Detroit Diesel Allison
Division of General Motors Corporation

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EDR 10076

MASTER

GAS TURBINE ENGINES AND TRANSMISSIONS FOR BUS DEMONSTRATION PROGRAMS

Technical Status Report
for Period 31 July 1979 - 31 October 1979

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Introduction

This technical status report is to fulfill the contractual requirements of Contract EM-78-C-02-4867. This quarterly status report covers the period from 31 July 1979 through 31 October 1979 and is a summary of DDA activities for the effort performed on the procurement and delivery of eleven (11) Allison GT 404-4 gas turbine engines and five (5) HT740CT and six (6) V730CT Allison automatic transmissions and the required associated software.

The contract requires the delivery of eleven (11) Allison GT 404-4 Industrial Gas Turbine Engines and five (5) HT740CT and six (6) V730CT Allison Automatic Transmissions for the Greyhound and Transit Coaches, respectively. In addition, software items such as cost reports, technical reports, installation drawings, acceptance test data and parts lists are required.

A recent decision by the DOE will modify the build configuration for the last four (4) Transit Coach engines. It was decided by the DOE at a meeting in Washington, D.C. on March 28, 1979 with representatives from DDA, NASA/LeRC, JPL & Booz-Allen & Hamilton that these engines are to be built with ceramic regenerators.

The five (5) Greyhound Coach engines and the first two (2) Transit Coach engines were built in the all-metal configuration. The all-metal Transit Coach engines will be used to verify the coach installation design, power package to vehicle interface systems performance, and overall vehicle operation, but are expected to be converted to the ceramic regenerator configuration prior to commencing revenue service operation.

The Master Schedules for this program are attached. The schedules reflect revised delivery dates for the engine/transmission power packages. This has resulted from parts procurement problems, both late deliveries and poor quality. Also, because of these delays, the DOE recommended a change in the engine build sequence to alternate between Greyhound and Transit Coach engines, rather than complete the Greyhound build first. The schedules reflect deliveries completed and the build sequence for the remaining engines.

Status

The program is 100 percent completed with assembly and acceptance testing of the Greyhound Coach engines and 50 percent completed with the assembly and acceptance testing of the Transit Coach engines. Included in the latter is the first Transit Coach engine configured with ceramic regenerator hardware.

Assembly and acceptance testing for the five (5) HT740CT transmissions has been completed. Five (5) of the six (6) V730CT transmissions have also been assembled and acceptance tested.

The HT740CT transmissions were configured with second gear start in drive range instead of first gear start as employed previously. This change was considered to be a product improvement (eliminate harsh 2-1 downshift for

improved passenger comfort) and is consistent with the selective introduction and evaluation of the modified diesel version transmissions in the Greyhound fleet. However, during road evaluation of the first Greyhound Coach power package (T5/30576) in Coach 5992, it became evident that vehicle acceleration was unacceptable due to the combined effect of 2nd gear start and the inherent acceleration lag of the engine. Satisfactory vehicle performance comparable with diesel equipped coaches was restored through transmission modification for first gear start in drive range and elevated engine gasifier speed in gear.

Power package deliveries completed to date are summarized below.

Greyhound Coach Engine/Transmission	Date Shipped
Engine S/N T5/HT740CT S/N 30576	6-19-79
Engine S/N T6/HT740CT S/N 29804	7-12-79
Engine S/N T7/HT740CT S/N 30579	8-3-79
Engine S/N T8	9-19-79
Engine S/N T9	10-25-79
/HT740CT S/N 30575	9-10-79*
/HT740CT S/N 30578	9-10-79*

* shipped in advance of mating engines since needed by Greyhound to replace units requiring first gear start modification.

