

September 8, 1949

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Lab. - Phase I Part II

CC-NACA-4

EJT  
RCR  
RFC  
KAR  
WAB  
WLG-2  
RRB  
FN  
PJM  
JBM  
AAV-4  
KBH-3  
LHR-3  
KWB  
WGC-3  
RDK-3  
DRM  
FILES

Note: The Progress Report for August 15th was omitted as a result of conflicting Conferences, estimate preparation and vacation schedules.

I - OPERATIONS BUILDING

Contract awarded to Sam W. Emerson Company and construction has been started at the site. Some minor revisions on drawings for parking area drainage are being completed. Shop drawings for steel work have been checked and returned. Other shop drawings are expected in the immediate future.

II - ALTITUDE TEST CHAMBERS

Contract awarded to Treadwell Construction for principal work and materials are being procured. No major changes in design are evident.

Specifications along with drawing CE-104088 ready for release to Vendors for bids on thrust platform and linkages.

Thrust measurement diaphragms to be obtained separately by NACA.

III - SHOP AND ACCESS BUILDING

Principle work out to Vendors with bid opening scheduled for September 9th.

Other work associated with this building such as CO<sub>2</sub> system fuel piping, compressed air, instrumentation and cooling water are to be requirements of subsequent plans and specifications.

IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

a) Mechanical (CE-104500 to CE-104524)

The final design of first step of combustion air piping was agreed upon at Conference in Cleveland on August 25th. Information needed to complete first step is control valve details. NACA is waiting for revised proposals from Vendors. Air heaters and piping to and from same will be a part of second step construction.

|                                                                                     | <u>No. 19</u> | <u>No. 20</u> |
|-------------------------------------------------------------------------------------|---------------|---------------|
| 2301 - General Arrangement - Plan                                                   | 60%           | 60%           |
| 2302 - General Arrangement - Elevations                                             | 60            | 60            |
| 2303 - Flow Diagrams - Air and Gas Piping                                           | 70            | 75            |
| 2310 - Combustion Air Piping - Plan, Elevations and Details - Altitude Chamber Area | 50            | 70            |
| 2311 - Combustion Air Piping - Plan, Elevations and Details - Heater Area           | 20            | 30            |
| 2312 - Combustion Air Piping - Sections and Details                                 | 40            | 40            |
| 2313 - Combustion Air Piping - Sypports, Anchors and Miscellaneous Details          | 15            | 25            |
| 2314 - Valve and Expansion Joint Lists - Air and Gas Piping                         | 10            | 15            |
| 2315 - Control Piping - Plans, Elev. & Details                                      | 0             | 0             |
| 2316 - Control Piping - Sections and Details                                        | 0             | 0             |

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

Specifications for expansion joints which were reviewed at Conference in Cleveland on August 25th are being revised in line with NACA's comments and will be submitted to vendors for their comments.

Design of atmospheric exhaust stack was submitted to NACA for comments or approval on August 19th. Comments received. Ball bearing supports and vertical guide rollers are being investigated for offset sections of duct work in accordance with discussions at Conference at Cleveland on August 25th.

Information required to complete exhaust duct system is control valve information. NACA is waiting for revised proposals from vendors.

|                                                                      | <u>No. 19</u> | <u>No. 20</u> |
|----------------------------------------------------------------------|---------------|---------------|
| 4301 - Atmospheric Exhaust Stack                                     | 30%           | 40%           |
| 4302 - Atmospheric Exhaust Stack Details                             | 10            | 15            |
| 4303 - General Arrangement - End Anchor Sections and Roller Supports | 75            | 85            |
| 4304 - Tee and Pipe Sections, Plans, Elevations and Details          | 75            | 90            |
| 4305 - Transition Sections, Plan, Elev. & Details                    | 60            | 85            |

c) Structural Steel & Concrete Design (CE-104540 to CE-104549)

Drawing 4313 was eliminated and separate drawings were assigned to foundations for each, the secondary cooler, exhaust gas ducts, and combustion air piping and header trench. Percent indicated under No. 19 for drawing 4313 was recovered under No. 20 on drawings 4314, 4315 and 4316. Drawing 4314 (CE-104542) was completed and issued as a part of the contract for the Shop and Access Building.

|                                                                                                                | <u>No. 19</u> | <u>No. 20</u> |
|----------------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540 - (4310) - Walkways & Stairways - Test Chamber and Primary Coolers - Plans, Elevations, and Sections | 10%           | 70%           |
| CE-104541 - (4311) - Walkways & Stairways - Test Chamber & Primary Coolers - Sections and Details              | 0             | 0             |
| CE-104542 - (4314) - Secondary Cooler Foundation - Piling Plan Sections & Details                              | 20            | 95            |
| CE-104543 - (4315) - Trenches and Piping Foundation - Piling Plan, Sections & Details                          | 10            | 50            |
| CE-104544 - (4316) - Exhaust Piping and Stack Foundations - Piling Plan, Sections and Details                  | -             | 20            |
| CE-104545 - (4317) - Exhaust Piping and Stack Foundations - Sections and Details                               | -             | 0             |

d) Electrical (CE-104550 to CE-104557)

Work is continuing for the grounding system. Spare conduit system is being laid out to supply outdoor area lighting. Area lighting requirements are dependent upon final building, piping and walkway layouts.

|                                                                | <u>No. 19</u> | <u>No. 20</u> |
|----------------------------------------------------------------|---------------|---------------|
| 3301 - Outdoor Area Lighting and Receptacles Plans and Details | 0%            | 0%            |
| 3302 - Grounding System - Plans and Details                    | 0             | 10            |
| 3303 - Instrumentation & Controls - Plans & Details            | 0             | 0             |

V - COOLING TOWER AND CIRCULATING WATER SYSTEM  
(CE-104558 to CE-104609)

Pump house design is proceeding on the basis of additional pump information forwarded by NACA from Ingersoll-Rand.

Large anchor loads resulting from 48" supply and return main expansion joints have necessitated a study of another piping scheme employing offset bends. Anchor loads appear to be greatly reduced.

| a) <u>Mechanical</u> (CE-104558 to CE-104574)                          |  | <u>No. 19</u> | <u>No. 20</u> |
|------------------------------------------------------------------------|--|---------------|---------------|
| 2401 - Flow Sheet and Valve List                                       |  | 15%           | 35%           |
| 2402 - Location & Arrangement Plan - Pump House and Cooling Tower Area |  | 65            | 75            |
| 2403 - Location & Arrangement Plan - Equipment Area                    |  | 75            | 75            |
| 2404 - Pump House Piping - Plans, Sections and Details                 |  | 20            | 80            |
| 2405 - Details of Piping at Primary & Secondary Coolers                |  | 25            | 75            |
| 2406 - Details of Piping at Altitude Test Chambers                     |  | 20            | 85            |
| 2407 - Heating; Ventilating; and Details                               |  | 0             | 0             |
| 2408 - Water Treatment                                                 |  | 0             | 0             |
| 2409 - Water Treatment                                                 |  | 0             | 0             |

| b) <u>St. Steel &amp; Concrete</u> (CE-104575 to CE-104594)                   |  |     |     |
|-------------------------------------------------------------------------------|--|-----|-----|
| CE-104575 - (4401) - Cooling Tower Foundations Plans Sections & Details       |  | 100 | 100 |
| CE-104576 - (4402) - Pump House Foundations & Inlet Chamber - Plans & Details |  | 10  | 10  |
| 4403 - Pump House and Inlet Chamber - Arch. Plans and Details                 |  | 20  | 65  |
| 4404 - Pump House & Inlet Chamber - Arch. Sections and Details                |  | 20  | 20  |
| 4405 - Pump House - Strl. Steel and Details                                   |  | 10  | 10  |
| 4406 - Circulating Water Pipe Supports & Manholes                             |  | 0   | 10  |
| 4407 - Details of Manholes and Supports                                       |  | 0   | 0   |
| 4408 - Water Treating Building                                                |  | 0   | 0   |
| 4409 - Water Treating Building                                                |  | 0   | 0   |

c) Electrical (CE-104594 to CE-104609)

Work is continuing on C. W. Pump House, Cooling Tower and Substation "C". Require information requested in Conference No. 25, items K-1a to K-1d. Specification for switchgear and transformers in preparation.

|                                                                                | <u>No. 19</u> | <u>No. 20</u> |
|--------------------------------------------------------------------------------|---------------|---------------|
| 3401 - C.W. Pump House - Lighting, Grounding & Concealed Conduit Plan          | 0             | 80            |
| 3402 - C.W. Pump House - One Line Diagram Swgr. & Transformer Arrangement Plan | 10            | 50            |
| 3403 - C.W. Pump House - Equipment, Grounding, Conduit Plan and Details        | 0             | 0             |
| 3404 - Cooling Tower - Lighting Plan & Details                                 | 0             | 10            |
| 3405 - Cooling Tower - Conduit & Grounding Plans, Dets.                        | 0             | 10            |
| 3406 - Power Ducts & Manhole Details                                           | 0             | 10            |
| 3407 - Substation "C" Arrangement Plan and Sections                            | 0             | 0             |

# VI - FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

Piping around tanks and L.P. Pump House area and lines to H.P. Pump House have been completed except for details.

Comments on Fuel Flow sheet and H.P. Pump House drawing have not yet been received from NACA but work is proceeding on L.P. Pump House which has NACA's approval.

Information on H.P. Pumps has not been received from Mr. Jaworowski and work is being held up on these specifications pending his letter. Heads and capacities have been calculated for all low pressure pumps for this specification.

Information is required on metering station - i.e., type of meters, manufacturers, etc., before high pressure piping can be run.

## a) Mechanical (CE-104610 to CE-104639)

|                                                                           | <u>No. 19</u> | <u>No. 20</u> |
|---------------------------------------------------------------------------|---------------|---------------|
| 2501 - Flow Sheet and Valve List - HP & LP Systems                        | 35%           | 35%           |
| 2502 - Location & Arrangement Plan Storage & LP Pump House Area           | 35            | 75            |
| 2503 - Location & Arrangement Plan Altitude Chamber and H.P. Pumping Area | 5             | 5             |
| 2504 - Details of Piping in L.P. Pump House                               | 60            | 70            |
| 2505 - Details of Piping in H.P. Pump House                               | 0             | 50            |
| 2506 - Details of Piping - Metering Station and Altitude Chamber          | 0             | 0             |
| 2510 - Heating and Vent. Details                                          | 0             | 0             |
| 2513 - Fire Protection System(CO <sub>2</sub> )                           | 0             | 0             |
| 2514 - Fire Protection System(CO <sub>2</sub> )                           | 0             | 0             |

## b) St. Steel & Conc. (CE-104640 to CE-104654)

|                                                               |    |    |
|---------------------------------------------------------------|----|----|
| 4501 - Fuel Storage Tank Found. - Plans, Sections and Details | 60 | 65 |
| 4502 - L.P. Pump House - Plan Sections & Details              | 0  | 0  |
| 4503 - L.P. Pump House - Plan Sections & Details              | 0  | 0  |
| 4504 - H.P. Pump House - Plan Sections & Details              | 0  | 5  |
| 4506 - Fuel Distribution System - Manholes Details, Etc.      | 0  | 0  |

## c) Electrical (CE-104655 to CE-104669)

Work is continuing on L.P. Fuel Pump House and H.P. Fuel Pump House. Require information requested in Conference Notes No. 25, items K-2 to K-4 inclusive, and item K-8.

|                                                                              | <u>No. 19</u> | <u>No. 20</u> |
|------------------------------------------------------------------------------|---------------|---------------|
| 3501 - L.P. Fuel Pump House - Lighting, Grounding and Concealed Conduit Plan | 0             | 25%           |

Electrical (CE-104655 to CE-104669) Continued

|                                                                                 | <u>No. 19</u> | <u>No. 20</u> |
|---------------------------------------------------------------------------------|---------------|---------------|
| 3502 - L.P. Fuel Pump House - Equipment, Grounding<br>Conduit Plan and Details  | 0             | 0             |
| 3503 - Fuel Storage Area - Grounding, Outdoor Light-<br>ing and Conduit Plan    | 0             | 0             |
| 3504 - H.P. Fuel Pump House - Lighting, Grounding<br>and Concealed Conduit Plan | 0             | 40            |
| 3505 - H.P. Fuel Pump House - Equipment, Grounding<br>Conduit Plan and Details  | 0             | 0             |
| 3506 - Telephone and Intercommunication Ducts<br>and Manhole Details            | 0             | 0             |

VII - ELECTRICAL SUBSTATIONS (No numbers assigned by NACA)

When information requested in Conference No. 25 items K-5 to K-7 inclusive is received final drawing assignments will be made. Tentatively the following drawings are contemplated.

a) Electrical

- 3601 - Substations "A, B and G" One Line Diagrams
- 3602 - Substations "A, and B" Changes - Plan
- 3603 - Substations "A and B" Changes - Sections
- 3604 - Substation "G" Changes - Plan
- 3605 - Substation "G" Changes - Sections
- 3606 - Substation "G" Additions - Plan
- 3607 - Substation "G" Additions - Sections
- 3608 - Substation "G" Additions - Details
- 3609 - Substation "G" Conduit Plan and Details
- 3610 - Power (34.5 KV) Duct and Manhole Details

VIII - EQUIPMENT BUILDING

Studies of arrangement for compressors and exhausters were discussed at Conference in Cleveland on August 26th. Preliminary drawings of exhausters were received from Roots-Connersville Corp. on August 25th. These drawings not suitable for final design layouts. No drawings have been received from Elliott Company for compressors.

Proposals for combustion air inter and after coolers, and exhauster intercoolers are being reviewed by NACA. Air heater specifications have been prepared by NACA. NACA to furnish information on primary air cooler and drier in accordance with discussions in Cleveland on August 26th.

Tentative layouts are being made to determine size of Equipment Building.

IX - COMPLETION PROCESS

Based on the status of the work as of September 1st, 1949, we believe that the following percentages may be considered as reasonably accurate for engineering and design completion.

|                                             | <u>August 1st</u> | <u>September 1st</u> |
|---------------------------------------------|-------------------|----------------------|
| 1. Operations Building                      | 96%               | 97%                  |
| 2. Altitude Test Chambers                   | 95                | 96                   |
| 3. Shop and Access Building                 | 93                | 93                   |
| 4. Test Air Piping (1st Step)               | 40                | 52                   |
| 5. Cooling Tower & Circulating Water System | 30                | 40                   |
| 6. Fuel Storage and Distribution System     | 18                | 24                   |
| 7. Electrical Substations                   | 4                 | 5                    |
| 8. Equipment Building and Equipment         | 2-1/2             | 4                    |

DRMcConathy/KBH/LHR/RDK/WGC/id

*DRMcConathy*

September 20, 1949

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Laboratory - Phase I Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

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PJM  
JBM  
AAV-4  
KBH-3  
LHR-3  
KWB  
WGC-3  
RDK-3  
DRM  
FILES

### I - OPERATIONS BUILDING

Revised contours to indicate cut and fill for grading. Checked vendors' drawings on reinforcing steel and on cut stone work.

### II - ALTITUDE TEST CHAMBERS

Approved Treadwell's proposed construction for front access door. Revised reinforcing for openings in Exhaust Section. Awaiting comments from NACA on strengthening pressure diaphragm.

Redesigned thrust arm on thrust platform and now await comments from NACA.

### III - SHOP AND ACCESS BUILDING

Revisions made to incorporate minor changes to plumbing and ventilating.

Contract awarded to Sam W. Emerson Company. Checked vendor's drawings on structural steel.

Other work associated with this building such as CO<sub>2</sub> system fuel piping, compressed air, instrumentation and cooling water are to be requirements of subsequent plans and specifications.

IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

a) Mechanical (CE-104500 to CE-104524)

Work is being continued to complete the First Step of combustion air piping. Information needed from NACA is control valve details. NACA has received revised proposals for these.

Burns and Roe are preparing specifications for expansion joints for combustion air piping (First Step only) and will submit same to vendors for comments within the next week. Information is being obtained from vendors for valves and orifice fittings so that specifications for same can be written.

|                                                                                         | <u>No. 20</u> | <u>No. 21</u> |
|-----------------------------------------------------------------------------------------|---------------|---------------|
| 2301 - General Arrangement - Plan - Step 1 and 2                                        | 60%           | 60%           |
| 2302 - General Arrangement - Elevations<br>Step 1 and 2                                 | 60            | 60            |
| 2303 - Flow Diagrams - Air and Gas Piping<br>Step 1 and 2                               | 75            | 75            |
| 2310 - Combustion Air Piping - Plan, Elev.<br>and Details - Altitude Chamber First Step | 70            | 75            |
| 2311 - Combustion Air Piping - Plan, Elev.<br>and Details - Heater Area - Second Step   | 30            | 30            |
| 2312 - Combustion Air Piping - Sections & Details<br>Second Step                        | 40            | 40            |
| 2313 - Combustion Air Piping - Supports, Anchors<br>and Misc. Details - First Step      | 25            | 30            |
| 2314 - Valve & Expansion Joint Lists - Combustion<br>Air Piping - Step 1 and 2          | 15            | 20            |
| 2315 - Control Piping - Plans, Elev & Details<br>Step 1 and 2                           | 0             | 0             |
| 2316 - Control Piping - Sections And Details<br>Step 1 and 2                            | 0             | 0             |

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

Specifications for expansion joints were submitted to vendors for their comments on September 14th.

Ball bearing supports and vertical guide rollers will be used for offset sections of duct work, and details are being made.

Final drawings for atmospheric exhaust stack are being made in accordance with comments received.

Information required to complete exhaust duct system is for control valves. NACA has received revised proposals for these.

✓ Drawings and specifications for steel ducts to NACA for comments or approval by September 23, 1949.

|                                                                         | <u>No. 20</u> | <u>No. 21</u> |
|-------------------------------------------------------------------------|---------------|---------------|
| 4310 - Atmospheric Exhaust Stack                                        | 40%           | 50%           |
| 4302 - Atmospheric Exhaust Stack Details                                | 15            | 30            |
| 4303 - General Arrangement - End Anchor<br>Sections and Roller Supports | 85            | 90            |
| 4304 - Tee and Pipe Sections, Plans, Elevations<br>and Details          | 90            | 90            |
| 4305 - Transition Sections, Plan, Elev. & Details                       | 85            | 90            |

c) Structural Steel & Concrete Design (CE-104540 to CE-104549)

|                                                                                                             | <u>No. 20</u> | <u>No. 21</u> |
|-------------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540 - (4310) - Walkways & Stairways - Test Chamber<br>and Primary Coolers, Elevations<br>and Sections | 70%           | 80%           |
| CE-104541 - (4311) - Walkways & Stairways - Test Chamber<br>& Primary Coolers - Sections and<br>Details     | 0             | 10            |
| CE-104542 - (4314) - Secondary Cooler Foundation - Piling<br>Plan Sections and Details                      | 95            | 95            |
| CE-104543 - (4315) - Trenches and Piping Foundations<br>Piling Plan, Sections & Details                     | 50            | 70            |
| CE-104544 - (4316) - Exhaust Piping and Stack Founda-<br>tions - Piling Plan, Sections and<br>Details       | 20            | 60            |
| CE-104545 - (4317) - Exhaust Piping and Stack Founda-<br>tions - Sections and Details                       | 0             | 10            |

d) Electrical (CE-104550 to CE-104557)

Work is continuing for the grounding system. Spare conduit system is being laid out to supply outdoor area lighting. Area lighting requirements are dependent upon final building, piping and walkway layouts.

|                                                                   | <u>No. 20</u> | <u>No. 21</u> |
|-------------------------------------------------------------------|---------------|---------------|
| 3301 - Outdoor Area Lighting and Receptacles<br>Plans and Details | 0%            | 0%            |
| 3302 - Grounding System - Plans and Details                       | 10            | 10            |
| 3303 - Instrumentation & Controls - Plans<br>and Details          | 0             | 0             |

V - COOLING TOWER & CIRC. WATER SYSTEM (CE-104558 to CE-104609)

Circulating Water lines have been redesigned to permit expansion without excess anchor loads. Piping drawings are being forwarded to NACA 9/20/49 for review prior to issuance for bids. Flow sheet to follow.

