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NTO

G. R. Armstrong, 330
B. A. Bernstein, 310
W. E. Blevans, 330
E. H. Brooks, 200
C. R. Dippel, 340
R. B. Edmonson, 330
W. I. Edwards, 200
R. B. Glasscock, 308
D. Gray, 330
B. L. Haertjens, 200
W. R. Kazor, 308
S. N. Kemp, 341
W. J. Kurtz, 307
E. F. Lorman, 340
D. J. McCroskey, 340
W. R. Morris, 304
W. J. Morse, 312
P. E. Neal, 310
M. J. Neder, 330
D. Newby, 330
E. J. Ney, 200
R. J. Park, 330
I. L. Pfeifer, 200
A. J. Powell, 340
B. L. Rigney, 304
J. W. Sadler, 310
F. J. Sardinia, 330
H. G. Simens, 306
C. K. Soppet, 340
R. G. Staker, 341
W. F. Stuart, 330
A. J. Svasek, 330
A. M. Vetere, 340
W. D. Wayne, 307

WANL/Large

P. W. Davison
W. B. Henderson
F. W. Henning
J. R. Huber
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MASTER

NERVA TEST OPERATIONS

Nuclear Rocket Development Station

TO: Distribution

FROM: W. D. Wayne

SUBJECT: Semi-monthly Progress Report

DISTRIBUTION: Attached

DATE: February 7, 1968
NTO-M-20880
HNM:WDW:ch

Attached is the NTO Semi-monthly Progress Report for the period of January 16 through January 31, 1968. The inputs received here have, in some cases, been edited to eliminate redundant material.

W. D. Wayne
W. D. Wayne, Manager
NERVA Test Operations

Enclosure

NTO SEMI-MONTHLY PROGRESS REPORT

For the Period of January 16 through January 31, 1968

I. NTO PRODUCT ASSURANCE

A. ETS-1 Operations

1. Victaulic couplings are being removed from that portion of the fire protection system line that services valve pit Nos. 1 and 2. These couplings are being replaced with welded steel bands and each installation will be magnetic particle inspected.
2. Several leaks have been detected during the Test Stand Equipment Room inerting test. Primarily, leakage has been determined as issuing from those electrical harnesses that penetrate the deck to the test stand.
3. A torque check of the Steam Generator injector flange studs indicated that torque values of all studs were within the requirements of NRO specifications.
4. Product Assurance witnessed an attempt to perform a hydrostatic proof and leak test on the four duct vault pipe chase inerting bottles that were procured from Test Cell "A". Tests were terminated because the "Sprague" pump was inadequate to reach the required 5600 psi proof pressure.
5. Product Assurance has received approval from ETS-1 management on the approach to be used for lock and seal procedures. A lock and seal procedure should be ready for review by 5 February 1968.

B. MAD Operations

1. Performed an audit of all lifting equipment at E-MAD. All items that did not meet specification requirements were identified with a "HOLD" tag.

2. The XE-1 Continuous Reactor Purge system was inspected and 4 deviations from specification requirements were noted. These deviations are currently being dispositioned.
3. Inspection of the Actuator Checker High Pressure System was completed and 7 problems encountered during the inspection were identified on Discrepancy Reports. These Discrepancy Reports have either been dispositioned or are in the process of being dispositioned.

II. NTO SITE ENGINEERING

A. ETS-1

1. ETS-1 Supplementary Lighting - Engineering has been completed on the LH₂ Vaporizer lighting package. Technical Support is continuing to follow contractor installation of ETS-1 Supplementary Lighting package.
2. Electrical Power Distribution System - Installation of KVAR meters on Diesel Generator Control Panel is continuing. The NRO Short Circuit Study is being reviewed.
3. UTSN Heater (ECR 1082-616) - Design work has been initiated covering the installation of a 25 KW heater in the UTSN.
4. PCV-449 Hydraulic Pump - Initiated work on design of permanent installation of electrical power to PCV-449 Hydraulic Pump.
5. FEP-V Temporary Piping - The complete design package was released to ETS-1 for implementation. In the NTO review, it was determined that the venturi section was inadequate for both pressure and thermal load. A sliding sleeve was designed to carry the thermal bending stress. An Addendum to the design package was issued to cover the addition of a pressure relief valve.
6. Process Water Piping - Technical Support reviewed the planned modification for the underground 24", 20", and 14" water line

repair. Was recommended that the penetration of the line in the concrete wall be reworked to provide a soft filler around the line. It was also determined that special supports were not required in order to insure proper operation of the line.

