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ORGANIZATIONAL ISSUANCE

TD74

NOZZLE TEST FACILITY REGENERATIVE HEAT SYSTEM OPERATING PROCEDURE

Revision A

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline	BASELINE	SEP/12/00	Nozzle Test Facility REGENERATIVE HEAT SYSTEM OPERATIONAL INSTRUCTIONS Baseline AS IS,
Revision	A	11/02/2004	Up-dated due to CAITS 04-DA01-0387. Updated title.

1. PURPOSE

1.1 Purpose. This standard operating procedure contains instructions for the start-up and shutdown of the regenerative heat system at the Nozzle Test Facility (NTF).

2. APPLICABILITY

1.2 Applicability. This work instruction applies to the Test and Evaluation Department personnel and its contractors involved in operations at the NTF.

3. APPLICABLE DOCUMENTS

TD70-001	TEST & EVALUATION DEPARTMENT
TD74-100	EXPERIMENTAL FLUID DYNAMICS GROUP
TD74-NTF-001	NOZZLE TEST FACILITY OPERATING PROCEDURES
NPR 1441.1	NASA RECORDS RETENTION SCHEDULES
MPR 1050.1	CONTRACT (CUSTOMER AGREEMENT) REVIEW
MPR 8715.1	MSFC SAFETY, HEALTH AND ENVIRONMENTAL PROGRAM

4. DEFINITIONS

4.1 Affected Personnel: All Experimental Fluid Dynamic Group personnel.

4.2 Calibration Contact: The person responsible for one or more pieces of calibrated equipment. Responsibilities include tracking the usage of the equipment and scheduling calibration of the equipment with the calibration facility, in-house, or outside vendor.

4.3 Calibration Coordinator: Person who coordinates the activities of the calibration contacts and who is the custodian of the inventory of calibrated equipment.

4.4 CDDF: Center Director's Discretionary Fund

4.5 Customer Agreement: Agreement for MSFC to supply products or services to an external customer. Refer to MPR 1050.1 for details.

4.6 Customer Supplied Product: Products supplied by a customer for the purpose of fabrication, testing, storage, analysis, and/or refurbishment.

4.7 CWI: Centerwide Work Instruction

4.8 Data: Electronic or written information (obtained during test programs or analytic efforts) stored in any of several media (magnetic tapes, computer files, photographs, reports, etc.).

4.9 Data Acquisition Engineer: Individual responsible for a facility data acquisition system including transducers, data acquisition hardware and software, and on-site displays, printers, and data storage medium.

4.10 Data Manager: Custodian of controlled electronic data

4.11 Document Control Custodian: Person(s) responsible for processing and maintaining documentation and forms. TD70 will appoint both a primary and alternate Document Control Custodian (DCC). The DCC will assign unique document numbers and revision designators.

4.12 Facility: A group of mechanical, electrical, and control subsystems designed to prepare for, conduct, and acquire data for a test run of a test article.

4.13 Facility Engineer: Lead and point-of-contact for a specified facility. Responsible for the operation, maintenance, and development of that facility.

4.14 Facility Operator: Person authorized by the Group Lead to operate a specified facility.

4.15 Flight Hardware: Within the scope of MSFC ANSI/ASQC Q9001 registration, flight hardware, flight software, and flight or ground support equipment shall be considered any hardware or software that is intended to fly in, or is part of, the Shuttle Transportation System (STS) or some other flight system, or which is being designed and developed for a non-transportation system. Hardware and software intended to fly only on a balloon flight or sounding rocket is excluded. Please refer to Marshall Management Manual for the official definition.

4.16 Flight Support Equipment: Those items which are anticipated to be in physical or direct electrical contact with flight hardware.
IDP: Individual Development Plans

4.17 MPR: Marshall Procedural Requirements

4.18 NTF: Nozzle Test Facility

4.19 Onsite: Physically taking place on the grounds of the Marshall Space Flight Center or performed by Civil Service personnel whose permanent duty station is the Marshall Space Flight Center.

4.20 OPR: The Office of Primary Responsibility that is responsible for maintaining the accuracy and currency of the document and data from the baseline release through all follow-on actions. OPR's for TD70 are either in TD70, TD32, or TD74, respectively.

4.21 OI: Organizational Issuance

4.22 Protoflight Unit: A test unit that remains operational for inclusion in a flight program.

4.23 Qualification Unit: A representative test unit used in the process of acceptance of flight hardware, flight software, protoflight units, and associated flight support equipment.

4.24 Records Custodian: Individual who is responsible for controlling, storing, retrieving, and dispositioning records.

4.25 Reference Records: A non-current quality record maintained for a designated period of time to document the tasks performed on flight hardware, flight software, protoflight unit, qualification unit, or associated flight support equipment.

4.26 Servicing: A particular type of activity that focuses on post-delivery maintenance and support. The system to be serviced may be developed by MSFC or by a third party.

4.27 Task Agreement: For the purposes of the OWI, a Task Agreement is the directive for an affected person to perform a body of work. This directive is the approval from management to perform the work and can be in various forms (memoranda, e-mail, verbal) and is evidenced by Group or Department Lead's certification of time card.