Water treating system is being studied.

a) Mechanical (CE-104558 to CE-104574)

|                                                                        |     |     |
|------------------------------------------------------------------------|-----|-----|
| CE-104558 - 2401 - Flow Sheet and Valve List                           | 35% | 35% |
| CE-104559 - 2402 - Location and Arrangement Plan<br>Pump House         | 75  | 80  |
| CE-104560 - 2403 - Location & Arrangement Plan -<br>Equipment Area     | 75  | 75  |
| CE-104561 - 2404 - Pump House Piping - Plans, Sections<br>and Details  | 80  | 80  |
| CE-104562 - 2405 - Details of Piping at Primary &<br>Secondary Coolers | 75  | 75  |
| CE-104563 - 2406 - Details of Piping at Altitude<br>Test Chambers      | 85  | 90  |
| CE-104570 - 2407 - Heating, Ventilating and Details                    | 0   | 15  |
| CE-104572 - 2408 - Water Treatment                                     | 0   | 0   |
| CE-104573 - 2409 - Water Treatment                                     | 0   | 0   |

b) St. Steel & Concrete (CE-104575 to CE-104594)

|                                                                                   |     |     |
|-----------------------------------------------------------------------------------|-----|-----|
| CE-104575 - (4401) - Cooling Tower Foundations Plans<br>Sections & Details        | 100 | 100 |
| CE-104576 - (4402) - Pump House Foundations and<br>Inlet Chamber - Plan & Details | 10  | 15  |
| 4403 - Pump House and Inlet Chamber - Arch. Plans<br>and Details                  | 65  | 90  |
| 4404 - Pump House & Inlet Chamber - Arch. Sections<br>and Details                 | 20  | 75  |
| 4405 - Pump House - Strl. Steel and Details                                       | 10  | 10  |
| 4406 - Circulating Water Pipe Supports & Manholes                                 | 10  | 10  |
| 4407 - Details of Manholes and Supports                                           | 0   | 0   |
| 4408 - Water Treating Building                                                    | 0   | 0   |
| 4409 - Water Treating Building                                                    | 0   | 0   |

c) Electrical (CE-104594 to CE-104609)

Work is continuing on Circulating Water Pump House, Cooling Tower and Substation "C". Require information requested in Conference No. 25 - Items K-1a to K-1d. Specification for switchgear and transformers in draft for NACA review.

|                                                                                     | No. 20 | No. 21 |
|-------------------------------------------------------------------------------------|--------|--------|
| 3401 - C.W. Pump House - Lighting, Grounding &<br>Concealed Conduit Plan            | 80%    | 90%    |
| 3402 - C.W. Pump House - One Line Diagram Swgr.<br>and Transformer Arrangement Plan | 50     | 50     |
| 3403 - C.W. Pump House - Equipment, Grounding,<br>Conduit Plan and Details          | 0      | 10     |
| 3404 - Cooling Tower - Lighting Plan and Details                                    | 10     | 40     |
| 3405 - Cooling Tower - Conduit & Grounding Plans<br>and Details                     | 10     | 10     |
| 3406 - Power Ducts & Manhole Details                                                | 10     | 40     |
| 3407 - Substation "C" Arrangement Plan & Sections                                   | 0      | 0      |

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10-7-49-91  
to be prepared for  
removal of items

VI - FUEL STORAGE & DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

Specification is being written for all gasoline pumps.

Pressure control system has been discussed with vendors for information necessary for preparation of specification.

Duel flow sheet is being laid out on cloth according to NACA comments.

| a) <u>Mechanical</u> (CE-104610 to CE-104639)                                           |  | <u>No. 20</u> | <u>No. 21</u> |
|-----------------------------------------------------------------------------------------|--|---------------|---------------|
| CE-104610 - 2501 - Flow Sheet and Valve List<br>HP and LP Systems                       |  | 35%           | 35%           |
| CE-104611 - 2502 - Location & Arrangement Plan<br>Storage & LP Pump House Area          |  | 75            | 85            |
| CE-104612 - 2503 - Location & Arrangement Plan<br>Altitude Chamber & HP Pumping<br>Area |  | 5             | 5             |
| CE-104613 - 2504 - Details of Piping in LP Pump<br>House                                |  | 70            | 70            |
| CE-104614 - 2505 - Details of Piping in HP Pump<br>House                                |  | 50            | 50            |
| CE-104615 - 2506 - Details of Piping - Metering<br>Station & Altitude Chamber           |  | 0             | 0             |
| CE-104619 - 2510 - Heating and Vent. Details                                            |  | 0             | 0             |
| CE-104622 - 2513 - Fire Protection System (CO <sub>2</sub> )                            |  | 0             | 0             |
| 2514 - Fire Protection System (CO <sub>2</sub> )                                        |  | 0             | 0             |

b) St. Steel& Conc. (CE-104640 to CE-104654)

|                                                                      |    |    |
|----------------------------------------------------------------------|----|----|
| 4501 - Fuel Storage Tank Foundations - Plans<br>Sections and Details | 65 | 65 |
| 4502 - LP Pump House - Plan Sections & Details                       | 0  | 0  |
| 4503 - LP Pump House - Plan Sections & Details                       | 0  | 0  |
| 4504 - HP Pump House - Plan Sections & Details                       | 5  | 5  |
| 4506 - Fuel Distribution System - Manholes<br>Details, Etc.          | 0  | 0  |

c) Electrical (CE-104655 to CE-104669)

Work is continuing on L.P. Fuel Pump House and H. P. Fuel Pump House. Require information requested in Conference Notes 25 Items K-2 to K-4 inclusive, and item K-8.

|                                                                               | <u>No. 20</u> | <u>No. 21</u> |
|-------------------------------------------------------------------------------|---------------|---------------|
| 3501 - LP Fuel Pump House - Lighting, Grounding<br>and Concealed Conduit Plan | 25%           | 50%           |
| 3502 - LP Fuel Pump House - Equipment,<br>Grounding Conduit Plan and Details  | 0             | 0             |
| 3503 - Fuel Storage Area - Grounding, Outdoor<br>Lighting and Conduit Plan    | 0             | 0             |
| 3504 - HP Fuel Pump House - Lighting, Grounding<br>and Concealed Conduit Plan | 40            | 50            |

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c) Electrical (GE-104655 to GE-104669 Continued

|                                                                              | <u>No. 20</u> | <u>No. 21</u> |
|------------------------------------------------------------------------------|---------------|---------------|
| 3505 - HP Fuel Pump House - Equipment, Grounding<br>Conduit Plan and Details | 0             | 0             |
| 3506 - Telephone and Intercommunication Ducts<br>and Manhole Details         | 0             | 0             |

VII - ELECTRICAL SUBSTATIONS (No numbers assigned by NACA)

When information requested in Conference No. 25 items K-5 to K-7 inclusive is received final drawing assignments will be made. Tentatively the following drawings are contemplated.

a) Electrical

- 3601 - Substations "A, B and G" - One Line Diagrams
- 3602 - Substations "A, and B" - Changes - Plan
- 3603 - Substations "A and B" Changes - Sections
- 3604 - Substations "G" Changes - Plan
- 3605 - Substation "G" Changes - Sections
- 3606 - Substation "G" Additions - Plan
- 3607 - Substation "G" Additions - Sections
- 3608 - Substation "G" Additions - Details
- 3609 - Substation "G" Conduit Plan and Details
- 3610 - Power (34.5 KV) Duct and Manhole Details

VIII - EQUIPMENT BUILDING

Preliminary drawings of exhausters received from Roots-Connersville Corporation have been reviewed and comments sent to NACA on September 2.

*Sent to RAR*  
No drawings have been received from Elliott Company for compressors. These, as well as drawings for air and gas coolers are needed to carry on our studies for equipment building layout.

NACA to furnish information on air heaters, primary air cooler and drier as soon as possible.

Burns and Roe are obtaining information from vendors for valves and expansion joints for the compressor and exhauster piping system in the Equipment Building.

In the meantime, tentative layouts for the Equipment Building are being made with the information at hand.

DRMcConathy/KBH/LHR/RDK/WGC/ld

*DRMcConathy*  
*per id*

*Most of this info  
already sent to Dr. R. N. S. J. H.*

PROGRESS REPORT NO. 22

October 6, 1949 19139

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Laboratory - Phase I Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

CC-NACA-4  
EJT  
RCR  
RFC  
KAR  
WLG-2  
RRB  
FN  
JBM  
PJM  
AAV-4  
KBH-3  
LHR-3  
RDK  
KWB-3  
WGC-3  
DRM  
FILES

I - OPERATIONS BUILDING

Revisions are being made on drawings and specifications to include:

- a) Rerouting of storm sewer line to new head wall.
- b) Addition of parking area and curb drainage system. Change Order to be issued shortly for release to Contractor.

II - ALTITUDE TEST CHAMBERS

- a) Redesign (new drawing) of water cooled bulkhead changing size of opening from 4'-0" diameter to 6'-0" diameter.
- b) Design changes discussed with Treadwell at Midland, Pa. to permit fabrication to proceed.
- c) Awaiting on NACA for final comments on thrust platform drawing before release for bid.

III - SHOP AND ACCESS BUILDING

- a) Revisions to incorporate changes in:
  - 1. Building water lines - rerouting overhead.
  - 2. Building fire lines - rerouting overhead.
  - 3. Plumbing system - separation of F.O. and leaders with valves.
  - 4. Manhole locations and curb elevations.
  - 5. Miscellaneous details as requested.

- b) Amending specification to include walkways and roadway as part of Building Contract.
- c) Revision of primary cooler foundations to eliminate approximately 40% of anchor bolts.
- d) The control panels can not be designed until the control system valves are purchased and other instruments from fuel and water systems are established.
- e) Other work associated with this Building such as CO<sub>2</sub> system, fuel piping, compressed air, instrumentation piping and cooling water are to be requirements of subsequent plans and specifications.

#### IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

##### a) Mechanical (CE-104500 to CE-104524)

Specifications for purchase of the following equipment are being issued to NACA as indicated:

1. Combustion Air Gate Valves - October 7th.
2. Combustion Air Butterfly Valves - October 7th.
3. Orifice and metering - tentatively October 11th (Depends on information from manufacturers).
4. Combustion air Expansion Joints - October 7th or early the next week.

Specifications and drawings for combustion air system to be issued for final approval on October 7th.

Require information from NACA on control valves.

|                                                                                                         | <u>No. 21</u> | <u>No. 22</u> |
|---------------------------------------------------------------------------------------------------------|---------------|---------------|
| * CE-104500 (2303) Flow Diagrams - Air and Gas Piping Stel 1 and 2                                      | 75%           | 80%           |
| * CE-104501 (2301) General Arrangement - Plan Step 1 and 2                                              | 60            | 65            |
| * CE-104502 (2302) General Arrangement - Elevations Step 1 and 2                                        | 60            | 65            |
| **CE-104503 (2310) Combustion Air Piping - Plan, Elev. and Details - Altitude Chamber Area - First Step | 75            | 85            |
| **CE-104506 (2313) Combustion Air Piping - Supports, Anchors and Misc. Details 1st Step                 | 30            | 85            |
| **CE-104507 (2314) Expansion Joint List - Air & Gas Piping                                              | 20            | 25            |
| **CE-104508 (2315) Valve List - Air & Gas Piping                                                        | 0             | 5             |
| CE-104504 (2311) Combustion Air Piping, Plan, Elev. and Details - Heater Area                           | 30            | 30            |

|                                                                                    | <u>No. 21</u> | <u>No. 22</u> |
|------------------------------------------------------------------------------------|---------------|---------------|
| CE-104505 (2312) Combustion Air Piping - Section and Details - Heater Area         | 40%           | 40%           |
| CE-104509 (2316) Control Piping, Plans, Elevations and Details, Step 1 and 2       | 0             | 0             |
| CE-104510 (2317) Control Piping, Sections and Details - Step 1 and 2               | 0             | 0             |
| CE-104511 (2318) Combustion Air Piping- Arrangement of Control Valves - First Step | 0             | 0             |
| CE-104512 (2319) Combustion Air Piping - Details of Supports at Control Valves     | 0             | 0             |

\* Reference drawings for Combustion Air Piping Contract.

\*\* Contract drawings for Combustion Air Piping Contract.

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

Drawings and specifications for steel ducts were issued to NACA for comments or approval September 29, 1949.

Final specifications for Expansion Joints were issued to NACA October 3, 1949.

Atmosphere exhaust stack will be included as a part of the general building contract. Draft of specifications and drawings will be sent to NACA for comments on or about October 14th.

Information needed from NACA for exhaust control valves to determine supports and connection to gas ducts.

|                                                                                  | <u>No. 21</u> | <u>No. 22</u> |
|----------------------------------------------------------------------------------|---------------|---------------|
| CE-104525 (4310) - Atmospheric Exhaust Stack                                     | 50%           | 70%           |
| CE-104526 (4302) - Atmospheric Exhaust Stack Details                             | 30            | 40            |
| CE-104527 (4303) - General Arrangement - End Anchor Sections and Roller Supports | 90            | 95            |
| CE-104528 (4304) - Tee and Pipe Sections, Plans, Elevations and Details          | 90            | 95            |
| CE-104529 (4305) - Transition Sections, Plan, Elevations and Details             | 90            | 95            |

c) Struct. Steel & Conc. Design (CE-104540 to CE104549)

|                                                                                                       | <u>No. 21</u> | <u>No. 22</u> |
|-------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540 - (4310) - Walkways & Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80%           | 80%           |
| CE-104541 - (4311) - Walkways & Stairways - Test Chamber & Primary Coolers - Sections and Details     | 10            | 75            |
| CE-104542 - (4314) - Secondary Cooler Foundation - Piling Plan Sections & Details                     | 95            | 100           |
| CE-104543 - (4315) - Trenches and Piping Foundations Piling Plan, Sections & Details                  | 70            | 85            |
| CE-104544 - (4316) - Exhaust Piping & Stack Foundations - Piling Plan, Sections & Details             | 60            | 70            |

c) Struct Stl & Conc. Design (CE-104540 to CE-104549) Continued

|                                                                                | <u>No. 21</u> | <u>No. 22</u> |
|--------------------------------------------------------------------------------|---------------|---------------|
| CE-104545 - (4317) - Exhaust Piping and Stack Foundations - Sections & Details | 10            | 65            |

d) Electrical (CE-104550 to CE-104557)

Work is continuing for the grounding system. Spare conduit system is being laid out to supply outdoor area lighting. Area lighting requirements are dependent upon final building, piping and walkway layouts.

|                                                                | <u>No. 21</u> | <u>No. 22</u> |
|----------------------------------------------------------------|---------------|---------------|
| 3301 - Outdoor Area Lighting and Receptacles Plans and Details | 0%            | 10%           |
| 3302 - Grounding System - Plans and Details                    | 10            | 50            |
| 3303 - Instrumentation & Controls - Plans and Details          | 0             | 0             |

V - COOLING TOWER AND CIRCULATING WATER SYSTEM (CE-104558 to CE-104609)

Pump foundation design is awaiting final "certified" drawings from the manufacturer.

Final design of main circulating water lines is now being put on tracings.

Natural gas line from Walcott Road to Equipment Building will be included in this Contract to conserve on excavation work.

Specification for Circulating Water Piping System will be forwarded October 10, 1949.

a) Mechanical (CE-104558 to CE-104574)

|                                                                     | <u>No. 21</u> | <u>No. 22</u> |
|---------------------------------------------------------------------|---------------|---------------|
| CE-104558 - 2401 - Flow Sheet and Valve List                        | 35%           | 35%           |
| CE-104559 - 2402 - Location and Arrangement Plan Pump House Area    | 80            | 80            |
| CE-104560 - 2403 - Location & Arrangement Plan - Equipment Area     | 75            | 80            |
| CE-104561 - 2404 - Pump House Piping - Plans, Sections and Details  | 80            | 80            |
| CE-104562 - 2405 - Details of Piping at Primary & Secondary Coolers | 75            | 80            |
| CE-104563 - 2406 - Details of Piping at Altitude Test Chambers      | 90            | 90            |
| CE-104570 - 2407 - Heating, Ventilating & Details                   | 15            | 70            |
| CE-104572 - 2408 - Water Treatment                                  | 0             | 0             |
| CE-104573 - 2409 - Water Treatment                                  | 0             | 0             |

b) Struct Steel & Conc. (CE-104575 to CE-104594) No. 21 No. 22

|                                                         |     |     |
|---------------------------------------------------------|-----|-----|
| CE-104575 - (4401) - Cooling Tower Foundations Plans    |     |     |
| Sections & Details                                      | 100 | 100 |
| CE-104576 - (4402) - Pump House Foundations and Inlet   |     |     |
| Chamber - Plan & Details                                | 15  | 45  |
| CE-104577 - (4405) - Pump House - Strl. Steel & Details | 10  | 45  |
| CE-104579 - (4403) - Pump House - Plan, Elevations      |     |     |
| and Sections                                            | 90  | 95  |
| CE-104580 - (4404) - Pump House, Typical Details, Walls |     |     |
| Windows and Doors                                       | 75  | 95  |
| CE-104581 - (4407) - Pump House - Storm Water and Floor |     |     |
| Drainage Plan & Finish Schedule                         | 0   | 95  |
| CE-104583 - (4406) - Circulating Water Pipe Supports    |     |     |
| and Manholes                                            | 10  | 15  |
| (4408) - Water Treating Building                        | 0   | 0   |
| (4409) - Water Treating Building                        | 0   | 0   |

c) Electrical (CE-104594 to CE-104609)

The specification for the switchgear and transformers at the Circulating Water Pump House has been reviewed by NACA. Certain changes in the specification and associated sketches, which were requested by NACA have been made. The revised draft is now ready for NACA review. Acceptance of this specification will permit completion of the one-line and enable the work on conduit drawings to advance.

|                                                                                  | <u>No. 21</u> | <u>No. 22</u> |
|----------------------------------------------------------------------------------|---------------|---------------|
| 3401 - C.W. Pump House - Lighting, Grounding & Concealed Conduit Plan            | 90%           | 95%           |
| 3402 - C.W. Pump House - One Line Diagram Swgr. and Transformer Arrangement Plan | 50            | 50            |
| 3403 - C.W. Pump House - Equipment, Grounding Conduit Plan and Details           | 10            | 30            |
| 3404 - Cooling Tower - Lighting Plan and Details                                 | 40            | 90            |
| 3405 - Cooling Tower - Conduit & Grounding Plans and Details                     | 10            | 30            |
| 3406 - Power Ducts & Manhole Details                                             | 40            | 60            |
| 3407 - Substation "C" Arrangement Plan & Sections                                | 0             | 10            |

VI - FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

✓ Work on high pressure pump house affected by decision to add second story on building has been stopped pending additional information from NACA.

✓ Lines from high pressure pump house to cells are being run to accommodate any design at the pump house. Piping within pump house (1st floor) can be readily adapted to metering station on second floor.

✓ Specifications on fuel pumps and filters were forwarded to NACA on September 30, 1949.