7. Deluge System Nozzle Relocation - A Design package has been released covering the re-installation of the test stand heat shield.

B. Test Cell C

1. Test Cell C Scrubber - Design and follow up engineering has continued on the 2 lb/min. scrubber. The ETS-1 Scrubber mock-up hardware fabrication is approximately 90% complete.

C. E-MAD

1. Post Mortem Galley Service Hoist - A partial design package has been released covering long lead time items. Design is continuing on the remaining structural and electrical details. Technical support has been advised that funds are not available at this time for procurement of this hoist. The design package will be completed and retained for future use.
2. CSA Fixture Adapter - Stress analysis review was completed on the subject drawing and signed off for stress.

D. Counting Laboratory

1. Analysis of the NRX-A6 Dosimetry has been completed. The final Dosimetry Report is in preparation.
2. Discussions have continued with ETS-1 and E-MAD personnel concerning plans for dosimetry installation for XE-1.

E. Drafting

1. Completed

- a. ETS-1 FEP V Temporary Piping
 - b. ETS-1 E-1 Modification - Addendum 2
 - c. ETS-1 Deluge System Nozzle Relocation
 - d. ETS-1 Supplementary Lighting Plan
 - e. ETS-1 Altitude Simulation System Flow Diagram
 - f. E-MAD Nozzle Throat Plug Support
 - g. ETS-1 ATD Console, I&C
2. In Process
- a. E-MAD Post Mortem Gallery Service Hoist, 50%
 - b. ETS-1 Facilities Manual Illustrations, 70%
 - c. E-MAD Reactor Purge System, 75%
 - d. E-MAD Actuator Checker Piping, 75%
 - e. ETS-1 Test Stand Control Valve Hydraulic System, 90%
 - f. ETS-1 Process Gases and Cryogenic Flow Diagram, 75%

III. NTO HEALTH AND SAFETY

A. General

- 1. Data have been received from REECo which summarize the annual radiation exposures of all NTO personnel. The AEC report of radiation exposures for the year 1967 is being prepared for Westinghouse and Aerojet personnel.
- 2. One member of the NTO H&S staff terminated at the end of January. He will be replaced on February 12 by a professional safety engineer who will transfer to NRDS from AGC Sacramento.

B. E-MAD

1. Conducted monthly safety inspections of ETS-1 and E-MAD.
2. Consulted with E-MAD Engineering & Management relative to adding a permanent work platform on the bridge crane in the ETSMB.
3. Aided E-MAD management in resolving discrepancies appearing on previous safety inspections.

C. ETS-1

1. Meetings were held with NRO and SNPO-C personnel to review ETS-1 safety readiness for XECF. Action items were identified and assigned.
2. Continuing emphasis has been placed on cleaning up the general ETS-1 area. ETS-1 management is establishing special "clean-up times" to aid in solving the problem.

D. Test Cell "C"

A safety inspection was made of TCC by a committee of LASL-"user" personnel. A report of the inspection and action items was forwarded to NTO. On subsequent inspection NTO will participate in the test cell walk thru.

E. Criticality Control

1. Discussed preparations necessary at E-MAD for receipt of NRX-A6 fuel elements with E-MAD management. Lockable valves are being installed on water lines to the Disassembly Bay and the Post-op cells.
2. A fourth RIDL system for the neutron multiplication monitor was received and checked out. This provides a backup unit to the three units used for poison wire removal operations and can also be used as a data channel.

3. The XE-1 was rotated to the nozzle down position for UTSM installation. The neutron source and the "popper" detector were repositioned.
4. Checks of the NRX-A6 disassembly and Post-ops areas have revealed no violations of the NTO Criticality Manual.

IV. NTO DOCUMENTATION AND REPORTING

A. XECF

1. XECF-P16, "NTO Operating Procedure for XECF Pre-test Inspection and Checkout," was revised to clarify the steps to be followed during performance of the operation described by the procedure.
2. The XECF Pre-test Report was completed and submitted for approval.

B. XE-1

1. The XE-1 Continuous Purge Procedure, NTO-I-0403, was revised and presented to the TS&PRB for approval.
2. A recorder was provided to the XE-1 TS&PRB.

