraph 2
14	*Attachment 1. Statement of Objective (SOO)*	N2 On-site Supply to be designed with Back-up storage tanks and pumps and existing system will not be utilized	Correct, the supplier will the provide the gaseous nitrogen as specified in the SOO, and the existing system cannot be utilized by the awarded contractor	No change
15	*Attachment 1a. Responsibility Matrix*	NASA will provide the Geotechnical report along with RFP for vendor to provide the concrete foundation	Yes, see Attachment 11, Geotechnical Report A previous survey from a nearby area along with the current survey is attached	See Attachment 9, Incorporated Changes from the draft Request for Proposal (DRFP)
16	*Attachment 1a. Responsibility Matrix*	Condensate discharge solution to be defined and provided by NASA Condensate discharge (water resulting from air separation process) is considered industrial process water and disposal of that water must comply with local regulations, Condensate disposal is gravity fed to the edge of the pad for the customer to dispose of in accordance with local requirements Typically, a simple sanitary sewer connection is adequate for this type of water We are requesting clarification concerning NASA's role and the contractor's in providing the means for this disposal	NASA will accept the condensate discharge created by the vendor's hardware All interface requirements including discharge composition will be worked with successful offerer upon award of contract The design for the solution will be developed in compliance with environmental and energy performance objectives as stated in Executive Orders as well as those found in all local, state, and Federal regulations and statutes, including any Stennis Space Center specific rules	See Attachment 9, Incorporated Changes from the draft Request for Proposal (DRFP)
17	*Attachment 1a. Responsibility Matrix*	Generator fuel - Natural gas will not be available Diesel is the preferred fuel Please clarify on the responsibility matrix on who will provide the diesel storage tank and associated permitting	Natural Gas main header (8") is available within 250ft proximity to the proposed GNGS location, if desired Vendor responsible for tie-ins The contractor would be required to pay for any usage via a Reimbursable Space Act Agreement (RSAA) A draft RSAA is included as an Attachment Any required tank will be provided by the vendor Permitting will be performed by NASA based on the awarded contractor's solution	See Attachment 9, Incorporated Changes from the draft Request for Proposal (DRFP)
18	*Attachment 1a. Responsibility Matrix*	Cooling / makeup water - How many GPM available? Can you provide the specification of Cooling water available?	A flow rate of up to 250 GPM of potable water is available Additional flow can be provided upon justification SSC follows the Mississippi Drinking Water Regulations for water specifications The specification for any chemicals, residuals, contaminants, etc of the provided water follows public water systems as stipulated in the National Primary Drinking Water Regulations as published under Title 40 Code of Federal Regulations The Mississippi Primary Drinking Water Regulations will be provided as an attachment The supply line for the cooling water is listed as an 8" line This and all interface requirements will be worked with successful offerer upon award of contract	See Attachment 9, Incorporated Changes from the draft Request for Proposal (DRFP)
19	*Attachment 2 Pricing Sheet*	The minimum monthly volume that NASA will pay is the low volume in Tier 1 which is currently 65,644 MCF/month	Yes, we have changed the pricing sheet to include a base monthly amount which is guaranteed	See Attachment 9, Incorporated Changes from the draft Request for Proposal (DRFP)

80SSC023R0001, SSC Gaseous Nitrogen Generation Solution (GNGS)				
Solicitation Questions and Answers Log				
Question No.	Reference	Question / Comment	Response	Changes / Comments
Example	*Attachment 1, SOO, Section VI(1) Chart*	*Example Question*		
1	*Terms and Conditions, Performance Specifications (page 4 of 18 [4 on pdf]) and Attachment 12, Industry Day Documents, Product Quality (page 15 of 27 [223 on pdf])*	Request a deviation from the CO specification. Simply put, 5 ppm is far too low for a standard system. Ambient air contains ~20 ppm CO. The cryo-distillation process does not remove CO. At a minimum, it passes through. Typically, it actually concentrates to a degree. So, ambient air coming in at 20 ppm will have outlet generated nitrogen product with ~20-40 ppm CO. There are downstream purifiers that could hit this spec (and well beyond), however, they cost about as much as the generator itself and require a very high degree of maintenance for reliability. These purifiers are mainly utilized at ultra-high purity semiconductor foundries as those processes require <5 ppb level specs. Essentially, the addition of a downstream purifier to reduce CO by 20-30 ppm is extremely uneconomical and inefficient.	No deviation needed as the specification does not mandate CO requirements unless identified per the contract. The RFP (contract) does not include a requirement for Carbon Monoxide, Carbon Dioxide or Argon as required in Note "e" from Table 1 in the milspec. The RFP (contract) is being updated to include requirements for Argon to max ppm of 2,000.	Updated Perfomance Specification in the Continuation Pages, page 4 of 18 and SOO, Attachment 1, Section VI. Paragraph 2.