Specifications for fuel pressure control will be forwarded on October 14, 1949.

| a) <u>Mechanical</u> (CE-104610 to CE-104639)                                           |  | <u>No. 21</u> | <u>No. 22</u> |
|-----------------------------------------------------------------------------------------|--|---------------|---------------|
| CE-104610 - 2501 - Flow Sheet and Valve List<br>HP and LP systems                       |  | 35%           | 50%           |
| CE-104611 - 2502 - Location & Arrangement Plan<br>Storage & LP Pump House Area          |  | 85            | 85            |
| CE-104612 - 2503 - Location & Arrangement Plan<br>Altitude Chamber & HP Pumping<br>Area |  | 5             | 5             |
| CE-104613 - 2504 - Details of Piping in LP Pump<br>House                                |  | 70            | 85            |
| CE-104614 - 2505 - Details of Piping in HP Pump<br>House                                |  | 50            | 70            |
| CE-104615 - 2506 - Details of Piping - Metering<br>Station & Altitude Chamber           |  | 0             | 0             |
| CE-104619 - 2510 - Heating and Vent. Details                                            |  | 0             | 0             |
| CE-104622 - 2513 - Fire Protection System (CO <sub>2</sub> )                            |  | 0             | 0             |
| 2514 - Fire Protection System (CO <sub>2</sub> )                                        |  | 0             | 0             |

b) St. Steel & Conc. (CE-104640 to CE-104654)

|                                                                    |    |    |
|--------------------------------------------------------------------|----|----|
| 4501 - Fuel Storage Tank Foundations<br>Plans Sections and Details | 65 | 70 |
| 4502 - LP Pump House - Plan Sections<br>and Details                | 0  | 0  |
| 4503 - LP Pump House - Plan Sections<br>and Details                | 0  | 0  |
| 4504 - HP Pump House - Plan Sections<br>and Details                | 0  | 0  |
| 4506 - Fuel Distribution System -<br>Manholes Details, Etc.        | 0  | 0  |

c) Electrical (CE-104655 to CE-104669)

A final structural layout of L.P. Fuel Pump House is required for continuation of work on 3501 and 3502.

|                                                                                  | <u>No. 21</u> | <u>No. 22</u> |
|----------------------------------------------------------------------------------|---------------|---------------|
| 3501 - LP Fuel Pump House - Lighting<br>Grounding & Concealed Conduit<br>Plan    | 50            | 80            |
| 3502 - LP Fuel Pump House - Equipment<br>Grounding Conduit Plans and<br>Details  | 0             | 0             |
| 3503 - Fuel Storage Area - Grounding<br>Outdoor Lighting and Conduit<br>Plan     | 0             | 5             |
| 3504 - HP Fuel Pump House - Lighting,<br>Grounding and Concealed Conduit<br>Plan | 50            | 60            |

| c) <u>Electrical</u> (CE-104655 to CE-104669) <u>Continued</u>                 | <u>No. 21</u> | <u>No. 22</u> |
|--------------------------------------------------------------------------------|---------------|---------------|
| 3505 - HP Fuel Pump House - Equipment<br>Grounding Conduit Plan and<br>Details | 0             | 0             |
| 3506 - Telephone and Intercommunication<br>Ducts and Manhole Details           | 0             | 0             |

VII - ELECTRICAL SUBSTATIONS (No numbers assigned by NACA)

When information requested in Conference No. 25 items K-5 to K-7 inclusive is received final drawing assignments will be made. Tentatively the following drawings are contemplated.

a) Electrical

- 3601 - Substations "A, B and G" - One Line Diagrams
- 3602 - Substations "A, and B" - Changes - Plan
- 3603 - Substations "A and B" Changes - Sections
- 3604 - Substations "G" Changes - Plan
- 3605 - Substation "G" Changes - Sections
- 3606 - Substation "G" Additions - Plans
- 3607 - Substation "G" Additions - Sections
- 3608 - Substation "G" Additions - Details
- 3609 - Substation "G" Conduit Plan and Details
- 3610 - Power (34.5 KV) Duct and Manhole Details

VIII - EQUIPMENT BUILDING

Outline drawing of compressors received from Elliott Company October 3, 1949.

Outline drawings of foundations for compressors and exhauster are being made and will be submitted to both Elliott Company and Roots-Connersville for their comments about October 14, 1949. Motor air coolers will have to be changed to clear foundations. See NACA letter of September 29, paragraph 3.

Plan and elevation study drawings showing arrangement of compressors, exhausters, coolers etc. will be sent to NACA for review about October 12, 1949.

NACA to furnish information on air intercoller and aftercooler, air heaters, and gas intercoolers as soon as possible.

NACA are obtaining information on check valves for compressors and exhausters. See NACA's letter of September 9, 1949.

Specifications for butterfly valves and expansion joints for exhauster piping, and gate valves and expansion joints for compressor piping will be sent to NACA for review about October 20, 1949. Accurate information necessary for Equipment layout.

Studies of architectural details of building are being made. Floor elevations, arrangement of building facilities, etc. are being considered.

IX - PROGRESS

Based on the status of the work as of September 1st, 1949, we believe that the following percentages may be considered as reasonably accurate for engineering and design completion.

|                                               | <u>No. 21</u> | <u>No. 22</u> |
|-----------------------------------------------|---------------|---------------|
| 1. Operations Building                        | 97%           | 98%           |
| 2. Altitude Test Chambers                     | 96            | 97            |
| 3. Shop and Access Building                   | 93            | 94            |
| 4. Test Air Piping                            | 52            | 70            |
| 5. Cooling Tower and Circulating Water System | 40            | 59            |
| 6. Fuel Storage and Distribution System       | 24            | 38            |
| 7. Electrical Substations                     | 5             | 7             |
| 8. Equipment Building and Equipment           | 4             | 6             |

DRMcConathy/RDK/WGC/LHR/KBH/id

*DRMcConathy/id*

20366

PROGRESS REPORT NO. 23

October 20, 1949

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Laboratory - Phase I Part II  
Project No. 794 (NAA-5652) - D.R. W.O. #1218

CC-NACA-4 ✓

LJ1  
RCR  
RFC  
KAR  
VLG-2  
RSB  
FN  
JBM  
PJM  
AAV-4  
KBH-3  
LHR-3  
RDK  
KWB-3  
WGC-3  
DRM  
FILES

*G. W. W.*

I - OPERATIONS BUILDING

- a) Change Order #2 was issued on October 11th.

The changes cover:

1. Rerouting of storm sewer to new head wall.
2. Parking area drainage and subdrainage.
3. Drainage for Manhole 36.

- b) Change Order #4 Issued on October 20th.  
The change covers the addition of a valve pit on steam service line.

- c) Shop drawings on operation building are being checked.

II - ALTITUDE TEST CHAMBER

- a) Water Cooled Bulkhead redesigned, new drawing sent to N.A.C.A. October 17th.

- ✓ b) Thrust platform was discussed with N.A.C.A. on October 16th, changes and improvements to be incorporated on new design.

### III - SHOP AND ACCESS BUILDING

a) Change order #1 was issued on October 12th.

The changes cover:

1. Relocation of fire protection piping.
2. Relocation of Domestic Water piping.
3. Revision of floor drain system.
4. Addition of Driveway and Sidewalk.

b) Change order #3 was issued on October 14th.

The changes cover:

1. Relocation of Primary cooler sumps.
2. Addition of pipe opening and sliding pipe support.
3. Removal of foundation anchor bolts.

c) Shop drawings on Shop and Access Building are being checked.

### IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

a) Mechanical (CE-104500 to CE-104524)

Specifications for the following equipment were issued to H.A.C.A. for comments and approval:

1. Combustion Air Motor operated Gate Valves and Butterfly Valves - October 6th.
  2. Orifice Fittings - Combustion air piping - October 12th.
  3. Combustion air piping Expansion Joints - October 10th.
  4. Comb. Air piping System Phase I, First Step, October 7th.
- Require information from H.A.C.A. on control valves.

*See p. 8*

*Hold up  
to follow up  
with contract*

|                     |                                                                                      | <u>No. 22</u> | <u>No. 23</u> |
|---------------------|--------------------------------------------------------------------------------------|---------------|---------------|
| * CE-104500 (2303)  | Flow Diagrams - Air and Gas Piping Steel 1 and 2                                     | 80%           | 80%           |
| CE-104501 (2301)    | General Arrangement - Plan Step 1 and 2                                              | 65            | 65            |
| * CE-104502 (2302)  | General Arrangement - Elevations Step 1 and 2                                        | 65            | 65            |
| ** CE-104503 (2310) | Combustion Air Piping - Plan, Elev. and Details - Altitude Chamber Area - First Step | 85            | 90            |
| ** CE-104506 (2313) | Combustion Air Piping - Supports, Anchors and Misc. Details 1st Step                 | 85            | 90            |
| ** CE-104507 (2314) | Expansion Joint List - Air & Gas Piping                                              | 25            | 30            |
| ** CE-104508 (2315) | Valve List - Air & Gas Piping                                                        | 5             | 10            |
| CE-104504 (2311)    | Combustion Air Piping, Plan, Elev. and Details - Heater Area                         | 30            | 30            |

|                                                                                     | No. 22 | No. 23 |
|-------------------------------------------------------------------------------------|--------|--------|
| CH-104505 (2312) Combustion Air Piping - Section and Details - Heater Area          | 40     | 40.5   |
| CE-104507 (2316) Control Piping, Plans, Elevations and Details, Step 1 and 2        | 0      | 0      |
| CE-104510 (2317) Control Piping, Sections and Details - Step 1 and 2                | 0      | 0      |
| CH-104511 (2318) Combustion Air Piping - Arrangement of Control Valves - First Step | 0      | 0      |
| CE-104512 (2317) Combustion Air Piping - Details of Supports at Control Valves      | 0      | 0      |

\* Reference drawings for Combustion Air Piping Contract.  
 \*\* Contract Drawings for Combustion Air Piping Contract.

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

*Issued Nov*  
 Drawing and specifications for steel ducts discussed at Cleveland on October 17th. Minor changes and Revisions to be included on drawings.

General Building Contract, (Drawings and Specifications) sent to N.A.C.A. on October 20th.

Information needed on Exhaust Control Valves to determine supports and connection to gas ducts.

|                                                                                  | No. 22 | No. 23 |
|----------------------------------------------------------------------------------|--------|--------|
| *** CE-104525 (4310) - Atmospheric Exhaust Stack                                 | 70     | 85     |
| *** CE-104526 (4302) - Atmospheric Exhaust Stack Details                         | 40     | 60     |
| CE-104527 (4303) - General Arrangement - and Anchor Sections and Roller Supports | 95     | 95     |
| CE-104528 (4304) - Tee and Pipe Sections, Plans, Elevations and Details          | 95     | 95     |
| CE-104529 (4305) - Transition Sections, Plan, Elevations and Details             | 95     | 95     |

c) Struct. Steel & Conc. Design

|                                                                                                     |     |      |
|-----------------------------------------------------------------------------------------------------|-----|------|
| CE-104540 (4310) - Walkways & Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80  | 80.5 |
| CE-104541 (4311) - Walkways & Stairways - Test Chamber & Primary Coolers - Sections and Details     | 75  | 75   |
| CE-104542 (4314) - Secondary Cooler Foundation - Piling, Plan Sections & Details                    | 100 | 100  |
| *** CE-104543 (4315) - Trenches & Piping Foundations - Plan, Sections, Details & Piling Plan        | 85  | 90   |
| *** CE-104544 (4316) - Exhaust Piping & Stack Foundations. Plan, Sections, Details & Piling Plan    | 70  | 80   |
| *** CE-104545 (4317) - Exhaust Piping & Stack Foundations. Sections & Details                       | 65  | 80   |

\*\*\* Four (4) sets drawings sent N.A.C.A. October 18, 1949.

d) Electrical (CE-104550 to CE-104557)

Work is continuing for grounding and outdoor area lighting systems. Outdoor lighting will be located for walkways and at instrumentation and control points.

|                                                                          | <u>No. 22</u> | <u>No. 23</u> |
|--------------------------------------------------------------------------|---------------|---------------|
| CE-104550 - 3301 Outdoor Area Lighting and Receptacles - Plans & Details | 100           | 200           |
| CE-104551 - 3302 Grounding System - Plans & Details                      | 50            | 60            |
| CE-104552 - 3303 Instrumentation & Controls - Plans & Details            | 0             | 0             |

V - COOLING TOWER AND CIRCULATING WATER SYSTEM (CE-104558 to CE-104607)

Pump foundation design is awaiting final "certified" drawings from the manufacturer.

*These preliminary specs covered*  
Specifications for Circulating Water Piping System were forwarded to H.A.C.A. for comment and approval October 11, 1949. *in conference around 11-1*

| a) <u>Mechanical</u> (CE-104558 to CE-104574)                       | <u>No. 22</u> | <u>No. 23</u> |
|---------------------------------------------------------------------|---------------|---------------|
| CE-104558 - 2401 - Flow Sheet & Valve List                          | 350           | 800           |
| CE-104559 - 2402 - Location & Arrangement Plan Pump House Area      | 80            | 90            |
| CE-104560 - 2403 - Location & Arrangement Plan - Equipment Area     | 80            | 90            |
| CE-104561 - 2404 - Pump House Piping - Plans, Sections & Details    | 80            | 90            |
| CE-104562 - 2405 - Details of Piping at Primary & Secondary Coolers | 80            | 90            |
| CE-104563 - 2406 - Details of Piping at Altitude Pumphouse          | 90            | 95            |
| ***CE-104570 - 2407 - Heating, Ventilating & Details                | 70            | 80            |
| CE-104572 - 2408 - Water Treatment                                  | 0             | 0             |
| CE-104573 - 2409 - Water Treatment                                  | 0             | 0             |

\*\*\* Four (4) sets drawings sent NACA October 18, 1949.

| b) <u>Struct Steel &amp; Conc.</u> (CE-104575 to CE-104594)                                 | <u>No. 22</u> | <u>No. 23</u> |
|---------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104575 - (4401) - Cooling Tower Foundations Plans - Sections & Details                   | 100           | 100           |
| ***CE-104576 - (4402) - Pump House Foundations and Inlet Chamber. Plans, Sections & Details | 45            | 80            |
| ***CE-104577 - (4405) - Pump House - Roof Framing Plan. Elevations, Sections & Details      | 45            | 80            |
| ***CE-104579 - (4403) - Pump House - Plan, Elevations & Sections                            | 95            | 95            |
| ***CE-104580 - (4404) - Pump House - Typical Details. Walls, Windows & Doors                | 95            | 95            |

|                                             |    |    |
|---------------------------------------------|----|----|
| ***CE-104581 - (4407) - Pump House - Storm  |    |    |
| Water & Floor Drainage                      |    |    |
| Plan & Finished Schedules                   | 95 | 95 |
| CE-104583 - (4406) - Circulating Water Pipe |    |    |
| Supports & Manholes                         | 15 | 75 |
| (4408) - Water Treating Building            | 0  | 0  |
| (4409) - Water Treating Building            | 0  | 0  |

\*\*\* Four (4) sets drawings sent N.A.C.A. October 18, 1949.

c) Electrical (CE-104594 to CE-104609)

Equipment specification for the switchgear and transformers at the Circulating Water Pump House was sent N.A.C.A. October 17, 1949.

Burns and Roe are preparing an estimated time-current characteristic at 80% voltage for the 75 H.P. cooling tower fan motors. This will be sent 10/21/49. Same shall be incorporated with above switchgear & transformer specification.

Electrical section for General Building Contract specifications sent with same October 19, 1949.

Work is proceeding on subject drawings to be incorporated either in the General Building Contract or the General Electrical Contract (for 1st Step operation).

General Building Contract

|                                                | No. 22 | No. 23 |
|------------------------------------------------|--------|--------|
| ***CE-104594 - 3401 - Circ. Water Pump House - |        |        |
| Lighting, Grounding &                          |        |        |
| Concealed Conduit Plan                         | 95%    | 100%   |

General Electrical Contract

|                                                  |     |     |
|--------------------------------------------------|-----|-----|
| CE-104595 - 3402 - Circ. Water Pump House -      |     |     |
| One Line Diagram - Switchgear                    |     |     |
| & Transformer Arrangement                        |     |     |
| Plan                                             | 50% | 55% |
| CE-104596 - 3403 - Circ. Water Pump House -      |     |     |
| Equipment Grounding -                            |     |     |
| Conduit Plan & Details                           | 30  | 35  |
| CE-104597 - 3404 - Cooling Tower - Lighting      |     |     |
| Plan & Details                                   | 90  | 95  |
| CE-104598 - 3405 - Cooling Tower - Conduit &     |     |     |
| Grounding Plan & Details                         | 30  | 80  |
| CE-104599 - 3406 - Power Ducts & Manhole Details | 60  | 75  |
| CE-104600 - 3407 - Subs. "C" Arrangement Plan    |     |     |
| & Details                                        | 10  | 90  |

\*\*\* Four (4) sets drawings sent N.A.C.A. October 18, 1949.

*Poor spec  
Not to be  
redone*

VI - FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

Specifications for Heating and Ventilating a part of General Building Contract have been forwarded to N.A.C.A. for comment and approval - October 19th.

a) Mechanical (CE-104610 to CE-104639)

|                                                                                           | No. 22 | No. 23 |
|-------------------------------------------------------------------------------------------|--------|--------|
| CE-104610 - 2501 - Flow Sheet & Valve List<br>HP & LP systems                             | 50%    | 50%    |
| CE-104611 - 2502 - Location & Arrangement<br>Plan - Storage & LP<br>Pump House Area       | 85     | 90     |
| CE-104612 - 2503 - Location & Arrangement<br>Plan - Altitude Chamber &<br>HP Pumping Area | 5      | 40     |
| CE-104613 - 2504 - Details of Piping in<br>LP Pump House                                  | 85     | 90     |
| CE-104614 - 2505 - Details of Piping in<br>HP Pump House                                  | 70     | 70     |
| CE-104615 - 2506 - Details of Piping<br>Metering Station &<br>Altitude Chamber            | 0      | 0      |
| CE-104619 - 2510 - L.P. Pump House - Heating,<br>Ventilating & Details                    | 0      | 15     |
| CE-104622 - 2513 - Fire Protection System (CO <sub>2</sub> )                              | 0      | 0      |
| 2514 - Fire Protection System (CO <sub>2</sub> )                                          | 0      | 0      |

b) St. Steel & Conc. (CE-104640 to CE-104654)

|                                                                                                          |    |    |
|----------------------------------------------------------------------------------------------------------|----|----|
| ***CE-104640 - 4501 - Fuel Storage Tank Foundations<br>& Transfer Platform. Plans,<br>Sections & Details | 70 | 80 |
| CE-104641 - 4502 - L.P. Fuel Pump House -<br>Plan, Sections & Details                                    | 0  | 15 |
| CE-104642 - 4503 - L.P. Fuel Pump House &<br>Separator Pit. Plan,<br>Sections & Details                  | 0  | 0  |
| 4504 - HP Pump House - Plan<br>Sections & Details                                                        | 0  | 0  |
| 4506 - Fuel Distribution System -<br>Manholes Details, Etc.                                              | 0  | 0  |

\*\*\* Four (4) sets drawings sent N.A.C.A. October 18, 1949.

c) Electrical (CE-104655 to CE-104669)

Equipment Specification for switchgear and transformer for HP Fuel Pump House and Subs. "C" sent N.A.C.A. in September. Final specification not released to date.

Electrical work discontinued on HP Fuel Pump House until building design has crystallized.

*Specs were  
to have been  
had to be  
made*

Work is proceeding on subject drawings to be incorporated either in the General Building Contract or the General Electrical Contract (for 1st Step Operation).

General Building Contract

|                  |                                                                           | <u>No. 22</u> | <u>No. 23</u> |
|------------------|---------------------------------------------------------------------------|---------------|---------------|
| CE-104655 - 3501 | L.P. Fuel Pump House -<br>Lighting, Grounding &<br>Concealed Conduit Plan | 80            | 85            |
| CE-104658 - 3504 | H.P. Fuel Pump House -<br>Lighting, Grounding &<br>Concealed Conduit Plan | 60            | 65 (aa)       |

General Electrical Contract

|                  |                                                                          |   |    |
|------------------|--------------------------------------------------------------------------|---|----|
| CE-104656 - 3502 | L.P. Fuel Pump House -<br>Equipment Grounding,<br>Conduit Plan & Details | 0 | 0  |
| CE-104657 - 3503 | Fuel Storage Area - Outdoor<br>Lighting & Conduit Plan                   | 5 | 85 |
| CE-104659 - 3505 | HP Fuel Pump House -<br>Equipment Grounding, Conduit<br>Plans & Details  | 0 | 30 |
| CE-104660 - 3506 | Telephone & Intercommunication<br>Ducts & Manhole Details                | 0 | 0  |

(aa) Work discontinued until final building design is approved.

VII - Electrical Substations (No numbers assigned by N.A.C.A.)

Final drawing assignments will be included in next report. Tentatively, the following drawings are contemplated. NACA please advise CE drawing numbers for same.