C. General

1. NTO-SOP-0099, "NTO Standard Operating Procedure for Pressurization of GHe High Pressure Vessels (V-3204, 5 & 6) at ETS-1 and Helium Storage Trailers 1-3," was published.
2. A recorder was provided to the NRX-A6 Phase III TS&PRB.

V. Test Cell "C"

1. A local test was performed on January 19 in which the turbine was powered from a gaseous nitrogen tube trailer supply under "no-load" conditions. The purpose of the test was to observe the behavior of the wide-band accelerometer mounted on the turbine case. During hydrogen tests, this accelerometer had been observed to exhibit sharp resonant peaks in the speed range from 15,000 to 25,000 rpm. It was hoped that by changing the sound velocity in the turbine drive fluid that these resonances could be identified

with mechanical vibration or acoustic phenomena within the turbine. A turbine flow rate of 7.5 lbs/sec was attained at a turbine speed of 22,500 rpm. The resonant peaks observed when the turbine was operated under load were not observed.

2. EP-II objectives were discussed with J- and N-Division personnel at Los Alamos. After a test of the turbines powered with gaseous nitrogen with the pump load attached to resolve the question described as an objective for the local test, a series of runs will be performed to evaluate the adequacy of the facility operated in several configurations to adequately protect the nozzle and the reactor in case of an emergency or planned shutdown from full power or intermediate power. For this test, the turbine control valve will be hydraulically limited in its speed of response. A 10-cubic foot gas accumulator will be used, and an attempt will be made to program the reactor and tie tube impedance valves by use of a real-time analog computer. The pump liquid hydrogen bypass valves will be velocity-limited electronically for some of the test runs. The consequences of failure modes involving several critical facility valves will be investigated.
3. A review of the adequacy of the Dewar 4 and 5 cooldown system to provide reactor coolant during the shutdown sequence was conducted with the result that a new flow element was specified for this system in order to remove impedance which was unduly limiting reactor flow rate.
4. A review of Laboratory acoustical studies was conducted at Los Alamos. Several suspected problem areas at Test Cell "C" were defined for more detailed study in preparation for the Phoebus-2A power run. A meeting was arranged with personnel from Marshall Space Flight Center and Douglas Aircraft Corporation to define an analytical approach which will lead to an identification of the magnitude of the sound pressure field and its predicted effect on structures at Test Cell "C".
5. An NRDS coordination meeting was held to review the status of all required work in preparation for EP-II

of the Phoebus-2 Shutdown Series. The results of this meeting indicated a need to reschedule EP-II to a tentative date of February 14. The principal problem area causing the schedule slip was the amount of welding required to install new check valves in the high pressure dewar and the mixing chamber lines, as well as the installation of a new liquid hydrogen flow venturi in the Dewar 4 and 5 line. The short supply of welders available at TCC precludes using two complete shifts to accomplish this work.

6. The emergency power modification was completed and tested except for the operation of the remote control capability which will be checked on January 31.
7. Phoebus-2A channel requests have been processed in J-17 and transmitted to EG&G so that channel engineering may begin.
8. A meeting was held at Marshall Space Flight Center to review the effects of the acoustic fields on the test facility during the Phoebus-2A power run. Data from the Phoebus-1B and NRX-A6 power runs were transmitted to the acoustics group. This group has indicated a willingness to predict the response of the critical structural components of TCC for the sound pressure level expected during the Phoebus-2A full power run.

VI. MAD OPERATIONS

A. Test Article

1. XECF
 - a. A re-checkout of engine valve response after new orifices were installed was satisfactorily completed.
 - b. A successful leak check of the ETC purge line was completed.
 - c. The installation of vibration test equipment and the successful completion of vibration testing was completed.
 - d. A cryo-shock test with LN₂ on the cooldown line and the propellant supply line was conducted.

- e. Side shield latch checkout and an investigation of minor leaks in S-1 Top Trough and in the latch actuation pneumatic cylinders was conducted.
- f. The setup preparation and a successful leak check of the XECF was completed per Procedure XECF-P16.
- g. Modification of the TEL closures was completed and proof tested for use on the XECF engine checkout.