2	*Terms and Conditions, Specification Reporting (page 5 - 6 of 18 [5 and 6 on pdf])*	Additional clarification on the analysis and monitoring requirement as there are many ways to design this. Should the controls logic be setup to analyze/monitor only? Or, do build-in logic to auto-trip the plant offline for an off-spec reading? Do we wait for a certain number of off-spec readings before an auto-trip? If so, which contaminants?	Paragraph 6, Specification Reporting, of the T&Cs requires continuous monitoring of the product to ensure product meets the required specification. It also requires that the COR and Alt COR receive "read-only" access to the awarded contractor's monitoring system to review supplied product specifications on an ad hoc basis. Each offeror is required to design their solution to address NASA's requirements. MIL-PRF-27401G states the specifications that are required with the analysis and monitoring. Each offeror is responsible for ensuring NASA receives product that meets the specification and ensure NASA's test complex infrastructure is not compromised. Reference FAR 52.212-4(a).	No change
3	*SF 1449, Block 8*	Can we get an extension to the RFP?	Yes, we will extend the proposal due date to October 13, 2023 by 3:00 pm Central Time.	See SF 1449 Block 8
4		We did not find any language regarding what happens during events out of our control "Force Majeure". How would we be reimbursed if we have to bring liquid nitrogen in from ASUs that are far away in these cases?	Excusable delays are explained in FAR 52.212-4(f). As stated in our draft RFP Q&A attachment, "NASA's objective is to minimalize the need for liquid nitrogen since we intend to modify the way we receive gaseous nitrogen in order to reduce delivery risk (see SOO section 3 paragraph 2)," and "however, contractor shall be responsible for any backup generator needs necessary to ensure constant availability and reliability as needed." This contract is for the supply of gaseous nitrogen. Reimbursement for any solution should be included in the proposed MCF unit price.	No change
5		We didn't see a line item for liquid nitrogen deliveries to the backup tanks that will be part of the proposed solution. How will we be reimbursed for deliveries to the tanks? Or would we be expected to model that as a utility and assume that risk in tiered pricing as requested by NASA?	There is no line item for liquid nitrogen deliveries. This contract is for the supply of gaseous nitrogen. Reimbursement for any solution should be included in the proposed MCF unit price. Offerors' MCF unit price should be all-inclusive as requested in Attachment 2, Pricing Sheet.	No change
6		What is the expectation for the backup generator? Is it required to be large enough to power our entire plant (compressors and pumps for the backup system)?	As stated in our draft RFP Q&A attachment, "contractor shall be responsible for any backup generator needs necessary to ensure constant availability and reliability as needed."	No change
7		As for the power guarantee, we normally give an annual average based on annual average temperatures and relative humidity (these are the factors that affect compressor power because they affect air density). The power numbers will vary month to month with the seasons and air density, but the annual average should be consistent with our power guarantee. Will we be scored annually or monthly with respect to meeting the power guarantee?	After award and during contract performance, NASA will monitor the power consumption on a continuous monthly basis. If excessive usage is noted that deviates from the "proposed monthly kWh" table, NASA will request a justification.	No change
8	*Attachment 1b, Analysis, and Attachment 12, Industry Day Documents*	Request NASA provide flow data over a longer period of time than one week. We suggest at least three months. It's our experience that the longer period of data ensures a full understanding of demand bother over hours, weeks, months, and instantaneous demands	Yes, NASA will provide additional information. This will be added to the end of Attachment 1b, Analysis (AB and E Conplex Flow Data). Data shown represents 3 months of data; the negative values represent back-and-forth flow between East and West test areas (AB and E Test Areas). Also, reference page 5 of 8 in Attachment 1b, Analysis, which shows 13 months of data used at SSC.	Updated Attachment 1b, Analysis
9	*Attachment 2, Pricing Sheet*	Request NASA revise the pricing to allow for an annual firm-fixed unit price for each of the ten contract years for each tier.	NASA will continue to request one unit price for all tiers for the full 10-year period. If the Offeror believes another proposal method is a better option, per Attachment 5, FAR 52.212-1(e), Alternate Proposals, an offeror can submit alternate proposals that depart from the stated requirements. Offerors are required to submit a proposal that conforms to the solicitation as well as any alternate.	No change
10	*draft RFP Q&A #13*	If all other quality requirements for Grade B nitrogen per MIL-PRF-27401G are met, is up to 1.4% argon acceptable?"	The specification does not mandate Argon requirements unless identified per the contract. The initial RFP (contract) did not include a requirement for Argon as required in Note "e" from Table 1 in the milspec. The RFP (contract) has been updated to include requirements for Argon to max ppm of 2,000.	Correcting inaccurate response provided to draft RFP questions. Updated Perfomance Specification in the Continuation Pages, page 4 of 18 and SOO, Attachment 1, Section VI. Paragraph 2.
11	*T&C Unit Pricing, and Attachment 2, Pricing Sheet*	There is a difference in the Best Estimated Quantity for Tiers 2 - 4 between the two documents. What are the correct numbers?	The T&C Unit Pricing Tiers 2 - 4 numbers are correct. Attachment 2, Pricing Sheet, has been updated to reflect the correct numbers.	Attachment 2, Pricing Sheet