A) Electrical

- 3601 - Substations "A, B and G" - One Line Diagrams
- 3602 - Substations "A, and B" - Changes - Plan
- 3603 - Substations "A and B" Changes - Sections
- 3604 - Substations "G" Changes - Plan
- 3605 - Substation "G" Changes - Sections
- 3606 - Substation "G" Additions - Plans
- 3607 - Substation "G" Additions - Sections
- 3608 - Substation "G" Additions - Details
- 3609 - Substation "G" Conduit Plan and Details
- 3610 - Power (34.5 KV) Duct and Manhole Details

VIII - EQUIPMENT BUILDING (No CE numbers assigned by NACA)

NACA advise CE drawing numbers for this building.

Final design information (transient reactance, subtransient reactance, etc.) not received to date by Burns and Roe. Determination of switchgear requirements (500 KVA vs. 1000 KVA) are contingent upon this data. Cost analysis based on

*See our letter to B&R re: Substation elec. data 12/2/49*

- 8 -

approximate information was sent NACA, letter dated 9/20/49. Additional discussion was covered in our last conference, see Conf. Notes #27. Final analysis will not be made until motor design data is available from Elliott.

NACA to furnish information on air heaters as soon as possible. NACA please follow.

NACA are obtaining information on check valves for compressors and exhausters. See NACA's letter of September 9, 1949. NACA please follow.

Specifications for butterfly valves, gate valves and expansion joints for compressor piping and exhauster piping will be sent to NACA for review about October 26, 1949. Accurate information necessary for Equipment layout.

Conference on architectural, structural and mechanical arrangement is scheduled for week of October 17th at NACA, Cleveland. Studies of architectural details of building, floor elevations, arrangement of building facilities, etc. are being considered at these meetings.

*DRMcConathy*

DRMcConathy/KBH/KWB/AFS/es

PROGRESS REPORT NO. 24

November 2, 1949

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Laboratory - Phase I Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

21191

CC-NACA-4

EJT  
RCR  
RFC  
KAR  
WLG-2  
RRB  
FN  
JBM  
PJM  
AAV-4  
KBH-3  
LHR-3  
RDK  
KWB-3  
WGC-3  
DRM  
FILES

I - OPERATIONS BUILDING

- a) Several changes which have been made since contract was awarded have been covered by Proposed Change Order #1 and 2 and Revised Sepias forwarded.
- b) Additional changes in Electrical work are being made which grew out of further review of contract drawing by N.A.C.A. A proposed change order and revised sepia tracings will be forwarded shortly.
- c) A request for changes in office layout have been requested by N.A.C.A. to accommodate specific personnel assigned. Burns and Roe are submitting price adjustment and awaiting approval to proceed with changes requested.
- d) Checking of Shop drawings is perhaps 50% complete.

II ALTITUDE TEST CHAMBERS

- a) Checking of Shop drawings being started. Few drawings received to date. We know of no hold-up in fabrication.
- b) A proposed Change Order is being prepared covering all revisions to contract drawings since contract award. This order will serve to keep all records straight.

- c) The thrust measuring mechanism was fully discussed with N.A.C.A. to determine the best possible arrangement. While no completely satisfactory system can be found, it has been agreed to make revisions and changes in drawings in accordance with last conference. Approximately two (2) weeks will be required to complete this work.

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### III SHOP AND ACCESS BUILDING

- a) Revised Proposed Change Orders #3, 4, and 5 issued on October 28th to cover all changes made since award of contract.
- b) Shop drawing for steel are well completed and shop drawing for other work are being processed.

### IV AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

a) Mechanical (CE-104500 to CE-104524)

1. Waiting for comments or approval from N.A.C.A. on combustion air piping, gate and butterfly valves, orifice fittings, and expansion joints. These were sent to N.A.C.A. on October 6, 7, 10 and 12. See Report #23.

2. Drawing CE-104500 (Flow Diagram) being brought up to date.

3. Drawing CE-104501 (General Arrangement Plan) and Drawing CE-104502 (General Arrangement Elevations) being brought up to date.

4. Drawing CE-104503 (Combustion Air Piping - Plan) being revised in accordance with comments given at conference No. 28.

5. Pressure drop calculations being made for combustion air system in accordance with comments given at conference No. 28.

6. Work proceeding on drawings CE-104507 (Expansion Joint List) and CE-104508 (Valve List).

7. Require information from N.A.C.A. on all combustion air control valves, Spec. C-768 to complete drawings CE-104503, CE-104506, CE-104507, CE-104508, CE-104511, and CE-104512.

|                                                     | No. 23 | No. 24 |
|-----------------------------------------------------|--------|--------|
| * CE-104500 (2303) Flow Diagrams - Air and Gas      | 80%    | 85%    |
| Piping Steel 1 and 2                                |        |        |
| CE-104501 (2301) General Arrangement - Plan         | 65     | 67     |
| Step 1 and 2                                        |        |        |
| * CE-104502 (2302) General Arrangement - Elevations | 65     | 67     |
| Step 1 and 2                                        |        |        |
| ** CE-104503 (2310) Combustion Air Piping - Plan,   | 90     | 92     |
| Elev. and Details - Altitude                        |        |        |
| Chamber Area - First Step                           |        |        |

|                     |                                                                                | <u>No.23</u> | <u>No.24</u> |
|---------------------|--------------------------------------------------------------------------------|--------------|--------------|
| ** CE-104506 (2313) | Combustion Air Piping - Sup-<br>ports, Anchors and Misc. De-<br>tails 1st Step | 90           | 90           |
| ** CE-104507 (2314) | Expansion Joint List - Air &<br>Gas Piping                                     | 30           | 35           |
| ** CE-104508 (2315) | Valve List - Air & Gas Piping                                                  | 10           | 15           |
| CE-104504 (2311)    | Combustion Air Piping, Plan,<br>Elev. and Details - Heater Area                | 30           | 30           |
| CE-104505 (2312)    | Combustion Air Piping - Section &<br>Details - Heater Area                     | 40           | 40           |
| CE-104509 (2316)    | Control Piping, Plans, Eleva-<br>tions and Details, Step 1 & 2                 | 0            | 0            |
| CE-104510 (2317)    | Control Piping, Sections and<br>Details, Step 1 and 2                          | 0            | 0            |
| CE-104511 (2318)    | Combustion Air Piping - Arrange-<br>ment of Control Valves - First<br>Step     | 0            | 0            |
| CE-104512 (2319)    | Combustion Air Piping - Details<br>of Supports at Control Valves               | 0            | 0            |

\* Reference drawings for Combustion Air Piping Contract.

\*\* Contract drawings for Combustion Air Piping Contract.

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

1. Drawing and specifications for steel ducts discussed at Cleveland on October 17th. Minor changes and Revisions being included on drawings.
2. Final specifications for expansion joints written by N.A.C.A. in accordance with discussion at conference #28.
3. General Building Contract, (Drawings and Specifications) sent to N.A.C.A. on October 20th.
4. Drawings CE-104527, CE-104528 and CE-104529 to be revised for for combustion air by pass connection.
5. Information needed on Exhaust Control Valves to determine supports and connection to gas ducts.
6. Final Sepia tracings are being issued immediately for release to bidders with specification revised at last conference as final.

|                      |                                                                     | <u>No.23</u> | <u>No.24</u> |
|----------------------|---------------------------------------------------------------------|--------------|--------------|
| *** CE-104525 (4310) | Atmospheric Exhaust Stack                                           | 85%          | 95%          |
| *** CE-104526 (4302) | Atmospheric Exhaust Stack<br>Details                                | 60           | 95           |
| CE-104527 (4303)     | General Arrangement - 2nd<br>Anchor Sections and Roller<br>Supports | 95           | 95           |

|                                                                       | <u>No.23</u> | <u>No.24</u> |
|-----------------------------------------------------------------------|--------------|--------------|
| CE-104528 (4304) Tee and Pipe Sections, Plans, Elevations and Details | 95%          | 95%          |
| CE-104529 (4305) Transition Sections, Plan, Elevations and Details    | 95           | 95           |

c) Structural Steel and Concrete Design.

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1. Require information on Control Valves for support design.
2. Final location for By-pass. (To be established later).
3. Decision as to requirements for walkways to Secondary Cooler and Control Valves.

|                                                                                                   | <u>No.23</u> | <u>No.24</u> |
|---------------------------------------------------------------------------------------------------|--------------|--------------|
| CE-104540 (4310) Walkways & Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80%          | 80 %         |
| CE-104541 (4311) Walkways & Stairways - Test Chamber & Primary Coolers - Sections and Details     | 75           | 80           |
| CE-104542 (4314) Secondary Cooler Foundation - Piling Plan Sections & Details                     | 100<br>95    | 100<br>95    |
| CE-104543 (4315) Trenches & Piping Foundations - Plan, Sections, Details & Piling Plan            |              |              |
| CE-104544 (4316) Exhaust Piping & Stack Foundations. Plan, Sections, Details & Piling Plan        | 80           | 90           |
| CE-104545 (4317) Exhaust Piping & Stack Foundations. Sections & Details                           | 80           | 90           |

d) Electrical (CE-104550 to CE-104557)

Work is continuing for grounding and outdoor area lighting systems. Outdoor lighting will be located for walkways and at instrumentation and control points.

|                                                                          | <u>No.23</u> | <u>No.24</u> |
|--------------------------------------------------------------------------|--------------|--------------|
| CE-104550 (3301) Outdoor Area Lighting and Receptacles - Plans & Details | 20%          | 50%          |
| CE-104551 (3302) Grounding System - Plans & Details                      | 60           | 70           |
| CE-104552 (3303) Instrumentation & Controls - Plans & Details            | 0            | 0            |

V COOLING TOWER AND CIRCULATING WATER SYSTEM (CE-104558 to CE-104609)

Specifications for Circulating Water Piping System have been revised in accordance with N.A.C.A. comment and pertinent paragraphs concerning control valves and miscellaneous other items have been added.

Drawings are being checked and corrected prior to signing.

Specification and drawings will be forwarded to N.A.C.A. November 4, 1949.

a) Mechanical (CE-104558 to CE-104574)

|                                                                      | No.23 | No.24 |
|----------------------------------------------------------------------|-------|-------|
| CE-104558 (2401) Flow Sheet & Valve List                             | 80%   | 90%   |
| CE-104559 (2402) Location & Arrangement Plan<br>Pump House Area      | 90    | 90    |
| CE-104560 (2403) Location & Arrangement Plan<br>Equipment Area       | 90    | 90    |
| CE-104561 (2404) Pump House Piping - Plans,<br>Sections & Details    | 90    | 95    |
| CE-104562 (2405) Details of Piping at Primary<br>& Secondary Coolers | 90    | 95    |
| CE-104563 (2406) Details of Piping at Altitude<br>Chamber            | 95    | 95    |
| CE-104570 (2407) Heating, Ventilating & Details                      | 80    | 95    |
| CE-104572 (2408) Water Treatment                                     | 0     | 0     |
| CE-104573 (2409) Water Treatment                                     | 0     | 0     |

b) Structural Steel & Conc. (CE-104575 to CE-104594)

|                                                                                                | No.23 | No.24 |
|------------------------------------------------------------------------------------------------|-------|-------|
| CE-104575 (4401) Cooling Tower Foundations<br>Plans - Sections & Details                       | 100   | 100   |
| CE-104576 (4402) Pump House Foundations and<br>Inlet Chamber. Plans, Sect-<br>ions and Details | 80    | 85    |
| CE-104577 (4405) Pump House - Roof Framing<br>Plan. Elevations, Sections<br>& Details          | 80    | 95    |
| CE-104579 (4403) Pump House - Plan, Elevations<br>& Sections                                   | 95    | 95    |
| CE-104580 (4404) Pump House - Typical Details.<br>Walls, Windows & Doors                       | 95    | 95    |
| CE-104581 (4407) Pump House - Storm Water &<br>Floor Drainage. Plan & Fin-<br>ished Schedules  | 95    | 95    |
| CE-104583 (4406) Circulating Water Pipe Sup-<br>ports & Manholes                               | 75    | 85    |
| (4408) Water Treating Building                                                                 | 0     | 0     |
| (4409) Water Treating Building                                                                 | 0     | 0     |

c) Electrical (CE-104594 to CE-104609)

Equipment specification for the switchgear and transformers at the Circulating Water Pump House was sent N.A.C.A. October 17, 1949.

Work is proceeding on subject drawings to be incorporated either in the General Building Contract or the General Electrical Contract (for 1st Step operation).

|                                                                                               | No.23 | No.24 |
|-----------------------------------------------------------------------------------------------|-------|-------|
| CE-104594 (3401) Cir. Water Pump House - Light-<br>ing, Grounding & Concealed<br>Conduit Plan | 100%  | 100%  |

|                  |                                                                                       | No.23<br>55% | No.24<br>60% |
|------------------|---------------------------------------------------------------------------------------|--------------|--------------|
| CE-104595 (3402) | Circ. Water Pump House - One Line Diagram - Switchgear & Transformer Arrangement Plan | 211          | 191          |
| CE-104596 (3403) | Circ. Water Pump House - Equipment Grounding - Conduit Plan & Details                 | 35           | 35           |
| CE-104597 (3404) | Cooling Tower - Lighting Plan & Details                                               | 95           | 95           |
| CE-104598 (3405) | Cooling Tower - Conduit & Grounding Plan & Details                                    | 80           | 90           |
| CE-104599 (3406) | Power Ducts & Manhole Details                                                         | 75           | 85           |
| CE-104600 (3407) | Subs. "C" Arrangement Plan & Details                                                  | 90           | 95           |

# VI FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

N.A.C.A. comments from recent conference are being incorporated on drawings. Drawing #104615 is being used, in part, to show test chamber drain piping. Lack of information on metering system is holding up work on high pressure pump house piping and metering station. High pressure pump house structural drawings are also being held up pending further information.

## a) Mechanical (CE-104610 to CE-104639)

|                  |                                                                  | No.23<br>50% | No.24<br>55% |
|------------------|------------------------------------------------------------------|--------------|--------------|
| CE-104610 (2501) | Flow Sheet & Valve List HP & LP Systems                          |              |              |
| CE-104611 (2502) | Location & Arrangement Plan - Storage & LP Pump House Area       | 90           | 90           |
| CE-104612 (2503) | Location & Arrangement Plan - Altitude Chamber & HP Pumping Area | 40           | 40           |
| CE-104613 (2504) | Details of Piping in LP Pump House                               | 90           | 90           |
| CE-104614 (2505) | Details of Piping in HP Pump House                               | 70           | 70           |
| CE-104615 (2506) | Details of Piping Metering Station & Altitude Chamber            | 0            | 20           |
| CE-104619 (2510) | L.P. Pump House - Heating, Ventilating & Details                 | 15           | 90           |
| CE-104622 (2513) | Fire Protection System (CO2)                                     | 0            | 0            |
| (2514)           | Fire Protection System (CO2)                                     | 0            | 0            |

## b) St. Steel & Conc. (CE-104640 to CE-104654)

|                  |                                                                              |    |    |
|------------------|------------------------------------------------------------------------------|----|----|
| CE-104640 (4501) | Fuel Storage Tank Foundations & Transfer Platform. Plans, Sections & Details | 80 | 95 |
| CE-104641 (4502) | L.P. Fuel Pump House Plan. Sections & Details                                | 15 | 75 |
| CE-104642 (4503) | L.P. Fuel Pump House & Separator Pit. Plan, Sections & Details               | 0  | 70 |

|                                                           | <u>No.23</u> | <u>No.24</u> |
|-----------------------------------------------------------|--------------|--------------|
| (4504) HP Pump House - Plan, Sections & Details           | 0            | 75           |
| (4506) Fuel Distribution System - Man-holes Details, Etc. | 0            | 0            |

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c) Electrical (CE-104655 to CE-104669)

Equipment Specification for switchgear and transformer for HP Fuel Pump House and Subs. "C" sent N.A.C.A. in September.

Electrical work discontinued on HP Fuel Pump House until building design has crystallized.

Work is proceeding on subject drawings to be incorporated either in the General Building Contract or the General Electrical Contract (for 1st Step Operation).

General Building Contract

|                                                                                      | <u>No.23</u> | <u>No.24</u> |
|--------------------------------------------------------------------------------------|--------------|--------------|
| CE-104655 (3501) L.P. Fuel Pump House - Lighting, Grounding & Concealed Conduit Plan | 85           | 90           |
| CE-104658 (3504) H.P. Fuel Pump House - Lighting, Grounding & Concealed Conduit Plan | 65 (aa)      | 65 (aa)      |

General Electrical Contract

| CE-104656 (3502) L.P. Fuel Pump House - Equipment Grounding, Conduit Plan & Details | 0  | 0  |
|-------------------------------------------------------------------------------------|----|----|
| CE-104657 (3503) Fuel Storage Area - Outdoor Lighting & Conduit Plan                | 85 | 95 |
| CE-104659 (3505) HP Fuel Pump House - Equipment Grounding, Conduit Plans & Details  | 30 | 35 |
| CE-104660 (3506) Telephone & Intercommunication Ducts & Manhole Details             | 0  | 0  |

(aa) Work discontinued until final building design is approved.

VII ELECTRICAL SUBSTATIONS (No numbers assigned by N.A.C.A.)

Final drawing assignments will be included in next report. Tentatively, the following drawings are contemplated. N.A.C.A. please advise CE drawing numbers for same.

A) Electrical

- 3601 - Substations "A, B and C" - One Line Diagrams
- 3602 - Substations "A, and B" - Changes - Plan
- 3603 - Substations "A and B" Changes - Sections
- 3604 - Substations "C" Changes - Plan
- 3605 - Substation "C" Changes - Sections
- 3606 - Substation "C" Additions - Plans
- 3607 - Substation "C" Additions - Sections
- 3608 - Substation "C" Additions - Details
- 3609 - Substation "C" Conduit Plan and Details
- 3610 - Power (34.5 KV) Duct and Manhole Details

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VIII EQUIPMENT BUILDING ( NO. GE numbers assigned by N.A.C.A.)

(N.A.C.A. to advise GE drawing numbers for the building).

- a) N.A.C.A. to furnish information on air heaters and air drier.
- b) N.A.C.A. to furnish certified prints for compressors and exhausters. Prints furnished to date are preliminary only.
- c) N.A.C.A. to furnish outline drawings for intercoolers and after-cooler.

N.A.C.A. please follow above.

- d) N.A.C.A. to furnish Burns and Roe information obtained from Vendors on check valves for exhausters and compressors.
- e) Tentative list of rubber expansion joints is being made and will be sent to U. S. Rubber Co. for comments and recommendations. After these are received, specifications will be written and sent to N.A.C.A. for review.
- f) Specification for low pressure butterfly valves for exhausters and compressors are being prepared and will be sent to N.A.C.A. for review about November 10, 1949.
- g) Revised study drawings are being made of arrangement of exhausters and compressors, based on discussions and comments made at Conference No. 28. Proposed drawings from Ross Heater Co. are being used for layout of intercoolers and aftercooler.
- h) Information needed on size of switchgear and starting MG set to determine final location of same in general arrangement of equipment building.

Final location of major units of equipment depends on having this information.

- i) Foundation design drawings are being started for compressors and exhausters. Final drawings cannot be made until certified drawings are received for exhausters, compressors and coolers.
- j) Architectural studies are being made of equipment building based on discussions and comments made at conference No. 28.
- k) Need information from Elliott Co. as per Burns and Roe letter of October 10 to N.A.C.A. to determine height of compressor bay of equipment building.
- l) Presentation drawings are being prepared for the Equipment Building. Three general schemes of design for exterior are being considered.
  - 1) Building using Z-panels, Aluminum Surface on exterior and brick - No windows.
  - 2) Same as above with windows.
  - 3) Exterior brick surface with windows.
- m) Investigation of sound levels and sound absorption qualities for various types of construction are being made.
- n) Preliminary consideration is being given to column spacing, stairway location and general Building layout.
- o) Final design information (transient reactance, subtransient reactance, etc.) not received to date by Burns and Roe. Determination of switchgear requirements (500 KVA vs. 1000 KVA) breakers contingent upon this data. Cost analysis based on approximate information was sent N.A.C.A., letter dated 9/20/49. Additional discussion was covered in our last conference, see Conf. Notes #27. Final analysis will not be made until motor design data is available from Elliott.
- p) Study of Deep Sewer or drainage requirements are being submitted to N.A.C.A. for comments and decision.