2. XE-1

- a. Installation of the nozzle was completed on 25 January 1968 per Procedure XE-1-P5.
- b. The installation of the actuator checker gas supply system was completed.
- c. Fit and adjustments of the nozzle throat plug and the poison wire retention hardware was completed.
- d. The removal of the plastic poison wire retention plate and the installation of the central poison wire bales was completed per Procedure XE-1-P5.
- e. The installation of plumbing for the actuator drive gas manifold was completed.

3. NRX-A6

- a. The first section of the beryllium reflector upper half was removed, the remaining sections were separated and shipped to E-MAD.
- b. Side-by-side photographs were taken of elements and fillers and delivered for viewing.
- c. A special fuel element removal tool was designed and fabricated and was successful in removing bonded reactor fuel elements with an acceptable breakage level.

d. The following NRX-A6 work was continued at R-MAD and at E-MAD:

- 1) Beryllium inspection was performed.
- 2) Support block inspection, including BAT, was continued.
- 3) Examination and recording of nozzle braze patches was completed.
- 4) Hot end cluster hardware examinations were continued.
- 5) WIPE operations were initiated.
- 6) Operations on control drums were continued.
- 7) Core support plate disassembly was completed.
- 8) MULE operations were initiated.
- 9) Whole body ionization operations were initiated.
- 10) Examination of the core support ring and aft end support ring were completed.
- 11) Removal of the hardware from control drum #3 was completed.
- 12) Removal of fuel elements from the reactor core was continued.
- 13) Photography requirements of the upper center reflector portion were completed.
- 14) Removal of the external nozzle instrumentation was completed.
- 15) Initiated preparations for the reading of thermal capsules.
- 16) Continued removal and processing of the reactor elements.

- 17) Removal of seal segments from the reflector was completed.
- 18) Removal of the instrumentation on the simulated shield was continued.
- 19) Disassembly of the beryllium reflector segments, dye penetrant checking, visual and photographic examination was continued.
- 20) Disassembly operations of the nozzle, control drum #3, aft end support ring and "O" ring, simulated shield, drive shafts, miscellaneous AGC and WANL instrumentation and metallographic samples of the aft end locating ring and aft end support core were continued.
- 21) Approximately six hundred (600) elements have been removed from the reactor core. This includes partial, fueled and central elements.

4. RADA/WEMU

- a. RADA was transferred to the engine re-assembly stand in the Cold Bay to allow realignment of the lower line alignment clamps to fit the RADA configuration for recalibration of the UTSN/Shield nut tool for repair of a damaged Marman clamp and for 90° rotation of TEL Marman clamps.

B. Radiochemistry

1. Radiochemistry Laboratory work was completed on the following after NRX-A6 testing:
 - a. Elephant Gun cannisters.
 - b. Effluent particulates.
 - c. Reactor debris from disassembly operations.
 - d. FROG filter debris.
2. Radiochemistry Laboratory work was initiated in the following areas:

- a. Gross ion measurement on whole fuel elements.
 - b. Data reduction for all core disassembly operations.
 - c. Fuel element sectioning and dissolution for chemical analysis.
3. Irradiated fuel particles submitted by USNRDL are being analyzed for several fission products by both germanium detector gamma counting and by other chemical techniques as a part of an interlaboratory calibration program.

C. Facility Equipment and Systems

1. General

- a. The high pressure air system installation and testing was completed and checked out 15 January 1968. This high pressure air system was required for the operation of special tooling in the Hot Bay.
- b. Modifications to the Motor Control Center #9 were completed on 26 January 1968. Modifications were required for the acceptance of the FEPS Gross Gamma Scanner.
- c. Air sampling efforts in the controlled assembly area were continued in support of XE-1 assembly operations.

2. Cranes/Hoists/Manipulators

- a. Ultrasonic testing of all crane hooks in the E-MAD Facility was completed on 25 January 1968.

3. HVAC/PA/CCTV/Rad Safe

- a. Modifications of the CCTV system to permit installation of the rectilinear manipulator in the CDAE were completed on 26 January 1968.
- b. Modifications to upgrade the criticality alarm system were completed. Modifications included the installation of a separate power supply installation and automatic reset capabilities in case of general power failures.

- c. Assembly of the TV cameras and adjustable pedestals to be used for remote conoseal inspections and checkout of electrical connectors following remote electrical checkout of the engine in the Hot Bay was completed.