4.28 Test Engineer: Person(s) responsible for the planning, conduction, and reporting for a specified test.

4.29 ULO: Using Line Organization -- the users of calibrated equipment.

4.30 Wavier: A written authorization to depart from specific requirements in a controlled document.

5. INSTRUCTIONS

The Facility Operator shall

5.0 START-UP

5.1 PREREQUISITES

5.1.1 Ensure amber "Power On" light is illuminated on H-123 Heater Panel located south of the plenum.

5.1.2 Test System Master control Disable/Enable switch on Panel C is in the "Disable" position and key is removed.

5.1.3 Have the Service Air System operating per TD74-NTF-001, Section NTE-SA-001, Service Air Systems Operation.

5.1.4 Have the Regenerative Heat System area clear of personnel and interferences.

5.2 OPERATIONAL GUIDELINES

5.2.1 Verify Main Breaker is in "ON" position.

5.2.2 Verify Breaker #2, Regenerative Heater H-123 Supply Breaker, is in "ON" position.

5.2.3 Verify Breaker #14, Blower B-122 Supply Breaker, is in "ON" position.

5.2.4 Verify Disconnect, Blower B-122 Disconnect (East Wall TTE), is in "ON" position.

5.2.5 Verify ROV-101 A&B, Test Air Supply Isolation, is closed.

5.2.6 Verify PCV-110, Model Inlet (Po) Pressure Control Valve, is closed.

5.2.7 Verify PCV-115, Model Backpressure Valve, is open.

5.2.8 Verify TCV-107A, Test Air Temperature Control Valve – Hot, is open.

5.2.9 Verify TCV-107B, Test Air Temperature Control Valve – Cold, is closed.

NOTE
If PCV-110, TCV-107A, TCV-107B or PCV-115 are not in their correct Position, the hydraulic system may have to be started per TD74-NTF-001, Section NTE-HY-001, Hydraulic Sys. Operation, to correctly position these valves.

NOTE
Steps 5.2.10 – 5.2.13 are for the Chromalox Heater Controller Operation.

5.2.10 Press the Menu/Val push-button to slect “MENU” as indicated by the green light being illuminated above MENU on the “MENU/VAL” indicator.

5.2.11 Select Menu #1, as indicated by “1” in the lower window, by pressing the arrow push-buttons.

5.2.12 Press the Menu/Val push-button to select “VAL” as indicated by the green light being illuminated below VAL on the “MENU/VAL” indicator.

5.2.13 Adjust the heater setpoint, as indicated in the lower window, with the arrow push-buttons.

5.2.14 Adjust H-123, Chromalox Temperature Indicating Controller, located on Panel E, to the temperature desired for regenerative heat.

5.2.15 Place Heat System Control Disable/Enable Switch on Panel E in the “ENABLE” position.

5.2.16 Open ROV-119, B-122 Suct Isolation Valve, using handswitch located on Panel E.

5.2.17 Open ROV-118, B-122 Suct Isolation Valve, using handswitch located on Panel E.

5.2.18 Open ROV-126, Disch Isolation Valve, using handswitch located on Panel E.

5.2.19 Open ROV-124, Disch Isolation Valve, using handswitch located on Panel E.

5.2.20 Start Heat Systems Control Regenerative Heat System blower by pressing the blower “Start” push-button on Panel E.

5.2.21 Start Heat Systems Control Regenerative Heat System heater by pressing the heater “Start” push-button on Panel E.

5.2.22 Verify desired temperature (normally 300-350 degrees F) was attained by the regenerative sys.

5.3.0 SHUTDOWN

5.3.1 Stop Heat Systems Control Regenerative Heat System heater by pressing the heater "STOP" push-button on Panel E.

5.3.2 Stop Heat Systems Control Regenerative Heat System blower by pressing the blower "STOP" push-button on Panel E.

5.3.3 Close ROV-124, H-123 Disch Isolation Valve, using handswitch located on Panel E.

5.3.4 Close ROV-126, H-123 Disch Isolation Valve, using handswitch located on Panel E.

5.3.5 Close ROV-118, H-122 Suct Isolation Valve, using handswitch located on Panel E.

5.3.6 Close ROV-119, H-122 Suct Isolation Valve, using handswitch located on Panel E.

5.3.7 Place Heat System Control Disable/Enable Switch on Panel E in the "DISABLE" position.

NOTE
If the hydraulic system was operated to properly position PVC-110, TCV-107A, TCV-107B or PCV-115, shutdown the system per TD74-NTF-001, Section 5.2 NTE-HY-001.

6. NOTES

7. SAFETY PRECAUTIONS AND WARNING NOTES

7.1 ALL prerequisites shall be completed, if possible, prior to commencing a section of a procedure.

7.2 Any conflicts encountered during the performance of this procedure should be resolved prior to completion of the procedure.

7.3 Exercise caution in the vicinity of electrical equipment.

7.4 Exercise caution in the vicinity of rotating equipment and high temperature

systems.

7.5 **EMERGENCY** telephone numbers are as follows:

Ambulance	911
Medical Center	4-2390
Fire	117
Security	4-4357
Utilities	4-3919
Communication Repair	4-1771

8. APPENDICES, DATA, REPORTS, AND FORMS

None

9. RECORDS

None

10. TOOLS, EQUIPMENT, AND MATERIALS

None

11. PERSONNEL TRAINING AND CERTIFICATION

Training requirements for NTF personnel are outlined in OI TD74-NTF-001. Topics outlined address facility and drawing familiarity, operations with oversight by experienced operator, crane and forklift certifications. Other test specific requirements may also be on a case-by-case basis.

12. FLOW DIAGRAM

None