## IX PROGRESS

Based on the status of the work as of September 1st, 1949, we believe that the following percentages may be considered as reasonably accurate for engineering and design completion.

|                                               | No. 22 | No. 24 |
|-----------------------------------------------|--------|--------|
| 1. Operations Building                        | 98%    | 99%    |
| 2. Altitude Test Chambers                     | 97     | 97     |
| 3. Shop and Access Building                   | 94     | 95     |
| 4. Test Air Piping                            | 70     | 80     |
| 5. Cooling Tower and Circulating Water System | 59     | 78     |
| 6. Fuel Storage and Distribution System       | 38     | 60     |
| 7. Electrical Substations                     | 7      | 10     |
| 8. Equipment Building and Equipment           | 6      | 10     |

22123

PROGRESS REPORT NO. 25

November 21, 1949

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Laboratory - Phase I Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

cc-NACA-4

RCR  
EJT  
RFC  
KAR  
WLG-2  
RRB  
FN  
JBM  
PJM  
AAV-4  
KBH-3  
LHR-3  
WGC-3  
KWE-3  
RDK-3  
DRM  
FILES

I - OPERATIONS BUILDING

a) Additional changes in electrical work were covered in change order #6. Revised sepia tracings and subject change order sent to NACA on November 4, 1949.

b) Comments returned on 11/4/49 on proposed lighting alterations covered by NACA letter of 10/27/49.

c) Revisions to building necessitated by change in end rooms, adding toilet and paneling as requested by NACA being made. This change will require two (2) new tracings and require revisions to 18 of present tracings.

d) Burns and Roe proposed change orders #1, 2, and 6 issued. Majority of this work covered by NACA in letters to contractor.

II - ALTITUDE TEST CHAMBERS

a) Shop drawings from Treadwell Construction Company are being processed at a steady rate.

b) Proposed change order covering all revisions to contract drawings and specifications since award of contract is being completed.

c) Sketch of thrust measuring device redesigned in accordance with discussions during conference in Cleveland on October 18th and sent to NACA for approval or comment. NACA please advise.

### III - SHOP AND ACCESS BUILDING

a) Checking of ship drawings for structural steel is now complete. Other shop drawings are being processed.

b) Changes in Electrical work are being made which grew out of further review of contract drawings by NACA and Burns and Roe. A proposed change order and revised sepiu tracings will be forwarded 11/17/49.

c) Burns and Roe proposed change orders #3, 4 and 5 issued. NACA have issued covering letters to contractor.

### IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

#### a) Mechanical (CE-104500 to CE-104524)

1. Waiting for comments or approval from NACA on combustion air piping, gate and butterfly valves, orifice fittings, and expansion joints. These were sent to NACA on October 6, 7, 10 and 12. See Report #23 dated 10/23/49.

2. Information received on Daniel Orifice fitting. This will be discussed with NACA at next conference.

3. Drawing CE-104500 (Flow Diagram) brought up to date.

4. Drawing CE-104501 (General Arrangement Plan) and drawing #CE-104502 (General Arrangement Elevations) brought up to date.

5. Drawing CE-104503 (Combustion Air Piping - Plan) revised in accordance with comments given at Conference No. 28.

6. Drawing CE-104506 to be revised when size and location of bypass line is determined. Should be determined during NACA visit to B412 on 11.30-12.2

7. Pressure drop calculations made for combustion air system in accordance with comments given at Conference No. 28 and submitted to NACA for comments.

8. Drawings CE-104507 (Expansion Joint List) and CE-104508 (Valve List), completed as far as possible for First Step Construction.

9. Require information from NACA on all combustion air control valves, Spec. C-768, to complete drawings CE-104503, CE-104506, CE-104507, CE-104508, CE-104511, and CE-104512.

CE-104500 (2303) Flow Diagrams - Air and Gas Piping Steps 1 and 2  
CE-104501 (2301) General Arrangement - Plan Step 1 and 2

| No. 24 | No. 25 |
|--------|--------|
| 85%    | 90%    |
| 67     | 70     |

Indelivered  
drawings discussed  
in conference  
of 11-21-49.

To be revised by B&R

This is the spec. on how to lay out the piping.

not received

not received

information given  
to Burns  
and Roe  
11-21-49  
contact Burns  
for this info.

|                  |                                                                                                     |     |     |
|------------------|-----------------------------------------------------------------------------------------------------|-----|-----|
| CE-104502 (2302) | General Arrangement - Elevations<br>Step 1 and 2                                                    | 67% | 67% |
| CE-104503 (2310) | Combustion Air Piping - Plan<br>Elevation and Details - Al-<br>titude Chamber Area - First<br>Step. | 92  | 93  |
| CE-104506 (2313) | Combustion Air Piping - Sup-<br>ports, Anchors and Misc.<br>Details, 1st Step                       | 90  | 90  |
| CE-104507 (2314) | Expansion Joint List - Air &<br>Gas Piping                                                          | 35  | 40  |
| CE-104508 (2315) | Valve List - Air & Gas Piping                                                                       | 15  | 25  |
| CE-104504 (2311) | Combustion Air Piping - Plan<br>Elev. and Details - Heater Area                                     | 30  | 30  |
| CE-104505 (2312) | Combustion Air Piping - Section<br>& Details - Heater Area                                          | 40  | 40  |
| CE-104509 (2316) | Control Piping, Plans, Elev.<br>and Details, Step 1 & 2                                             | 0   | 0   |
| CE-104510 (2317) | Control Piping, Sections &<br>Details, Step 1 and 2                                                 | 0   | 0   |
| CE-104511 (2318) | Combustion Air Piping - Arrange-<br>ment of Control Valves - First<br>Step                          | 0   | 0   |
| CE-104512 (2319) | Combustion Air Piping - Details<br>of Supports at Control Valves                                    | 0   | 0   |

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

1. Specifications for expansion joints sent to vendors by NACA on November 8, 1949. Bids due November 30, 1949.

2. Drawings CE-104527, CE-104528 and CE-104529 to be revised for combustion air by pass connection, when this is determined. *Should be determined during NACA visit to B-2 11-20-1949.*

3. Information needed on Exhaust Control valves to determine sup-  
ports and connection to gas ducts. *B-2 should contact Henry Pratt Co. for this info.*

4. NACA has now final sepia tracings and final specifications for steel ducts for release to bidders.

5. Stiffening rings are being investigated for effect of tempera-  
ture stresses. Computations have been made for support rings. NACA  
will receive report on above during week of November 21st.

6. Minor revisions are being made to atmospheric exhaust stack.  
Government will furnish sound reduction panels.

|                                                                                      | No. 24 | No. 25 |
|--------------------------------------------------------------------------------------|--------|--------|
| CE-104525 (4310) Atmospheric Exhaust Stack                                           | 95%    | 95%    |
| CE-104526 (4302) Atmospheric Exhaust Stack<br>Details                                | 95     | 95     |
| CE-104527 (4303) General Arrangement - 2nd<br>Anchor Sections and Roller<br>Supports | 95     | 95     |

|                                                                       | <u>No. 24</u> | <u>No. 25</u> |
|-----------------------------------------------------------------------|---------------|---------------|
| CE-104528 (4304) Tee and Pipe Sections, Plans, Elevations and Details | 95%           | 95%           |
| CE-104529 (4305) Transition Sections, Plan, Elevations and Details    | 95            | 95            |

c) Structural Steel and Concrete Design

1. Require information on control valves for support design.
2. Final location for by-pass. (To be established later). *at conf. 11-30*
3. Decision required as to requirements for walkways to Secondary Cooler and Control Valves.
4. Minor changes being made to Air and Gas Piping Foundations to accommodate connecting walk between Shop and Access Building and Equipment Building.

|                                                                                                   | <u>No. 24</u> | <u>No. 25</u> |
|---------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540 (4310) Walkways & Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80%           | 80%           |
| CE-104541 (4311) Walkways and Stairways - Test Chamber & Primary Coolers - Sections and Details   | 80            | 80            |
| CE-104542 (4314) Secondary Cooler Foundation - Piling Plan Sections & Details                     | 100           | 100           |
| CE-104543 (4315) Trenches and Piping Foundations Plan, Sections Details & Piling Plan             | 90            | 95            |
| CE-104544 (4316) Exhaust Piping & Stack Foundations. Plan, Sections, Details and Piling Plan      | 90            | 95            |
| CE-104545 (4317) Exhaust Piping and Stack Foundations, Sections and Details                       | 90            | 95            |

d) Electrical (CE-104550 to CE-104557)

Work is continuing outdoor area lighting systems.

|                                                                            | <u>No. 24</u> | <u>No. 25</u> |
|----------------------------------------------------------------------------|---------------|---------------|
| * CE-104550 (3301) Outdoor Area Lighting and Receptacles - Plans & Details | 50%           | 85%           |
| * CE-104551 (3302) Grounding System - Plans and Details                    | 70            | 90            |
| CE-104552 (3303) Instrumentation & Controls - Plans and Details            | 0             | 0             |

\* Four (4) prints sent to NACA on 11/15/49.

V - COOLING TOWER AND CIRCULATING WATER SYSTEM (CE-104558 to CE-104609)

Final specification forwarded to NACA on November 14, 1949. Final sepia tracings of specification drawings forwarded to NACA on November 17, 1949.

Assessment  
11-22-25  
→ Automatic control system for Circulating Water Pumps has been designed and will be forwarded to NACA next week.

A system head curve to fix operating pressures for pump control is contemplated, but is not necessary for study purposes, and will be compiled when more pressing design work has been completed.

| a) <u>Mechanical</u> (CE-104558 to CE-104574) |                                                  | <u>No. 24</u> | <u>No. 25</u> |
|-----------------------------------------------|--------------------------------------------------|---------------|---------------|
| CE-104558 (2401)                              | Flow Sheet and Valve List                        | 90%?          | 100%?         |
| CE-104559 (2402)                              | Location & Arrangement Plan Pump House Area      | 90            | 100 X         |
| CE-104560 (2403)                              | Location & Arrangement Plan Equipment Area       | 95            | 100 X         |
| CE-104561 (2404)                              | Pump House Piping - Plans, Sections and Details  | 95            | 100 X         |
| CE-104562 (2405)                              | Details of Piping at Primary & Secondary Coolers | 95            | 100 X         |
| CE-104563 (2406)                              | Details of Piping at Altitude Chamber            | 95            | 100 X         |
| CE-104570 (2407)                              | Heating, Ventilating & Details                   | 95            | 100 X         |
| CE-104572 (2408)                              | Water Treatment                                  | 0             | 0             |
| CE-104573 (2409)                              | Water Treatment                                  | 0             | 0             |

b) Structural Steel and Concrete (CE-104575 to CE-104594)

1. Elevation of Mezzanine floor of Circulating Water Pump House is to be raised 12-1/2" to provide additional space for electrical conduits and cables.

2. Minor revisions to Pump House being made in accordance with NACA comments on approval drawings.

|                  |                                                                       | <u>No. 24</u> | <u>No. 25</u> |
|------------------|-----------------------------------------------------------------------|---------------|---------------|
| CE-104575 (4401) | Cooling Tower Foundations - Plans - Sections and Details              | 100%          | 100%          |
| CE-104576 (4402) | Pump House Foundations and Inlet Chamber. Plans, Sections and Details | 85            | 85            |
| CE-104577 (4405) | Pump House - Roof Framing Plan Elevations, Sections & Details         | 95            | 95            |
| CE-104579 (4403) | Pump House - Plan, Elevations and Sections                            | 95            | 95            |
| CE-104580 (4404) | Pump House - Typical Details Walls, Windows and Doors                 | 95            | 95            |
| CE-104581 (4407) | Pump House - Storm Water & Floor Drainage. Plan & Finished Schedules  | 95            | 95            |
| CE-104583 (4406) | Circulating Water Pipe Supports and Manholes                          | 85            | 95            |
| (4408)           | Water Treating Building                                               | 0             | 0             |
| (4409)           | Water Treating Building                                               | 0             | 0             |

These drawings are in box  
Plans to be sent to B-12  
11-30-12-2

c) Electrical (CE-104594 to CE-104609)

Certain manufacturers redesigned and modified their switchgear space requirements for high voltage starters with current limiting fuses. This modifies equipment specification for transformer and switchgear (Circulating Pump House location) which was sent to NACA on 10/17/49. Revision will be sent to NACA on 11/17/49.

Due to the physical size of the 500 KVA transformers at the Circulating Water Pump house the proposed foundation pad will only accommodate the two (2) 500 KVA transformers. No foundation pad will be provided for a future 750 KVA transformers, however, conduits will be installed now under transformer pad for future use.

Work is proceeding on subject drawings to be incorporated either in the General Building Contract or the General Electrical Contract (1st Step Operation).

|                                                                                                                                | <u>No. 24</u> | <u>No. 25</u> |
|--------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| *CE-104594 (3401) Circ. Water Pump House -<br>(General Build- Lighting, Grounding, and<br>ing Contract) Concealed Conduit Plan | 100%          | 100%          |
| CE-104595 (3402) Circ. Water Pump House - One<br>Line Diagram - Switchgear &<br>Transformer Arrangement Plan                   | 60            | 70            |
| CE-104596 (3403) Circ. Water Pump House - Equip-<br>ment Grounding - Conduit Plan<br>and Details                               | 35            | 40            |
| **CE-104597 (3404) Cooling Tower - Lighting Plan<br>and Details                                                                | 95            | 100           |
| **CE-104598 (3405) Cooling Tower - Conduit &<br>Grounding Plan and Details                                                     | 90            | 100           |
| CE-104599 (3406) Power Ducts & Manhole Details                                                                                 | 85            | 90            |
| CE-104600 (3407) Subs. "C" Arrangement Plan<br>and Details                                                                     | 95            | 95            |

\* Four (4) prints sent to NACA on 10/18/49

\*\* Four (4) prints sent to NACA on 11/4/49

VI - FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

Drawings indicated as 95% complete are being checked. Drawing CE-104619 is being redrawn in conformance with NACA's request for revisions to Ventilating system. Drawings CE-104614 and CE-104615, help-up awaiting metering information, can now be completed following receipt of NACA's letter of November 10, 1949 with fuel metering information.

Fuel pump specification with revised pump head will be forwarded to NACA November 18, 1949.

High pressure fuel pump house building design can proceed as soon as study of metering area has been completed.

a) Mechanical (CE-104610 to CE-104639)

|                                                                                | <u>No. 24</u> | <u>No. 25</u> |
|--------------------------------------------------------------------------------|---------------|---------------|
| CE-104610 (2501) Flow Sheet and Valve List<br>HP and LP Systems                | 55%           | 55%           |
| CE-104611 (2502) Location and Arrangement Plan<br>Storage & LP Pump House Area | 90            | 95            |
| CE-104612 (2503) Location & Arrangement Plan                                   | 40            | 95            |
| CE-104613 (2504) Details of Piping in LP Pump<br>House                         | 90            | 95            |
| CE-104614 (2505) Details of Piping in HP Pump<br>House                         | 70            | 75            |
| CE-104615 (2506) Details of Piping Metering<br>Station & Altitude Chamber      | 20            | 30            |
| CE-104619 (2510) L.P. Pump House - Heating,<br>Ventilating and Details         | 90            | 90            |
| CE-104622 (2513) Fire Protection System (CO <sub>2</sub> )                     | 0             | 0             |
| (2514) Fire Protection System (CO <sub>2</sub> )                               | 0             | 0             |

b) Structural Steel and Conc. (CE-104640 to CE-104654)

1. Minor revisions being made to low pressure pump house in accordance with NACA comments on approval drawings.

2. High pressure pump house will be designed and included as a part of contract for construction of pump houses, pipe foundations, tank foundations, etc.

3. Burns and Roe drawing #4506 - Fuel Distribution System - Manholes, Details, etc. has been eliminated. Required details will be shown on mechanical drawings.

|                                                                                                       | <u>No. 24</u> | <u>No. 25</u> |
|-------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104640 (4501) Fuel Storage Tank Foundations<br>& Transfer Platform. Plans,<br>Sections and Details | 95%           | 95%           |
| CE-104641 (4502) LP Fuel Pump House Plan,<br>Sections and Details                                     | 75            | 80            |
| CE-104642 (4503) LP Fuel Pump House and Separ-<br>ator Pit. Plan, Sections and<br>Details             | 70            | 80            |
| (4504) HP Pump House - Plan, Sections<br>and Details                                                  | 75            | 15            |

c) Electrical (CE-104655 to CE-104669)

Electrical work discontinued on HP Fuel Pump House until building design has crystallized.

Work is proceeding on subject drawings to be incorporated either in the General Building Contract or the General Electrical Contract (for 1st Step Operation).

Pump Houses, Pipe Foundations, Tank Foundations, Etc.

|                                                                                          | <u>No. 24</u> | <u>No. 25</u> |
|------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104655 (3501) LP Fuel Pump House - Lighting<br>Grounding & Concealed Conduit<br>Plan  | 90%           | 100%          |
| CE-104658 (3504) HP Fuel Pump House - Lighting,<br>Grounding & Concealed Conduit<br>Plan | 65(aa)        | 65(aa)        |

Gen. Electrical Contract

|                                                                                          |    |        |
|------------------------------------------------------------------------------------------|----|--------|
| CE-104656 (3502) LP Fuel Pump House - Equipment<br>Grounding, Conduit Plan &<br>Details  | 0  | 30     |
| *CE-104657 (3503) Fuel Storage Area - Outdoor<br>Lighting & Conduit Plan                 | 95 | 98     |
| CE-104659 (3505) HP Fuel Pump House - Equipment<br>Grounding, Conduit Plans &<br>Details | 35 | 35(aa) |
| CE-104660 (3506) Telephone & Intercommunication<br>Ducts & Manhole Details               | 0  | 0      |

(aa) Work discontinued until final building design is approved.

VII - ELECTRICAL SUBSTATIONS (No number assigned by NACA)

Final drawing assignments will be included in next report. Tentatively, the following drawings are contemplated. NACA please advise CE drawing numbers for same.

a) Electrical

- 3601 - Substations "A, B and G" - One Line Diagrams
- 3602 - Substations "A, and B" - Changes - Plan
- 3603 - Substations "A and B" Changes - Sections
- 3604 - Substations "G" Changes - Plan
- 3605 - Substation "G" Changes - Sections
- 3606 - Substation "G" Additions - Plans
- 3607 - Substation "GW Additions - Sections
- 3608 - Substation "G" Additions - Details
- 3609 - Substation "G" Conduit Plan and Details
- 3610 - Power (34.5 KV) Duct and Manhole Details

VIII - EQUIPMENT BUILDING ( CE numbers to be assigned by NACA)

(NACA to advise CE drawing numbers for the building) - done

a) NACA to furnish information on air heaters air drier, and re-  
frigeration.

b) NACA to furnish certified prints for compressors and exhausters.  
Prints furnished to date are preliminary only.

*Discussed  
on 11/21-23  
with NACA.*

*H B 12 agree with 1295.  
The spec above the Contractor 30  
for foundation dimensions 4  
for equipment 1295. about 7  
has have 1295. about 7  
award 1295.*

c) NACA to furnish outline drawings for intercoolers and after-cooler (Items 2 and 9 awarded to Ross, remaining to G=R).

d) NACA to furnish Burns and Roe information obtained from Vendors on check valves for exhausters and compressors.

e) List of rubber expansion joints made, and sent to U.S. Rubber Company for comments and recommendations. After these are received, specifications will be written and sent to NACA for review.

f) Specification for low pressure butterfly valves for exhausters and compressors are being prepared and will be sent to NACA for review as soon as possible.

g) Study drawings made of arrangement of exhausters and compressors, based on discussions and comments made at Conference No. 28. Proposal drawings from Ross Heater Co. were used for layout of intercoolers and aftercooler. These studies will be discussed with N.A.C.A. at conference in Cleveland, the week of November 21, 1949.

h) Information needed on size of starting MG set exciters, slip regulators etc. to determine final location of same in general arrangement of equipment building. Tentative layouts using station type 1000 MVA switchgear are being prepared. Final location of major units of equipment depends on having this information.

i) Foundation design drawings are being started for compressors and exhausters. Final drawings cannot be made until certified drawings are received for exhausters, compressors and coolers.

j) Architectural studies are being made of equipment building based on discussions and comments made at conference No. 28.

k) Need information from Elliott Co. as per Burns and Roe letter of October 10 to N.A.C.A. to determine height of compressor bay of equipment building.

l) Presentation drawings are being prepared for the Equipment Building. Three general schemes of design for exterior are being considered.