4. Postmortem-GSE

- a. The design for the CDAE/Cell No. 160 intercell gate drive modifications were completed for fabrication.
- b. The design of a postmortem cell HOCMTS car emergency removal fixture was completed.
- c. A modification of the HOCMTS car control system was completed to permit capability as a backup for the FMHS.
- d. The design was completed and fabrication was initiated for the AP-502, AP-504 and the AP-772 pressure transducer bombs for Postmortem Cell No. 168 at E-MAD.
- e. The designs for the AD-701, 702 and 703 linear variable differential transformer micrometer tests (LVDT) and for the AD 301 thru AD 306 lateral displacement micrometer test were continued.
- f. The design and fabrication of a mold die and wire conductor and a conductor mount and clamp was completed for the mercury electrical contactor.
- g. The fabrication, installation and checkout of a torsion balance for one (1) inch incremental weights was completed for Postmortem Cell No. 162.
- h. An element cross-cut fixture for metallography, radiochemistry and cup sectioning was received and checked out for use.
- i. Modifications to the Semkit vacuum potting fixture was continued. A new relief valve has been requisitioned and redesign effort to add adapter plates to cast mold for met mount casting in Cell No. 164 was continued.
- j. A modification was initiated to provide failsafe operation of the alignment fixtures during power or plant air losses.

D. Construction

1. Construction Items in Process

- a. The installation, checkout and final inspection of the Fire and Smoke Detection System were completed on 26 January 1968.

2. Construction Packages in Preparation

- a. Shielding Doors 122-1 and 122-2 modification package for door guides was completed. Tentative schedules are: contractor bid opening on 6 February 1968; estimated start date, 15 February 1968 and a completion date of 15 March 1968. Amendments to these dates are in process due to interference with the present disassembly schedule of NRX-A6.

VII ENGINE TEST OPERATIONS

A. NEP-He-I

Activities which are to be completed prior to the initiation of NEP-He-I were in progress, and included the following items.

1. LN₂ cryo-shock and leak tests of the facility cooldown supply line and main propellant supply line up to the engine shut-off valve were conducted on 18 January 1968. These tests were performed in accordance with procedure NTO-I-0399 to determine integrity of the cooldown and propellant supply lines with the XECF assembly installed in the test stand prior to conducting NEP-He-I. No leakage was observed with LN₂. With GHe, leakage was observed at valves in the cooldown line and suspected leakage from the engine valve actuation system could not be verified. Completion of the helium leak test on the facility and TSA piping will be accomplished during the next XECF engine leak test in accordance with procedure P-16.
2. The remaining portion of the XECF vibration test was completed 20 January 1968, in accordance with Change No. 4 to procedure NTO-I-0399. Large deflections were observed in the turbine inlet line at frequencies of 12 and 16.5 cps.

3. Reactivation of the Steam Generator System was continued and included completion of the electro-mechanical checkout tests and calibration of the NES duct transducers.
4. Instrumentation activities included the continuation of data system calibration and checkout in accordance with NTO-I-0340.
5. Installation of various ETC transducers and strain gauges (mounted on XECF) was in progress.
6. Facility Modifications

No. 38 - Post-ETC Checkout Punch List Mods.

a. No. 38.8 - H₂/O₂ Analyzer

A preliminary system leak check revealed two leaks which were repaired. A final system leak check will be performed when the ETC is again mated.

b. No. 38.9 - Linear Transducer Bracket Installation

The transducer adjustment was made which completed this modification on 17 January 1968.

No. 44 - ETC Purge Line

A 50 psig system leak check was accomplished, which completed this modification on 23 January 1968.

No. 114 - ETC Side Shield Latches

The ETC side shield latches were adjusted and checkout was conducted on 17 January 1968. During subsequent separation of the side shields, leakage was observed at several latch actuation cylinders. A final checkout will be conducted after repair of the actuation cylinders and following repair of the ETC top trough which leaked liquid eutectic alloy on 18 January 1968. See Modification No. 157 for details on the ETC top trough repair.

No. 124 - Steam Line

The remaining work to reduce shock loads in the steam line during startup of the Steam Generator was accomplished, which completed this modification on 24 January 1968.

1. A second leak test was initiated on the installed XECF assembly in accordance with procedure P-16 to verify system integrity following completion of the vibration tests. Checkout of the instrumentation system was continued.
2. Due to numerous discrepancies which have arisen, the setup and checkout of the data acquisition system in accordance with procedure NTO-I-340B has not progressed as rapidly as had been anticipated. These discrepancies included grounding problems, Digital Data System failures and miscellaneous channel problems. The grounding problems were not discovered in previous tests because the system was never loaded to capacity and patched simultaneously in all the various channel configurations.
3. Upon completion of the data acquisition system setup, a final system calibration will be performed and analyzed for channel integrity by the 3200 computer and the system will be ready for XECF tests.
4. Work was continued preparatory to pre-test checkout of the Test Stand and Engine Control System. Various discrepancies resulting from TSCS/ECS checkout tests were resolved.
5. Facility Modifications

No. 29 - Engine Shield Fill & Drain System

Preliminary checkout of the system disclosed a leak in the "jumper" piping. Trouble shooting and corrective action was in progress to verify system integrity.

No. 30 and No. 31 - Data Link System and Test Diagnostic Center (TDC)

Checkout tests were continued on the Test Diagnostic Center/Data Link System. Problems were still being experienced with the Data Link/Computer interface.

No. 95 - TSER Inerting System

The initial checkout of the Test Stand Equipment Room inerting system was conducted with GN₂ on 22 January 1968. As a result of this test, additional sealant was placed at the cable trays to reduce leakage of GN₂ through the room walls. A subsequent inerting test on 30 January 1968 completed this modification. The TSER was inerted to 3 1/2% oxygen concentration in 790 seconds (approx. 13 minutes).

No. 109 - Data Acquisition System

Installation and checkout of the remaining 25 pre-sampling 4 cps filters was completed 26 January 1968.

Another channelization digital tape is to be produced due to soft ware changes in the CDC 3200 computer channelization program. This modification will not constrain XECF testing since the system channelization was completed manually.

Checkout of the torque transducer mode cards was accomplished, which completed this modification on 26 January 1968.

No. 133 - V-5001 Area H₂ Flanges Manifold

Installation of the shrouds was completed and leak tests were initiated.

No. 136 - Fire Protection for Electrical Control Cabling

Installation of the remaining zipper tubing on the electrical control cabling above the ETC top shield completed this modification on 24 January 1968.

No. 139 - ETS-1 Fire Protection System Repair

The 14-inch, 18-inch, 20-inch and 24-inch diameter underground lines supplying water to the fire protection valve pits No. 1 & 2 were uncovered. Repairs were initiated and consisted of replacing the coupling joints with pipe sleeves to prevent failures experienced in the 24-inch diameter line.

No. 150 - Duct Vault and Pipe Chase
Inerting System

As a result of the full inert system checkout with GN_2 on 11 January 1968, additional system refinements were in progress to reduce leakage of inerting gas from the duct vault and pipe chase. Hydrostatic proof tests of the GN_2 storage vessels (V-3901 through V-3904) obtained from Test Cell "A" were initiated.

Documentation for XECF Cold Flow

The final issue of the XECF Test Operating Procedure for EP-I was prepared and is to be submitted to the TRB. The TOP for EP-II was revised and re-submitted for external review. The EP-III TOP was being revised to incorporate previous review comments. A proposed Modification No. 3 to the Test Specification was released for external review. A procedure was being prepared for post-test checkout of XECF at ETS-1.

Operator Training

Operator training conducted during this report period was directed primarily towards meeting XECF requirements. The majority of these requirements are completed except for simulator training.

C. FEP-V

1. Facility Modifications

No. 62 - Actuator Supply Cryo-Trap

A work order for installation of the cryo-trap will be prepared upon receipt of the necessary drawings from NRO.

No. 103 - Line 207-He-12 Supports

A work order package was submitted to SNPO-N for relocation of line 207-He-12 supports to permit the installation of the cryo-trap (Mod. No. 62).

No. 145 - NES Test Device

Since the work order package for modification of the NES test device to accommodate the requirements

for FEP-V was included in the Modification No. 154 work order package, this modification number was deleted on 29 January 1968.

No. 154 - XE-1 Cooldown Simulator System

The work order package for system installation was assigned to PAN AM and piping spool fabrication was initiated.

2. Documentation for FEP-V

Internal review of the FEP-V Test Description was continued. The RDR was prepared and submitted for internal review.