1) Building using Q-panels, Aluminum Surface on exterior and brick-No windows.

2) Same as above with windows.

3) Exterior brick surface with windows.

m) Investigation of sound levels and sound absorption qualities for various types of construction are being made.

- 10 -

n) Preliminary consideration is being given to column spacing, stairway location and general Building layout. Operating floor plan is being studied.

o) Deep sewer final study and design to be started as soon as letter received from N.A.C.A. *Deep sewer now approved.*

p) Arrangements being made for watertreating conference in New York during week of November 28.

*DRMcConathy*

DRMcConathy/RDK/WGC/AHR/KBH/ld

PROGRESS REPORT NO. 26

December 7, 1949

Subject: National Advisory Committee for Aeronautics  
Flight Propulsion Science Laboratory - Phase I Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

cc: NACA-4  
EJT

RCR  
RFC  
KAR  
WLG-2  
RRB  
FN  
JBM  
PJM  
AAV-4  
KBH-3  
LHR-3  
WGC-3  
KWB-3  
RDK-3  
DRM  
AS  
FILES

I - OPERATIONS BUILDING

a) Shop drawings "Hatfield Electric Co." Nos. HE-601-5 and HE-691-7 showing conduit for receptacles, telephone and signal on first floor located in floor slab were returned. Location of conduits not approved since installation would not allow partition.

b) Revisions to building necessitated by change in end rooms, adding toilet and paneling as required by NACA being made. This change will require two (2) new tracings and require revisions to 18 of present tracings.

c) The checking of shop drawing is progressing satisfactorily. It is suggested that NACA advise contractors that time will be saved in the return of shop drawings if full manufacturer's data be submitted along with the equipment drawings. Drawings cannot be approved without this data. It is further suggested that subcontractors' drawings be carefully reviewed by prime contractor before submission for approval.

II - ALTITUDE TEST CHAMBERS

a) Shop drawings from Treadwell Construction Company are being processed at a steady rate. Treadwell are continuing to send all five (5) copies of approval drawings direct to Burns and Roe.

*This matter was discussed with Mr. Rader Dec. 13* (TW)

✓ b) Proposed change order covering all revisions to contract drawings and specifications since award of contract to be issued on or before December 9th. *Rec'd.*

✓ c) Verbal approval on revised design of thrust platform was obtained during Conference in New York on December 2nd. Drawing is being completed accordingly and draft of specifications is being prepared.

### III - SHOP AND ACCESS BUILDING

a) Trench for heating steam and condensate revised to provide greater inside clear depth. Field Sketch No. 1 was prepared and later revised as discussed during Conference in New York on December 1st and 2nd. Contractor will work from Field Sketch; drawings will be revised at later date.

b) Contract drawings will have to be revised if combustion air pipe is moved to outside of building. (See mechanical notes under Air and Gas Piping, 1st Step).

c) Changes in electrical work are being made which will eliminate the use of large junction boxes and obviate the necessity of grouping safety switches and combination starters near the junction boxes. Power panels will be substituted for the above. In addition, certain steel conduits located in the floors will be relocated. These changes will be incorporated in a change order to be sent to NACA December 15, 1949. The above changes will affect drawings: CE-104180, CE-104183, CE-104184 and CE-104187.

d) Relocation of the air piping outside the building wall will require relocation of the 2-150 KVA and 1-500 KVA (indicated future on drawing) transformers.

### IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

#### a) Mechanical (CE-104500 to CE-104524)

1. Comments have been received from NACA on combustion air piping. NACA requested that a study be made of rearrangement of orifice run from header to test cell, having the pipe line run outside of instead of through the Shop and Access Building.

If this arrangement is adopted it will require complete redrawing of CE-104503 and CE-104506, also new drawing for foundations, as well as revisions to certain drawings of shop and access building. A study is now being made of the proposed arrangement and will be discussed with NACA before proceeding with changes in detail drawings.

2. Design drawings of Daniel orifice fittings were given to NACA. They will issue final specifications, incorporating desirable construction details.

3. Pressure drop calculations for combustion air system were reviewed by NACA. It has been suggested that piping connections at heaters be made 36" instead of 30" and that the header be made 54" instead of 48". This will alter drawing #CE-104503.

4. Comments received from NACA on specifications for expansion joints for the combustion air system, (1st step). Final specifications will be written as soon as decision is made as to arrangement of orifice run as mentioned in paragraph 2 above.

5. Drawings CE-104507 (Expansion Joint List) and CE-104508 (Valve list), completed as far as possible for First Step Construction.

6. Require information from NACA on all combustion air control valves, Specification C-768, to complete drawings CE-104503, CE-104506, CE-104507, CE-104508, CE-104511, and CE104512.

|                                                                                                                   | <u>No. 25</u> | <u>No. 26</u> |
|-------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104500 (2303) Flow Diagrams - Air and Gas Piping<br>Steel 1 and 2                                              | 90%           | 92%           |
| CE-104501 (2301) General Arrangement - Plan Step 1&2                                                              | 70            | 72            |
| CE-104502 (2302) Gen. Arr't. - Elev. Step 1 and 2                                                                 | 67            | 68            |
| CE-104503 (2310) Combustion Air Piping - Plan, Elev.<br>and Details - Altitude Test Chamber<br>Area - First Step. | 93            | 93*           |
| CE-104506 (2313) Combustion Air Piping - Supports<br>Anchors & Misc. Details. 1st Step                            | 90            | 90*           |
| CE-104507 (2314) Expansion Joint List - Air & Gas Piping                                                          | 40            | 42            |
| CE-104508 (2315) Valve List - Air & Gas Piping                                                                    | 25            | 28            |
| CE-104504 (2311) Combustion Air Piping - Plan, Elev.<br>and Details - Heater Area                                 | 30            | 30            |
| CE-104505 (2312) Combustion Air Piping - Section and<br>Details - Heater Area                                     | 40            | 40            |
| CE-104509 (2316) Control Piping, Plans, Elev. and<br>Details, Step 1 and 2                                        | 0             | 0             |
| CE-104510 (2317) Control Piping, Sections and Details<br>Step 1 and 2                                             | 0             | 0             |
| CE-104511 (2318) Combustion Air Piping - Arrangement of<br>Control Valves - First Step                            | 0             | 0             |
| CE-104512 (2319) Combustion Air Piping - Details of<br>Supports at Control Valves                                 | 0             | 0             |

\* These drawings subject to complete change. See Paragraph 1.

b) Exhaust Gas Ducts (CE-104525 to CE-104539)

1. Bids on expansion joints received by Burns and Roe and are being analyzed.

2. Drawings CE-104527, CE-104528 and CE-104529 to be revised for combustion air by-pass connection, when this information is determined.

3. Information needed on Exhaust control valves to determine supports and connection to gas ducts.

4. Specifications and drawings for exhaust gas ducts were issued to bidders by NACA on November 18, 1949. Bids due December 12, 1949.

5. Report on investigation of temperature stresses in stiffening rings of steel ducts and computations for support rings were sent to NACA on November 21, 1949.

6. Final sepias and specifications for Atmospheric Exhaust Stack will be sent to NACA during week of December 5th as part of contract for construction of pump house, pipe foundations, tank foundations, etc.

|                                                                                 | <u>No. 25</u> | <u>No. 26</u> |
|---------------------------------------------------------------------------------|---------------|---------------|
| CE-104525 (4310) Atmospheric Exhaust Stack                                      | 95%           | 95%           |
| CE-104526 (4302) Atmospheric Exhaust Stack Details                              | 95            | 95            |
| CE-104527 (4303) Gen. Arrangement - 2nd and Anchor Sections and Roller Supports | 95            | 100           |
| CE-104528 (4304) Tee and Pipe Sections, Plans, Elevations and Details           | 95            | 100           |
| CE-104529 (4305) Transition Sections, Plan, Elevations and Details              | 95            | 100           |

c) Structural Steel and Concrete Design (CE-104540 to CE-104549)

1. Require information on control valves for support design.

2. Final location of by-pass will establish minor changes to foundation drawings.

3. Decision required as to requirements for walkways to Secondary Cooler and Control Valves.

4. Final sepias of drawings CE-104543, CE-104544 and CE-104545 will be sent to NACA during week of December 5th as part of Contract for Construction of Pump Houses, Pipe Foundations, Tank Foundations, etc.

5. Proposed relocation of combustion air pipe from within the Shop and Access Building to without, may require an additional foundation drawing.

6. Final location of connecting pipe to air heaters may necessitate minor changes to drawing CE-104543.

|                                                                                                     | <u>No. 25</u> | <u>No. 26</u> |
|-----------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540 (4310) Walkways and Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80%           | 80%           |
| CE-104541 (4311) Walkways and Stairways - Test Chamber & Primary Coolers - Sections and Details     | 80            | 80            |
| CE-104542 (4314) Secondary Cooler Foundation Piling Plan Sections and Details                       | 100           | 100           |
| CE-104543 (4315) Trenches and Piping Foundations Plan, Sections Details & Piling Plan               | 95            | 95            |
| CE-104544 (4316) Exhaust Piping & Stack Foundations Plan, Sections, Details and Piling Plan         | 95            | 95            |
| CE-104545 (4317) Exhaust Piping & Stack Foundations, Sections and Details                           | 95            | 95            |

d) Electrical (CE-104550 to CE-104557)

Comments on drawings marked \* were discussed in Cleveland 11-21-49. Drawings will be revised and final sepia tracings sent to NACA.

|                                                                              | <u>No. 25</u> | <u>No. 26</u> |
|------------------------------------------------------------------------------|---------------|---------------|
| * CE-104550 (3301) Outdoor Area Lighting and Receptacles - Plans and Details | 85%           | 95%           |
| * CE-104551 (3302) Grounding System - Plans and Details                      | 90            | 95            |
| CE-104552 (3303) Instrumentation and Controls - Plans and Details            | 0             | 0             |

V - COOLING TOWER AND CIRCULATING WATER SYSTEM (CE-104558 to CE-104609)

a) Mechanical (CE-104558 to CE-104574)

|                                                                     | <u>No. 25</u> | <u>No. 26</u> |
|---------------------------------------------------------------------|---------------|---------------|
| CE-104558 (2401) Flow Sheet and Valve List                          | 100%          | 95%           |
| CE-104559 (2402) Location & Arrangement Plan Pump House Area        | 100           | 95            |
| CE-104560 (2403) Location & Arrangement Plan Equipment Area         | 100           | 95            |
| CE-104561 (2404) Pump House Piping - Plans, Sections and Details    | 100           | 95            |
| CE-104562 (2405) Details of Piping at Primary and Secondary Coolers | 100           | 95            |
| CE-104563 (2406) Details of Piping at Altitude Chamber              | 100           | 95            |
| CE-104570 (2407) Heating, Ventilating & Details                     | 100           | 95            |
| CE-104572 (2408) Water Treatment                                    | 0             | 0             |
| CE-104573 (2409) Water Treatment                                    | 0             | 0             |

1. Final specification for piping system (forwarded to NACA 11/14/49) is being processed by NACA.

2. Comments on specification drawings (forwarded to NACA 11/14/49) were received 12/1/49 and will require slight revisions to drawings and complete rechecking. New Sepias will be reforwarded after work is completed.

3. A Conference held in New York on December 1st indicates that some changes in the present design at cooling tower basin outlet and circulating water pump house may be necessary.

The most practical solution at the moment for water treatment seems to be a vacuum deaeration system in conjunction with a demineralizing system for make-up water.

A report is to be prepared with the necessary cost estimates for complete water treatment study for NACA approval before proceeding. *Report will be an evaluation of "shell" system estimates for various applicable methods of water treatment.*

b) Structural Steel and Concrete (CE-104575 to CE-104594)

1. Elevation of Mezzanine floor of circulating water pump house was raised 12-1/2" to provide additional space for electrical conduits and cables.

2. Final sepia of drawings CE-104576, CE-104577, CE-104579, CE-104580 and CE-104581 and revised draft of specifications will be sent to NACA during the week of December 5th as part of Contract for construction of Pump House, Pipe Foundations, Tank Foundations, etc.

3. Final Sepia of drawin CE-104583 was sent to NACA on November 17th, 1949.

|                                                                                              | <u>No. 25.</u> | <u>No. 26</u> |
|----------------------------------------------------------------------------------------------|----------------|---------------|
| CE-104575 (4401) Cooling Tower Foundations - Plans<br>Sections and Details                   | 100%           | 100%          |
| CE-104576 (4402) Pump House Foundations and Inlet<br>Chamber, Plans, Sections and Details    | 85             | 95            |
| CE-104577 (4405) Pump House - Roof Framing Plan,<br>Elevations, Sections and Details         | 95             | 95            |
| CE-104579 (4403) Pump House - Plan, Elevations and<br>Sections                               | 95             | 95            |
| CE-104580 (4404) Pump House - Typical Details Walls,<br>Windows and Doors                    | 95             | 95            |
| CE-104581 (4407) Pump House - Storm Water and Floor<br>Drainage, Plan and Finished Schedules | 95             | 95            |
| CE-104583 (4406) Circulating Water Pipe Supports and<br>Manholes                             | 95             | 95            |
| (4408) Water Treating Building                                                               | 0              | 0             |
| (4409) Water Treating Building                                                               | 0              | 0             |

c) Electrical (CE-104594 to CE-104609)

Drawings marked \* and \*\* discussed with NACA 11-21-49. Comments will be incorporated and sepia tracings forwarded NACA when completed.

Augomatic control scheme for the Circulating Water Distribution System including control diagram for Manual-Automatic Operation drawing SK-1218-E-13 was discussed with NACA 11-21-49. Comments will be incorporated and revised scheme to be sent NACA when completed.

|                                                                                                                     | <u>No. 25</u> | <u>No. 26</u> |
|---------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| *CE-104594 (3401) Circ. Water Pump House Lighting,<br>(Gen. Bldg. Grounding and Concealed Conduit<br>Contract) Plan | 100%          | 100%          |
| CE-104594 (3402) Circ. Water Pump House - One Line<br>Diagram - Swgr & Transformer<br>Arrangement Plan              | 70            | 80            |
| CE-104596 (3403) Circ. Water Pump House - Equipment<br>Grounding - Conduit Plan & Details                           | 40            | 50            |
| **CE-104597 (3404) Cooling Tower - Lighting Plan and<br>Details                                                     | 100           | 100           |
| **CE-104598 (3405) Cooling Tower - Conduit & Grounding<br>Plan and Details                                          | 100           | 100           |
| CE-104599 (3406) Power Ducts & Manhole Details                                                                      | 90            | 90            |
| CE-104600 (3407) Subs. "C" Arrangement Plan and<br>Details                                                          | 95            | 95            |

\*Four (4) prints sent to NACA on 10/18/49

\*\* Four (4) prints sent to NACA on 11/4/49

**VI - FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)**

| <b>a) <u>Mechanical</u> (CE-104610 to CE-104639)</b> |                                                               | <b><u>No. 25</u></b> | <b><u>No. 26</u></b> |
|------------------------------------------------------|---------------------------------------------------------------|----------------------|----------------------|
| CE-104610 (2501)                                     | Flow Sheet HP and LP Systems                                  | 55%                  | 70%                  |
| CE-104611 (2502)                                     | Location and Arrangement Plan<br>Storage & LP Pump House Area | 95                   | 95                   |
| CE-104612 (2503)                                     | Location & Arrangement Plan                                   | 95                   | 95                   |
| CE-104613 (2504)                                     | Details of Piping in LP Pump House                            | 95                   | 95                   |
| CE-104614 (2505)                                     | Details of Piping in HP Pump House                            | 75                   | 75                   |
| CE-104615 (2506)                                     | Details of Piping at Altitude Chamber<br>and Valve List       | 30                   | 40                   |
| CE-104619 (2510)                                     | LP Pump House - Heating, Ventilating<br>and Details           | 90                   | 90                   |
| CE-104622 (2513)                                     | Fire Protection System (CO <sub>2</sub> )                     | 0                    | 0                    |
| (2514)                                               | Fire Protection System (CO <sub>2</sub> )                     | 0                    | 0                    |

**b) Struct. Steel and Concrete (CE-104640 to CE-104654)**

1. Minor revisions are being made to low pressure pump house in accordance with NACA comments on approval drawings.

2. High pressure pump house will be designed and included as a part of contract for Construction of Pump Houses, Pipe Foundations, Tank Foundations, etc. It is anticipated that this inclusion will be in the form of an Addendum so that issuance of contract to bidders need not be delayed.

3. Burns and Roe drawing 4506 = Fuel Distribution System - Manholes, Details, etc. has been eliminated. Required details will be shown on mechanical drawings.

4. Final sepias of drawings CE-104640, CE-104641 and CE-104642 will be sent to NACA during week of December 5th as a part of contract for Construction of Pump Houses; Pipe Foundations, Tank Foundations, etc.

|                  |                                                                                       | <b><u>No. 25</u></b> | <b><u>No. 26</u></b> |
|------------------|---------------------------------------------------------------------------------------|----------------------|----------------------|
| CE-104640 (4501) | Fuel Storage Tank Foundations &<br>Transfer Platform - Plans, Sections<br>and Details | 95%                  | 95%                  |
| CE-104641 (4502) | LP Fuel Pump House Plan, Sections<br>and Details                                      | 80                   | 85                   |
| CE-104642 (4503) | LP Fuel Pump House and Separator<br>Pit. Plan, Sections and Details                   | 80                   | 95                   |
| (4504)           | HP Pump House - Plan, Sections<br>and Details                                         | 15                   | 15                   |

**c) Electrical (CE-104655 to CE-104669)**

1. Bids received on HP Fuel Pump House transformer and Switchgear were rejected since all took exception to the specification requirements. Additional switchgear requirements could not be incorporated with submitted arrangements. New specifications to be prepared and sent to NACA when completed.

2. Study drawing to be sent to NACA 12-8-49 indicating information required to complete drawing CE-104660.

3. Drawings marked \* discussed with NACA on 11-21-49. Sepia tracings to be forwarded to NACA when completed.

|                                                                                            | <u>No. 25</u> | <u>No. 26</u> |
|--------------------------------------------------------------------------------------------|---------------|---------------|
| *CE-104655 (3501) LP Fuel Pump House - Lighting<br>Grounding & Concealed Conduit Plan      | 100%          | 100%          |
| CE-104658 (3504) HP Fuel Pump House - Lighting,<br>Grounding and Concealed Conduit<br>Plan | 65(aa)        | 65(aa)        |

General Electrical Contract

|                                                                                            |        |        |
|--------------------------------------------------------------------------------------------|--------|--------|
| CE-104656 (3502) LP Fuel Pump House - Equipment<br>Grounding, Conduit Plan and<br>Details  | 30     | 40     |
| *CE-104657(3503) Fuel Storage Area - Outdoor<br>Lighting and Conduit Plan                  | 98     | 100    |
| CE-104659 (3505) HP Fuel Pump House - Equipment<br>Grounding, Conduit Plans and<br>Details | 35(aa) | 35(aa) |
| CE-104660 (3506) Telephone and Intercommunication<br>Ducts and Manhole Details             | 0      | 0      |

(aa) Work discontinued until final building design is approved.

VII - ELECTRICAL SUBSTATIONS (CE-102374 to CE-102383)

*Calder 12/19/44 by K. Clark*

NACA should assign a minimum of twenty (20) numbers for this section. In addition to the above electrical drawings, structural drawings also will be required.