D. XE-1 Installation and Checkout

1. Facility Modifications

No. 27 - Relief Valves (Fluid Systems)

A relief valve from Test Cell "A" is being reworked to meet the required pressure relief setting for RV-2952 in the He cooldown system. Relief valves for the GN₂ engine disconnect and for the He purge are installed.

No. 35 - Valve and Power Failure Mods.

This modification provides backup actuation for critical components in the cooldown system. The mechanical and electrical portion of the pneumatic system are completed. Hardware fabrication was in progress for mechanically blocking the valves "open" in accordance with ECR 683-000.

No. 36 - Control Room Stereo

This modification consisting of dual channel console headsets, was completed 24 January 1968.

No. 38 - Post-ETC Checkout Punch List Mods.

a. 38.6 - EIV Wand

I&C system design was in progress in conjunction with Modification No. 144.

b. 38.10 - S-1/S-2 Limit Switch Pit Drains

The drain holes have been drilled through the concrete. Installation of the drain pipes is pending manpower availability.

c. 38.11 - Replace Damaged Expansion Joint

No activity for replacing expansion joints in the ETC water lines.

d. 38.12 - Repair S-2 Pylon Sheave Support

Design work is completed.

e. 38.14 - Setup and Checkout Duct & Shield Monitor

No activity.

No. 39.3 - TSCS Nozzle Torus Pressure Averager

This modification was deleted by ETO/NRO on 5 January 1968.

No. 52 - Facility Supplementary Lighting (Craft)

Installation of tunnel emergency lights and trenching for the "39" area lighting was initiated on 22 January 1968 to provide adequate night lighting.

No. 67 - BFV-666 Motorization

Circuitry design for control of the drive unit to permit remote operation of the 42 inch main water supply valve, BFV-666, is to be initiated. Installation of the drive unit will be after completion of XECF tests.

No. 112 - Facility Kitchen and Rest Room

The rest room modification was completed 24 January 1968. Work was in progress on the kitchen installation.

No. 144 - ETC Shield Park Limit/Torque

I&C system design per Functional Requirement NTO-FR-401 was continued to provide an inch mode of operation as the shields approach their parking stops. Limit switch operation is also to be improved.

No. 149 - S-3 Shield Test Position Stop Control

I&C system design per Functional Requirement NTO-FR-401 was continued to provide an inch mode of operation as the shield approaches the test position stops. Limit switch operation is also to be improved.

No. 151 - ETC Trough Steam Heater (Melt Eutectic)

The steam generator is available at ETS-1 and is mounted on a portable cart. No special effort is being expended for providing this auxiliary heating system as a backup for melting the eutectic alloy trough seals until after XECF cold flow tests are completed.

No. 159 - V-3801 and Area 32 Structural Supports

This is a facility requirement for AEC tests and does not constrain XE-1 tests. Contract award is expected by 13 February 1968.

No. 161 - Heat Shield Reinforcement

Installation of the modification was initiated 11 January 1968 by PAN AM.

No. 162 - NES Duct Demineralizer Flushing System

No scheduled activity.

2. Data System Accuracy Test No. 3

The detailed scope and schedule for this test have not been established. Previous Data System Accuracy Tests did not include the LVTD and Zero Suppression Systems.

3. Documentation

The XECF installation and checkout procedure P-16 will be upgraded to incorporate the nuclear aspects associated with XE-1 installation and checkout. Initiation of this task is pending completion of conducting P-16 on XECF.

E. XE-1 Test Program

1. Facility Modifications for EP-I

No. 39.4 TSCS Experimental Controls (Chassis #1)

The wiring is installed and the chassis is to be installed following completion of XECF cold flow.

No. 39.5 - TSCS - AC Power Rearrangement

The portion covering the signal conditioning racks is completed. Wiring of affected racks is to be resumed following completion of XECF cold flow tests.

No. 39.6 - TSCS Backup Power Supplies

Checkout tests were continued and are expected to be completed 1 February 1968.

No. 88 - ATD Console

The design work is completed and material is on-board. Installation of equipment will be initiated following completion of FEP-V.

No. 115 - LN₂ Vaporizer (Remote Control)

The mechanical and instrumentation installation is essentially completed. The remaining work consists of installing the control circuits for remote operation of the LN₂ vaporizer from the GFS console and conducting checkout tests.