VIII - EQUIPMENT BUILDING (NACA to assign CE Nos.)

*← have done in Bldg. space.*

(a) Mechanical:

1. Specifications for air heaters have been released to Vendors. More specific data on heaters will permit continuation of work such as air piping and foundations in the area between the header pit and Equipment Building.
2. Requirements for the drying and refrigeration system have been decided by NACA. Briefly these are 225# of air per second dried to 7 grain moisture content and 100#/sec. at - 70°F. Tests are continuing on the air turbine. It has been suggested that a discussion on this subject be held, that the resulting conclusions be submitted to Manufacturers for study, that conferences be held with the manufacturers as to their suggested offerings before specifications are written for the procurement of equipment.  
*? (115#/sec) 235 (wet air) Required moisture content here still indefinite*
3. Certified prints for General Arrangements of Compressors and Exhausters have not been received from NACA.
4. Burns and Roe require the final outline drawings for intercoolers and aftercoolers (Item 2 and 9 awarded to Ross and Items 1, 3 and 7 to Griscom-Russell).
5. NACA to furnish Burns and Roe information obtained from Vendors on check valves for exhausters and compressors.
6. Comments on rubber expansion joints received from U.S. Rubber Co. specifications will be written and sent to NACA for review.
7. Specification for low pressure butterfly valves for exhausters are being prepared and will be sent to NACA for review as soon as possible.
8. Study drawings made of arrangement of exhausters and compressors, based on discussions and comments made at Conference No. 29. Proposal drawings from Ross Heater Co. were used for layout of intercoolers and aftercooler. These studies were discussed with NACA at conference in New York the week of November 28, 1949.
9. The approximate final location of major equipment in the Equipment Building will permit study of cooling water system provided equipment drawing for the inter-and-after coolers can be obtained.

*Certified prints are not due for 6 weeks.*

**(b) Structural and Architectural:**

1. Presentation drawings were prepared using Q panels, Brickwork and fenestration. These were reviewed for purpose of study of the Mass Effect in relation to an original plow layout. These elevations are to be restudied basing ultimate exterior expression on results of restudy of floor plan. Floor plan to be coordinated to ideas presented and discussed at meeting in New York on November 28.
2. Foundation design drawings are being started for compressors and exhausters. Final drawings cannot be made until certified drawings are received for exhausters, compressors and coolers.
3. Preliminary design drawing of foundation for first stage exhauster was given to NACA at Cleveland during conference No. 29. NACA have sent this to Roots-Connersville for their comments.
4. Need information from Elliott Co. as per Burns and Roe letter of October 10 to NACA to determine height of compressor bay of equipment building.
5. Investigation of sound levels and sound absorption qualities for various types of construction are being made.

**(c) Electrical:**

1. At meeting with NACA 11-21-49 it was agreed that 1000 MVA switchgear would be used for the running bus and 500 MVA switchgear for the starting bus. Preliminary layouts for switchgear are being prepared installing the 500 MVA switchgear on mezzanine in basement and 1000 MVA switchgear on operating floor.
2. Dimensions (overall and with radiators and accessories removed) for the main transformers were given Burns and Roe verbally by NACA. These dimensions are within 4 inches. Transformers are to be located along building wall near secondary cooler.
3. In order that equipment may be reasonably located within the Equipment Building we will require information on the size of starting MG set exciters, slip regulator, neutral resistor, etc. Approximate dimensions are being used to locate equipment on the preliminary layout.

**(d) Deep Sewer:**

NACA have completed a study to determine the preferable location of deep sewer for laboratory requirements both present and future. Two routes have been chosen, one which favors psl location while the second offers greater advantages for future expansion. Burns and Roe are awaiting a decision as to the route to be selected before continuing with design drawings and specifications.

Progress:

Based on the status of the work as of December 1st, 1949 we believe that the following percentages may be considered as reasonably accurate for engineering and design completion.

|                                         | <u>No. 24</u> | <u>No. 26</u> |
|-----------------------------------------|---------------|---------------|
| 1. Operations Building                  | 99%           | 99%           |
| Amendment #1                            | 99%           | 99%           |
| Amendment #2                            | -             | 25            |
| 2. Altitude Test Chambers               | 97            | 98            |
| 3. Shop and Access Building             | 95            | 96            |
| 4. Test Air Piping                      | 80            | 86            |
| 5. Cooling Tower and Circ. Water System | 78            | 85            |
| 6. Fuel Storage & Distribution System   | 60            | 75            |
| 7. Elec. Substations                    | 10            | 15            |
| 8. Equipment Building & Equipment       | 10            | 15            |

DRMcConathy/RDK/KBH/LHR/WGC/id

December 19, 1949

Subject: National Advisory Committee for Aeronautics  
Propulsion Research Laboratory - Phase I  
Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

cc: NACA-4  
EJT-1

RCR  
RFC  
KAR  
WLG-2  
RRB  
FN  
JBM  
PJM  
AAV-4  
KBH-3  
LHR-3  
WGC-3  
RDK-3  
AFS  
DRM  
FILES

### I - OPERATIONS BUILDING

a) Proposed Change Order No. 11 covering revisions to building necessitated by Change in end rooms and adding toilet and paneling as required by NACA is being prepared. Revised drawings and one new drawing were forwarded to NACA on December 16th, one additional drawing and finish schedule yet to be forwarded.

b) In general, the checking of shop drawings is progressing satisfactorily except that resubmission of drawings for stairways and front entrance doors is slow. It is suggested that subcontractors drawings be carefully reviewed by prime contractor before submission for approval with special consideration given to proper identification of shop drawings on the drawings as to specific contract to which they apply.

### II - ALTITUDE TEST CHAMBERS

a) Shop drawings from Treadwell Construction Company are being processed at a steady rate.

b) Proposed change order covering all revisions to contract drawings and specifications since award of contract was sent to NACA.

c) Drawings and rough draft of specification for thrust platform and measuring device were sent to NACA for final approval on December 15th.

### III - SHOP AND ACCESS BUILDING

a) Contract drawings will have to be revised if combustion air pipe is moved to outside of building. (See mechanical notes under Air and Gas Piping, 1st Step).

b) On all electrical drawings changes have been made. Change Order No. 7 and the corrected sepia's will be forwarded to NACA this week.

c) Proposed relocation of the air piping outside the building wall will require relocation of the 2 - 150 KVA and 1 - 500 KVA (indicated future on drawing) transformers. *mounted on top of lines*

#### IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

##### a) Mechanical (CE-104500 to CE-104524)

1. Study made of rearrangement of combustion air orifice run. Estimate made of cost of making changes to drawings. NACA requested quotation on the cost before proceeding to make any changes. (See NACA letter dated 12-9-49).

2. NACA have submitted marked up prints of orifice fitting to Daniel Orifice Fitting Company requesting improvement in design. NACA writing specifications for orifice fitting.

3. Final specifications for expansion joints for combustion air piping cannot be written until NACA decides on change described above.

4. Require information from NACA on all combustion air control valves Specification C-768. These are needed to complete contract drawings.

|                  |                                                                                           | <u>No. 25</u> | <u>No. 26</u> |
|------------------|-------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104500 (2303) | Flow Diagrams - Air & Gas Piping Steel 1 and 2                                            | 92%           | 92            |
| CE-104501 (2301) | General Arrangement - Plan Step 1 and 2                                                   | 72**          | 72            |
| CE-104502 (2302) | Gen. Arr't. - Elev. Step 1 and 2                                                          | 68**          | 68            |
| CE-104503 (2310) | Combustion Air Piping - Plan, Elev. and Details - Altitude Test Chamber Area - First Step | 93*           | 93            |
| CE-104506 (2313) | Combustion Air Piping - Supports Anchors and Miscellaneous Details - 1st Step             | 90*           | 90            |
| CE-104507 (2314) | Exp. Joint List - Air & Gas Piping                                                        | 42**          | 42            |
| CE-104508 (2315) | Valve List - Air and Gas Piping                                                           | 28            | 28            |
| CE-104504 (2311) | Combustion Air Piping - Plan, Elev. and Details - Heater Area                             | 30            | 30            |
| CE-104509 (2316) | Control Piping, Plans, Elev. and Details, Step 1 and 2                                    | 0             | 0             |
| CE-104510 (2317) | Control Piping, Sections and Details Step 1 and 2                                         | 0             | 0             |
| CE-104511 (2318) | Combustion Air Piping - Arrangement of Control Valves - First Step                        | 0             | 0             |
| CE-104512 (2319) | Combustion Air Piping - Details of Supports at Control Valves                             | 0             | 0             |

\*\* These drawings subject to revision. - See Paragraph 1.

\* These drawings subject to complete change. - See Paragraph 1.

##### b) Exhaust Gas Ducts (CE-104525 to CE-104539)

1. Bids on expansion joints received by Burns and Roe and recommendations for purchase made to NACA.

2. Drawings CE-104527, CE-104528 and CE-104529 to be revised for combustion air by-pass connection, when this information is determined.

3. Information needed on Exhaust control valves to determine supports and connection to gas ducts.

4. Bids on Exhaust Gas Ducts were received and comments were forwarded to NACA.

5. Final sepia's and specifications for Atmospheric Exhaust Stack were sent to NACA as part of contract for Exhaust Stack, Pump House, Tank Foundations, Pipe Supports, etc.

|                                                                                       | <u>No. 26</u> | <u>No. 27</u> |
|---------------------------------------------------------------------------------------|---------------|---------------|
| CE-104525 (4310) Atmospheric Exhaust Stack                                            | 95%           | 97            |
| CE-104526 (4302) Atmospheric Exhaust Stack Details                                    | 95            | 97            |
| CE-104527 (4303) General Arrangement - Second and Anchor Sections and Roller Supports | 100           | 100           |
| CE-104528 (4304) Tee and Pipe Sections, Plans, Elevations and Details                 | 100           | 100           |
| CE-104529 (4305) Transition Sections, Plan, Elevations and Details                    | 100           | 100           |

c) Structural Steel and Concrete Design (CE-104540 to CE-104549)

1. Require information on control valves for support design.

2. Final location of by-pass will establish minor changes to foundation drawings.

3. Decision required as to requirements for walkways to secondary cooler and control valves.

4. Final sepia's of drawings CE-104543, CE-104544 and CE-104545 were sent to NACA as part of Contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, etc.

5. Proposed relocation of combustion air pipe from within the Shop and Access Building to without, may require an additional foundation drawing.

6. Final location of connecting pipe to air heaters may necessitate minor changes to drawing CE-104543.

|                                                                                                     | <u>No. 26</u> | <u>No. 27</u> |
|-----------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540 (4310) Walkways and Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80%           | 80%           |
| CE-104541 (4311) Walkways and Stairways - Test Chamber and Primary Coolers - Sections and Details   | 80            | 80            |
| CE-104542 (4314) Secondary Cooler Foundation Piling Plan Sections and Details                       | 100           | 100           |

|                  |                                                                                  | <u>No. 26</u> | <u>No. 27</u> |
|------------------|----------------------------------------------------------------------------------|---------------|---------------|
| CE-104543 (4315) | Trenches and Piping Foundations<br>Plan, Sections Details & Piling Plan          | 95            | 97            |
| CE-104544 (4316) | Exhaust Piping & Stack Foundations<br>Plan, Sections, Details and Piling<br>Plan | 95            | 97            |
| CE-104545 (4317) | Exhaust Piping and Stack Foundations,<br>Sections and Details                    | 95            | 97            |

d) Electrical (CE-104550 to CE-104557)

|                   |                                                            |    |    |
|-------------------|------------------------------------------------------------|----|----|
| *CE-104550 (3301) | Outdoor Area Lighting and Receptacles<br>Plans and Details | 95 | 97 |
| *CE-104551 (3302) | Grounding System - Plans & Details                         | 95 | 97 |
| CE-104552 (3303)  | Instrumentation and Controls - Plans<br>and Details        | 0  | 0  |

V - COOLING TOWER AND CIRCULATING WATER SYSTEM (CE-104558 to CE-104609)

a) Mechanical

1. Drawings have been revised and will be checked next week prior to forwarding to NACA.
2. Requested move of high pressure fuel pump house has necessitated study of interference with 18" C.W. lines from Secondary Cooler.
3. Sepia tracing of drawing CE-104570, "Heating, Ventilation, and Details" was forwarded to NACA December 15, 1949 for issuance with contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, Etc.

| a) <u>Mechanical</u> (CE-104558 to CE-104574)                          | <u>No. 26</u> | <u>No. 27</u> |
|------------------------------------------------------------------------|---------------|---------------|
| CE-104558 (2401) Flow Sheet and Valve List                             | 95%           | 95%           |
| CE-104559 (2402) Location and Arrangement Plan<br>Pump House Area      | 95            | 95            |
| CE-104560 (2403) Location & Arrangement Plan<br>Equipment Area         | 95            | 95            |
| CE-104561 (2404) Pump House Piping - Plan, Sections<br>and Details     | 95            | 95            |
| CE-104562 (2405) Details of Piping at Primary and<br>Secondary Coolers | 95            | 95            |
| CE-104570 (2407) Heating, Ventilating & Details                        | 95            | 100           |
| CE-104572 (2408) Water Treatment                                       | 0             | 0             |
| CE-104573 (2409) Water Treatment                                       | 0             | 0             |

b) Structural Steel and Concrete (CE-104575 to CE-104594)

1. Final sepias of drawings CE-104576, CE-104577, CE-104579, CE-104580 and CE-104581 and revised draft of specifications were sent to NACA as part of contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, Etc.

|                  |                                                                                | <u>No. 26</u> | <u>No. 27</u> |
|------------------|--------------------------------------------------------------------------------|---------------|---------------|
| CE-104575 (4401) | Cooling Tower Foundations - Plans<br>Sections and Details                      | 100%          | 100%          |
| CE-104576 (4402) | Pump House Foundations and Inlet<br>Chamber, Plans, Sections and<br>Details    | 95            | 98            |
| CE-104577 (4405) | Pump House - Roof Framing Plan,<br>Elevations, Sections and Details            | 95            | 98            |
| CE-104579 (4403) | Pump House - Plan, Elevations and<br>Sections                                  | 95            | 98            |
| CE-104580 (4404) | Pump House - Typical Details Walls,<br>Windows and Doors                       | 95            | 98            |
| CE-104581 (4407) | Pump House - Storm Water and Floor<br>Drainage, Plan and Finished<br>Schedules | 95            | 98            |
| CE-104583 (4406) | Circulating Water Pipe Supports<br>and Manholes                                | 95            | 95            |
| (4408)           | Water Treating Building                                                        | 0             | 0             |
| (4409)           | Water Treating Building                                                        | 0             | 0             |

c) Electrical (CE-104594 to CE-104609)

The manual-automatic control scheme for the Circulating Water Distribution System and Drawing SK-1218-E-13, "Control Diagram for Manual-Automatic Operation" are being revised in accordance with the discussion with NACA. The revised system and drawing will be sent to NACA on completion.

|                  |                                                                                                          | <u>No. 26</u> | <u>No. 27</u> |
|------------------|----------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104594 (3401) | Circ. Water Pump House Lighting<br>(Gen. Bldg.<br>Contract) Grounding and Concealed Conduit<br>Plan      | 100%          | 100%          |
| CE-104594 (3402) | Circulating Water Pump House -<br>One Line Diagram - Switchgear<br>and Transformer - Arrangement<br>Plan | 80            | 90            |
| CE-104596 (3403) | Circulating Water Pump House -<br>Equipment Grounding - Conduit<br>Plan and Details                      | 50            | 70            |
| CE-104597 (3404) | Cooling Tower - Lighting Plan<br>and Details                                                             | 100           | 100           |
| CE-104598 (3405) | Cooling Tower - Conduit and<br>Grounding Plan and Details                                                | 100           | 100           |
| CE-104599 (3406) | Power Ducts and Manhole Details                                                                          | 90            | 95            |
| CE-104600 (3407) | Substation "C" Arrangement Plan<br>and Details                                                           | 95            | 100           |

VI - FUEL STORAGE AND DISTRIBUTION SYSTEM - (CE-104610 to CE-104669)

(a) Mechanical:

1. Four (4) prints each of all Fuel Piping drawings were handed to N.A.C.A. December 13, 1949 for review and comments.

2. Information received at conference will permit completion of all Fuel Piping drawings with the exception of metering room piping which will be issued later following final decisions on metering system.

3. Final design of High Pressure Pump House Building must await decision as to metering room space requirements.

4. Sepia tracing of Dwg. No. CE-104619 "L.P. Pump House - Heating, Ventilating, and Details" was forwarded to N.A.C.A. December 15, 1949 for issuance with contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, Etc.

|                                                                                               | <u>No. 26</u> | <u>No. 27</u> |
|-----------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104610 (2501) Flow Sheet HP and LP Systems                                                 | 70%           | 75%           |
| CE-104611 (2502) Location and Arrangement Plan<br>Storage & LP Pump House Area                | 95            | 95            |
| CE-104612 (2503) Location & Arrangement Plan -<br>Altitude Chamber and HP Pump<br>House Area. | 95            | 95            |
| CE-104613 (2504) Details of Piping in LP Pump House                                           | 95            | 95            |
| CE-104614 (2505) Details of Piping in HP Pump House                                           | 75            | 80            |
| CE-104615 (2506) Details of Piping at Altitude<br>Chamber and Valve List                      | 40            | 50            |
| CE-104619 (2510) LP Pump House - Heating, Ventilating<br>and Details                          | 90            | 100           |
| * CE-104620 (2511) HP Pump House - Heating, Ventilating<br>and Details                        | 0             | 0             |
| CE-104622 (2513) Fire Protection System (CO2)                                                 | 0             | 0             |
| (2514) Fire Protection System (CO2)                                                           | 0             | 0             |
| * New Drawing.                                                                                |               |               |

(b) Structural Steel and Concrete (CE-104640 to CE-104654)

1. High pressure pump house will be designed when metering space requirements are determined.

2. Final sepia of drawings CE-104640, CE-104641 and CE-104642 were sent to N.A.C.A. as a part of contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, Etc.

|                                                                                                         | <u>No. 26</u> | <u>No. 27</u> |
|---------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104640 (4501) Fuel Storage Tank Foundations &<br>Transfer Platform - Plans, Sections<br>and Details. | 95%           | 98%           |
| CE-104641 (4502) LP Fuel Pump House Plan, Sections<br>and Details                                       | 85            | 98            |
| CE-104642 (4503) LP Fuel Pump House and Separator<br>Pit. Plan, Sections and Details                    | 95            | 98            |
| (4504) HP Pump House - Plan, Sections and<br>Details                                                    | 15            | 15            |

(c) Electrical - (CE-104655)

Revised specifications have been prepared in rough draft form for the HP Fuel Pump House transformer and control center. These revised specifications will be discussed with N.A.C.A. during the week beginning December 19, 1949.

|                                                                                      | <u>No. 26</u> | <u>No. 27</u> |
|--------------------------------------------------------------------------------------|---------------|---------------|
| CE-104655 (3501) LP Fuel Pump House - Lighting, Grounding & Concealed Conduit Plan   | 100%          | 100%          |
| CE-104658 (3504) HP Fuel Pump House - Lighting, Grounding and Concealed Conduit Plan | 65(aa)        | 65(aa)        |

General Electrical Contract:

|                                                                                      |        |        |
|--------------------------------------------------------------------------------------|--------|--------|
| CE-104656 (3502) LP Fuel Pump House - Equipment Grounding, Conduit Plan and Details  | 40     | 60     |
| CE-104657 (3503) Fuel Storage Area - Outdoor Lighting and Conduit Plan               | 100    | 100    |
| CE-104659 (3505) HP Fuel Pump House - Equipment Grounding, Conduit Plans and Details | 35(aa) | 35(aa) |
| CE-104660 (3506) Telephone and Intercommunication Ducts and Manhole Details          | 0      | 0      |

(aa) Work discontinued until final building design is approved.

VII - ELECTRICAL SUBSTATIONS

N.A.C.A. should assign a minimum of twenty (20) numbers for this section. In addition to the above electrical drawings, structural drawings also will be required.