No. 156 - Control Room TV Camera

Installation and checkout of the control room TV system for display of control room activities at the A&E Building was essentially completed except for relocation of the required camera from the duct vault to the control room.

2. Facility Modifications for EP-IV

No. 80 - Additional Gas Storage (GN₂ Trailers)

Completion of this modification is pending receipt and hookup of the GN₂ tank trailers. Two trailers are at ETS-1 but are not connected to the system.

No. 90 - Deluge/Decontamination Water Control
(Craft Labor)

The modification was completed with the exception of installing some asphalt curbing. The contractor is no longer able to perform and the remaining work is to be re-negotiated.

No. 91 - Surface Preparation

The treatment of various surfaces in the test stand area for ease of surface decontamination is completed except for painting of the duct vault door. The door will be painted by PAN AM at the earliest opportunity.

No. 93 - Decontamination and Facility Cooling
Water (Craft Labor)

The piping installation was continued and is approximately 85% completed to provide a water deluge system in the test stand and vault areas. A portion of the piping was hydrostatic tested on 26 January 1968. Delivery of the 12-inch and 14-inch valves has been delayed to 29 March 1968.

No. 146 - PCV-472 Mechanical Brake

No scheduled activity.

Facility Modifications for EP-V

No. 39.7 - TSCS - Experimental Controls
(Chassis #2)

No scheduled activity.

3. Documentation for XE-1 Test Program

Preparation of the Support Operations Requirement Document (SORD) for the scheduled EP's was temporarily halted due to other priority work. Preparation of the RDR was in progress.

F. Data Control

1. Computer Programs

Work was continued on programming of the CDC 3200 for Real Time data processing for

display in the ETS-1 Test Diagnostic Center and A&E Building visitor's room. This program is identified as NTO-10500 and is approximately 99% complete.

Work was continued on the new calibration program. For each digital data system channel, this program will provide the following data:

"Average" at 0, 25, 50, 75 and 100% steps.

"Slope" at 75% step.

"Noise" at 0% step.

"Non-Linearity" at 25, 50, 75 and 100% steps.

"Drift" based on difference between 0% step averages at two calibration files.

2. Data Handling

Preparation of computer operator instructions was continued. Program NTO-I-0021 (E.U.) is awaiting typing.

Preparations were continued for XECF and NEP-He-I data processing. Processing of data obtained during XECF Pre-Test Inspection (Procedure P-16) was in progress. Processing of the Duct Vault and Pipe Chase Inerting and LN₂ cryo-shock test data was completed.

Mod I of the valve inventory update program was checked and is ready for use.

Analysis on the channel engineering end item table computer update program was initiated.

G. Channel Engineering

The following items were published:
Issues No. 34, 35 and 36 of the Transducer Inventory.

As run issue of the XECF cryo-shock datalog.

Updated Unit List.

No. 157 - ETC Top Trough Repair

The necessary heating elements, water cooling tubes and eutectic alloy were removed from the S-1 and S-2 top troughs to permit repair of a failed coolant line plug in the bottom of the S-1 top trough and to accomplish a similar pre-failure repair on the S-2 top trough. The existing condition of the S-1 top trough permits leakage of molten eutectic alloy into the cavity between the trough bottom and the top of the S-1 side shield.

No. 158 - ETC Intermediate Shield Bellows Replacement

The aluminum bellows in the return line of the intermediate shield coolant water system are leaking. Leakage may be due to defective internal welds which join the bellows to the water line. Plans were underway to replace the bellows with aluminum pipe. Although this modification is required for XECF tests, it must be completed prior to closing of the ETC shields for NEP-He-I.

No. 160 - UTS GN₂ Purge Heater

The 25 KW electric heater was received and installation was initiated. Purpose of this modification is to maintain transducer temperatures within the UTS above 40 degrees F. to prevent erratic data recording. Capacity of the heat exchanger is 1 lb. GN₂ per second.

Documentation for NEP-He-I

Preparation of the Test Prediction Report was continued by NRO following submittal of ETO review comments. Final issue of the TOP (NTO-I-0416) was prepared but will not be issued pending further evaluation of test requirements. The dry run check list was prepared and is to be issued for internal review.

B. XECF Cold Flow

Included in the activities, which are to be completed prior to the initiation of XECF cold flow tests, were the following items.