VIII - EQUIPMENT BUILDING

(a) Mechanical:

1. Specifications for air heaters have been released to Vendors. More specific data on heaters will permit continuation of work such as air piping and foundations in the area between the heater pit and Equipment Building.

2. Requirements for the drying and refrigeration system have been decided by N.A.C.A. Briefly these are ~~225~~ <sup>115 #/sec.</sup> of air per second dried to 7 grain moisture content and ~~100~~ <sup>235 # (wet air)</sup> #/sec. at -70°F. Tests are continuing on the air turbine. It has been suggested that a discussion on this subject be held, that the resulting conclusions be submitted to Manufacturers for study, that conferences be held with the manufacturers as to their suggested offerings before specifications are written for the procurement of equipment.

3. Certified prints of compressors, received from Elliott 12-12-49.

4. Certified prints for General Arrangements of Exhausters have not been received from NACA.

5. Burns and Roe require the final outline drawings for intercoolers and aftercoolers.

6. NACA to furnish Burns and Roe information obtained from Vendors on check valves for exhausters and compressors.

*Data not satisfactory.*  
7. Data on rubber expansion joints received from U.S. Rubber Company and sent to NACA for comments.

8. Information on low pressure butterfly valves for exhausters have been sent to vendors for recommendations, so that final specifications may be written.

9. Study drawings of arrangement of exhausters, compressors and coolers are being made, so that discussion of foundations, piping connections, thrusts, etc. made be had with Roots Connersville, Elliott, Griscom Russell and Ross Heater.

10. The approximate final location of major equipment in the Equipment Building will permit study of cooling water system provided equipment drawing for the inter-and-after coolers can be obtained.

b) Structural and Architectural:

1. Presentation drawings were prepared using Q panels, Brickwork and fenestration. These were reviewed for purpose of study of the mass effect in relation to an original plow layout. These elevations are being restudied basing ultimate exterior expression on results of restudy of floor plan. Floor plan is being coordinated to ideas presented and discussed at meeting in New York on November 28th, 1949.

2. Preliminary design drawing of foundation for second stage exhauster was sent to NACA. NACA to send this to Roots-Connersville for their comments.

3. Preliminary design drawing of foundation for compressors will be sent to NACA on December 16, 1949. This is to be sent to Elliott for comments.

4. Investigation of sound levels and sound absorption qualities for various types of construction are being made.

c) Electrical:

1. Preliminary one line diagram is nearing completion. Preliminary layouts for electrical equipment are being prepared.

2. Final dimensions are required from NACA for the M-G set exciters, slip regulator, neutral resistor, starting transformer, etc.

3. Elliott Company outline drawings for 10,500 hp and 10,000 hp motors were returned to NACA with Burns and Roe comments on December 15.

(d) Deep Sewer

Burns and Roe will stop all work on deep sewer. NACA will be responsible for all detailed engineering and design on this item. Connections from PSL facilities to deep sewer will be made after location and design of latter is determined.

DRMcConathy  
LHRoth/WGC/id

*DRMcConathy/id*

PROGRESS REPORT NO. 28

Subject: National Advisory Committee for Aeronautics  
Propulsion Science Research Laboratory - Phase I Part II  
Project No. 794 (NAW-5652) - B&R W.O. #1218

January 10, 1950

cc: NACA=4  
EJT =1

RCR  
RFC  
KAR  
WLG-2  
RRB  
FN  
JBM  
PJM  
AAV=4  
KBH=3  
LHR=3  
KWB=3  
WGC=3  
RDK=3  
AFS  
DRM  
FILES

I - OPERATIONS BUILDING

a) Proposed Change Order No. 11 covering revisions to building necessitated by change in end rooms and in adding toilet and paneling as required by NACA, and sepia's of new and revised drawings have been sent to NACA.

b) In general the checking of shop drawings is progressing satisfactorily, however, resubmission of shop drawings for front entrance doors is long overdue.

II - ALTITUDE TEST CHAMBERS

a) Shop drawings from Treadwell Construction Company are being processed at a steady rate.

b) Awaiting comments on drawings and rough draft of specification for thrust platform and measuring device which were sent to NACA for final approval.

III - SHOP AND ACCESS BUILDING

a) Change Order No. 7 covering changes in lighting and power circuiting and revised sepia tracings forwarded NACA. Additional changes will be required on these drawings due to relocation of the air piping outside the building.

b) Architectural and structural drawings are being revised to accommodate change in location of combustion air pipe.

#### IV - AIR AND GAS PIPING (1st Step) (CE-104500 to CE-104557)

##### a) Mechanical (CE-104500 to CE-104524)

25558

1. NACA authorized rearrangement of combustion air orifice run, and changes in drawings are now being made.

2. Specifications for expansion joints for combustion air piping will be revised and sent to NACA.

3. NACA have issued to vendors, specifications for orifice fittings and butterfly valves.

4. Bids received for gate valves and Burns and Roe recommendations sent to NACA for purchase.

5. Require information from NACA on all combustion air control valves Specification C-768.

|                                                                                                                                    | <u>No. 27</u> | <u>No. 28</u> |
|------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104500 (2303) Flow Diagrams - Air & Gas Piping<br>Steel 1 and 2                                                                 | 92            | 92            |
| CE-104501 (2301) Gen. Arrangement - Plan Step 1 & 2                                                                                | 72            | 75            |
| CE-104502 (2302) Gen. Arr't. - Elev Step 1 and 2                                                                                   | 68            | 70            |
| CE-104503 (2310) Combustion Air Piping - Plan, Elev.<br>and Details - Altitude Test Chamber<br>Area - First Step (Revised drawing) | 93            | 15            |
| CE-104506 (2313) Combustion Air Piping - Supports<br>Anchors and Misc. Details - 1st<br>(Revised drawing)                          | 90            | 0             |
| CE-104507 (2314) Exp. Joint List - Air & Gas Piping                                                                                | 42            | 42            |
| CE-104508 (2315) Valve List - Air & Gas Piping                                                                                     | 28            | 28            |
| CE-104509 (2316) Control Piping, Plans, Elev. &<br>Details, Step 1 and 2                                                           | 0             | 0             |
| CE-104510 (2317) Control Piping, Sections and Details<br>Step 1 and 2                                                              | 0             | 0             |
| CE-104511 (2318) Combustion Air Piping - Arrangement of<br>Control Valves - First Step                                             | 0             | 0             |
| CE-104512 (2319) Combustion Air Piping - Details of<br>Supports at Control Valves                                                  | 0             | 0             |

##### b) Exhaust Gas Ducts (CE-104525 to CE-104539)

1. Expansion joint contract awarded to Zallee Brothers by NACA. Need outline drawings of same to complete drawings of duct work.

2. Drawings CE-104527, CE-104528 and CE-104529 to be revised for combustion air by-pass connection, when this information is determined.

3. Information needed on Exhaust control valves to determine supports and connection to gas ducts.

4. Exhaust Gas Duct contract awarded to R. L. Carter Company by NACA. (Drawings CE-104527, CE-104528, CE-104529).

5. Contract for exhaust stack, pump house, tank foundations, pipe supports, etc. was issued to bidders. (Drawings CE-104525 and CE-104526 from this group plus others).

c) Structural Steel and Concrete Design (CE-104540 to CE-104549)

1. Require information on control valves for support design.

2. Final location of by-pass will establish minor changes to foundation drawings.

3. Decision required as to requirements for walkways to secondary coolers, control valves and explosion discs on Exhaust Gas Ducts.

4. Contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, etc. was issued to bidders. (Drawings CE-104543, CE-104544, and CE-104545 from this group plus others).

5. Relocation of combustion air pipe from within the Shop and Access Building to without, may require an additional foundation drawing and alterations to stairways to walkways over primary coolers and test chambers.

6. Final location of connecting pipe to air heaters may necessitate minor changes to drawing CE-104543.

|                                               |                                                                                           | <u>No. 27</u> | <u>No. 28</u> |
|-----------------------------------------------|-------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104540                                     | (4310) Walkways and Stairways - Test Chamber and Primary Coolers, Elevations and Sections | 80%           | 95%           |
| CE-104541                                     | (4311) Walkways and Stairways - Test Chamber and Primary Coolers - Sections and Details   | 80            | 95            |
| d) <u>Electrical</u> (CE-104550 to CE-104557) |                                                                                           |               |               |
| *CE-104550                                    | (3301) Outdoor Area Lighting and Receptacles Plans and Details                            | 97            | 98            |
| *CE-104551                                    | (3302) Grounding System - Plans & Details                                                 | 97            | 97            |
| CE-104552                                     | (3303) Instrumentation and Controls - Plans and Details                                   | 0             | 0             |

\*These drawings will require revisions due to relocation of air piping outside the Shop and Access Building.

V - COOLING TOWER & CIRCULATING WATER SYSTEM (CE-104558 to CE-104609)

a) Mechanical (CE-104558 to CE-104574)

1. Changes required in 18" secondary cooler lines to clear new location of high pressure fuel pump house completed. Lines to new explosion heads run. Remote operated butterfly valves for water cooled bulkhead and mono-rail added to piping drawing.

2. Drawing CE-104563 has been rechecked. Other drawings to checker on January 6, 1950.

3. Relocation of 48" Combustion Air Line may require changes to drawings due to interferences with relocated transformers.

4. Approval prints will be forwarded to NACA next week while drawings are being checked.

|                                                                        | <u>No. 27</u> | <u>No. 28</u> |
|------------------------------------------------------------------------|---------------|---------------|
| CE-104558 (2401) Flow Sheet and Valve List                             | 95%           | 95            |
| CE-104559 (2402) Location & Arrangement Plan<br>Pump House Area        | 95            | 95            |
| CE-104560 (2403) Location and Arrangement Plan<br>Equipment Area       | 95            | 95            |
| CE-104561 (2404) Pump House Piping - Plan,<br>Sections and Details     | 95            | 95            |
| CE-104562 (2405) Details of Piping at Primary<br>and Secondary Coolers | 95            | 95            |
| CE-104563 (2406) Details of Piping At Altitude<br>Chamber              | 95            | 95            |
| CE-104570 (2407) Heating, Ventilating & Details                        | 100           | 100           |
| CE-104572 (2408) Water Treatment                                       | 0             | 0             |
| CE-104573 (2409) Water Treatment                                       | 0             | 0             |

b) Structural Steel and Concrete (CE-104575 to CE-104594)

1. Contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, etc. was issued to bidders (Drawings CE-104576, CE-104577, CE-104579, CE-104580 and CE-104581 in this group plus others).

2. Removable ladders in pump house were changed to removable stairs as requested by NACA and elevation of house drain was raised.

3. Work has been started on new drawing CE-104584. This drawing will become a part of contract for Circulating Water Piping.

4. Information is needed as to requirements for water treating building.

|                                                                             | <u>No. 27</u> | <u>No. 28</u> |
|-----------------------------------------------------------------------------|---------------|---------------|
| CE-104583 (4406) Circulating Water Pipe Supports<br>and Manholes            | 95            | 95            |
| CE-104584 (4408) Steam Trench Extension Along<br>Walcott and Westover Roads | -             | 5             |
| (4409) Water Treating Building                                              | 0             | 0             |
| (4410) Water Treating Building                                              | 0             | 0             |

c) Electrical (CE-104594 to CE-104609)

The manual-automatic control scheme for the Circulating Water Distribution System and Drawing SK-1218-E-13, "Control Diagram for Manual-Automatic Operation" are being revised in accordance with the discussion with NACA. The revised system and drawing will be sent to NACA this week. Bill of Material is being included on this drawing to cover additions and revisions for Specification No. C-1175.

|           |                                                                                                                 | <u>No. 27</u> | <u>No. 28</u> |
|-----------|-----------------------------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104594 | (3401) Circ. Water Pump House Lighting<br>(Gen. Bldg. Cont.) Grounding and Concealed Conduit<br>Plan            | 100           | 100           |
| CE-104594 | (3402) Circulating Water Pump House -<br>One Line Diagram - Switchgear<br>and Transformer - Arrangement<br>Plan | 90            | 90            |
| CE-104596 | (3403) Circulating Water Pump House -<br>Equipment Grounding - Conduit<br>Plan and Details                      | 70            | 70            |
| CE-104597 | (3404) Cooling Tower - Lighting Plan<br>and Details                                                             | 100           | 100           |
| CE-104598 | (3405) Cooling Tower - Conduit and<br>Grounding Plan and Details                                                | 100           | 100           |
| CE-104599 | (3406) Power Ducts and Manhole Details                                                                          | 95            | 97            |
| CE-104600 | (3407) Substation "C" Arrangement Plan<br>and Details                                                           | 100           | 100           |

VI - FUEL STORAGE AND DISTRIBUTION SYSTEM (CE-104610 to CE-104669)

a) Mechanical (CE-104610 to CE-104639)

1. NACA comments of conference December 13-14, 1949 and later comments by Mr. H. T. Lehr (Conference December 19-21, 1949) have been incorporated on drawings. Valve list is being made up with coded valve numbers.

2. Metering flow sheet will be forwarded to NACA on January 6, 1950 for comments. Metering piping is being studied to determine space requirements. This will affect final size of h.p. pump house and piping dimensions.

3. Fuel piping at Shop and Access Building awaits final location of major equipment affected by change of 48" combustion air line.

4. Chamber drain system has been re-studied and forwarded to NACA on January 5, 1950 for comments. Drawing CE-104615 requires changes to conform with outside location of drain tanks requested by NACA.

|            |                                                                     | <u>No. 27</u> | <u>No. 28</u> |
|------------|---------------------------------------------------------------------|---------------|---------------|
| CE-104610  | (2501) Flow Sheet HP and LP Systems                                 | 75            | 75            |
| CE-104611  | (2502) Location and Arrangement Plan<br>Storage & LP PH Area        | 95            | 95            |
| CE-104612  | (2503) Location & Arrangement Plan<br>Altitude Chamber & HP PH Area | 95            | 95            |
| CE-104613  | (2504) Details of Piping in LP PH                                   | 95            | 95            |
| CE-104614  | (2505) Details of Piping in HP PH                                   | 80            | 80            |
| CE-104615  | (2506) Details of Piping at Altitude<br>Chamber and Valve List      | 50            | 60            |
| CE-104619  | (2510) LP PH - Heating, Vent. & Details                             | 100           | 100           |
| *CE-104620 | (2511) HP PH - Heating, Vent. & Details                             | 0             | 0             |
| CE-104622  | (2513) Fire Protection System (CO2)                                 | 0             | 0             |
|            | (2514) Fire Protection System (CO2)                                 | 0             | 0             |

(b) Structural Steel and Concrete (CE-104640 to CE-104654)

1. High pressure pump house will be designed when metering space requirements are determined.

2. Contract for Exhaust Stack, Pump Houses, Tank Foundations, Pipe Supports, Etc. was issued to bidders. (Drawing CE-104640, CE-104641 and CE-104642 in this group plus others).

|                                        | <u>No. 27</u> | <u>No. 28</u> |
|----------------------------------------|---------------|---------------|
| (4504) HP PH - Plan Sections & Details | 15            | 15            |

(c) Electrical - (CE-104655)

Revised specifications have been prepared in rough draft form for the HP Fuel Pump House transformer and control center. Relocation of air piping will determine the location of this transformer. When final location of the transformer is established specifications will be released.

Additional controls and interlocks will require revisions to the drawings associated with the General Building contract.

|                                                                                            | <u>No. 27</u> | <u>No. 28</u> |
|--------------------------------------------------------------------------------------------|---------------|---------------|
| CE-104655 (3501) LP Fuel Pump House - Lighting,<br>Grounding & Concealed Conduit Plan      | 100%          | 100%          |
| CE-104658 (3504) HP Fuel Pump House - Lighting,<br>Grounding and Concealed Conduit<br>Plan | 65(aa)        | 65(aa)        |

General Electrical Contract:

|                                                                                         |        |        |
|-----------------------------------------------------------------------------------------|--------|--------|
| CE-104656 (3502) LP Fuel Pump House - Equipment<br>Grounding, Conduit Plan & Details    | 60     | 70     |
| CE-104657 (3503) Fuel Storage Area- Outdoor Lighting<br>and Conduit Plan                | 100    | 100    |
| CE-104659 (3505) HP Fuel Pump House - Equipment<br>Grounding, Conduit Plans And Details | 35(aa) | 35(aa) |
| CE-104660 (3506) Telephone and Intercommunication Ducts<br>and Manhole Details          | 0      | 0      |

(aa) Work discontinued until final building design is approved.

VII - ELECTRICAL SUBSTATIONS

NACA has assigned the following drawing #CE-102374 to CE-102384 and CE-102388 to CE-102407. It is understood that certain rearrangement and relocations of equipment are being made by NACA at Substations "B" and "G". Definite drawing number assignments and drawing titles will be allocated when these changes have been made. Both electrical and structural drawings will be required.

## VIII - EQUIPMENT BUILDING

### (a) Mechanical:

1. Specifications for air heaters have been released to Vendors. More specific data on heaters will permit continuation of work such as air piping and foundations in the area between the heater pit and Equipment Building. *227 #/sec match*

2. Requirements for the drying and refrigeration system have been decided by NACA. Briefly these are ~~225#~~ of air per second dried to 7 grain moisture content, and ~~100#~~/sec. at -70°F. Tests are continuing on the air turbine. It has been suggested that a discussion on this subject be held, that the resulting conclusions be submitted to Manufacturers for study, that conferences be held with the manufacturers as to their suggested offerings before specifications are written for the procurement of equipment. *OK*

3. Certified prints of compressors, received from Elliott 12-12-49, and returned to NACA with comments.

4. Certified prints of General Arrangement of First Stage Exhausters received from Roots Connersville 12-27-49. Need certified prints for Second Stage Exhausters.

5. Need final outline drawings for intercoolers and aftercoolers from Griscom Russell and Ross Heater.

6. NACA to furnish Burns and Roe information obtained from Vendors on check valves for exhausters and compressors.

7. Data on rubber expansion joints received from U.S. Rubber Co. and sent to NACA for comments.

8. Information on low pressure butterfly valves for exhausters have been sent to vendors for recommendations, so that final specifications may be written.

9. Study drawings of arrangement of exhausters, compressors and coolers are being made, so that discussion of foundations, piping, connections, thrusts, etc. made be had with Roots Connersville, Elliott Griscom Russell and Ross Heater, at a conference in Cleveland the week of January 9, 1950.

10. The approximate final location of major equipment in the Equipment Building will permit study of cooling water system provided equipment drawing for the inter-and-after coolers can be obtained.

### b) Structural and Architectural:

1. Elevation drawings are being restudied basing ultimate exterior expression on results of restudy of floor plan. Floor plan is being coordinated to ideas presented and discussed at meeting in New York on November 28, 1949.

2. Detailed design of equipment building is being delayed until more definite information is known about mechanical and electrical requirements.

3. Final drawings are being started on foundations for compressors and first stage exhausters.

4. Investigation of sound levels and sound absorption qualities for various types of construction are being made.

(c) Electrical:

1. Preliminary one line diagram is in progress, additional auxiliary motors are being added as shop drawings are received.

2. Final dimensions are required for the M-G set exciters, slip regulator, neutral resistor, starting motor-generator set. NACA to expedite.

3. Switchgear layout being held up pending final present and future 13.8 KV switchgear requirements. NACA preparing specification for same.

| <u>Progress</u>                               | <u>No. 26</u> | <u>No. 28</u> |
|-----------------------------------------------|---------------|---------------|
| 1. Operations Building                        | 99%           | 99%           |
| Amendment #1                                  | 99%           | 99%           |
| Amendment #2                                  | 25            | 100           |
| 2. Altitude Test Chambers                     | 98            | 98            |
| 3. Shop and Access Building                   | 96            | 97            |
| 4. Test Air Piping                            | 86            | 88            |
| 5. Cooling Tower and Circulating Water System | 85            | 90            |
| 6. Fuel Storage and Distribution System       | 75            | 85            |
| 7. Electrical Substations                     | 15            | 15            |
| 8. Equipment Building                         | 15            | 18            |

DRMcJonathy/LEH/RDK/KEH/WGC/id

*DRMcJonathy/id*