Transit Coach Engine/Transmission	Date Shipped
Engine S/N T11/V730CT S/N 11121	8-7-79
Engine S/N T12/V730CT S/N 11561	8-31-79
Engine S/N T13/V730CT S/N 11489	10-23-79

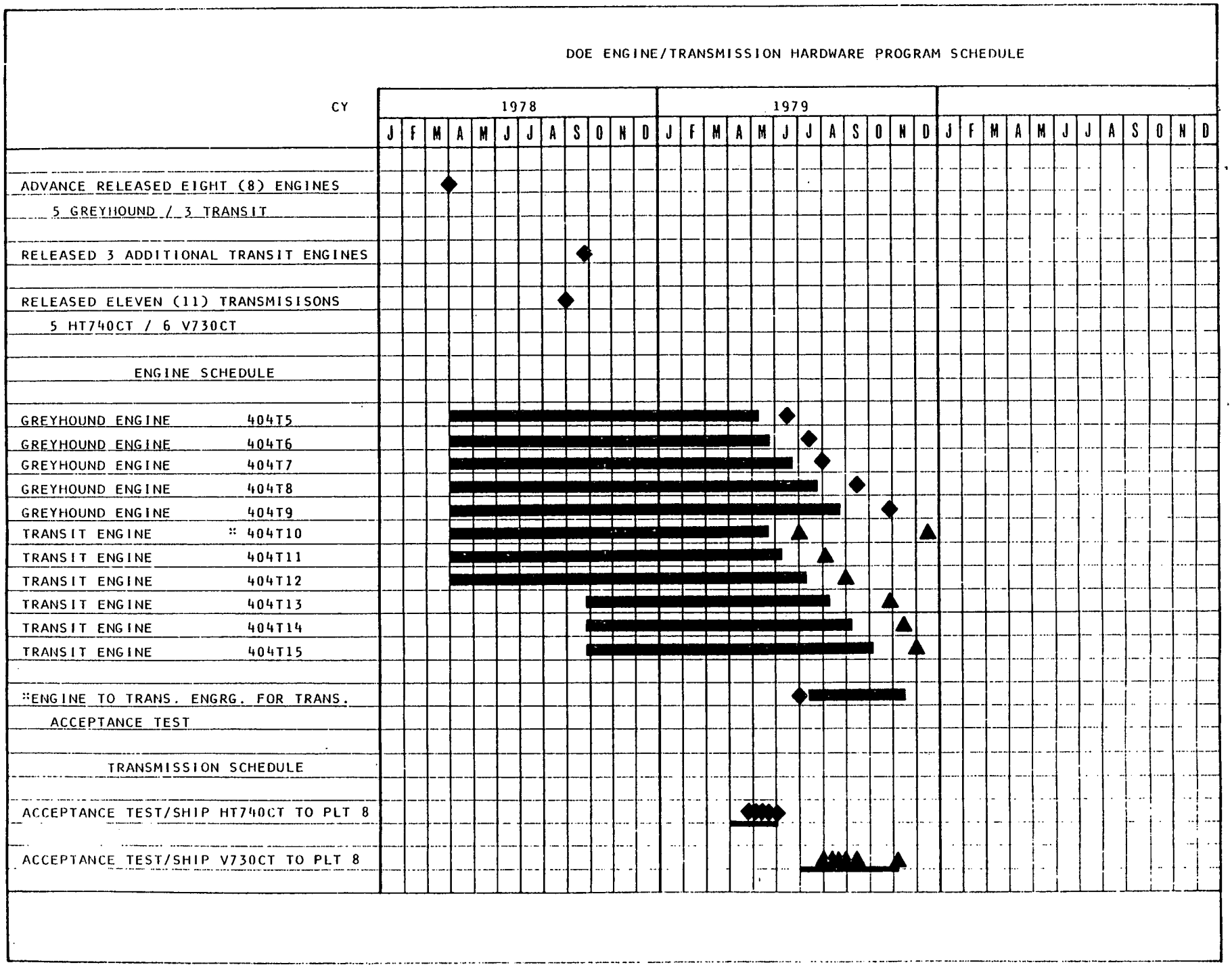
Engine S/N T10 is being used in-house for the acceptance testing of the last V730CT transmission. Upon completion of this task, expected early November, the engine will be refurbished and delivered as the last engine under the contract.

Upon completing the acceptance test of Greyhound Coach engine S/N T8, engine performance data was obtained and used to develop a typical coach engine performance map. This map has been submitted under separate cover.

Assemblies of Transit Coach engines S/N T14 and S/N T15 are in progress.

The Monthly Cost Report for October 1979 is being submitted under separate cover. The Monthly Cost Reports for October 1978 through September 1979 were delivered to the DOE on schedule.

The acceptance test data and parts lists for the delivered engines and transmissions are being submitted under separate cover as deliveries are completed.


DOE ENGINE/TRANSMISSION HARDWARE PROGRAM SCHEDULE
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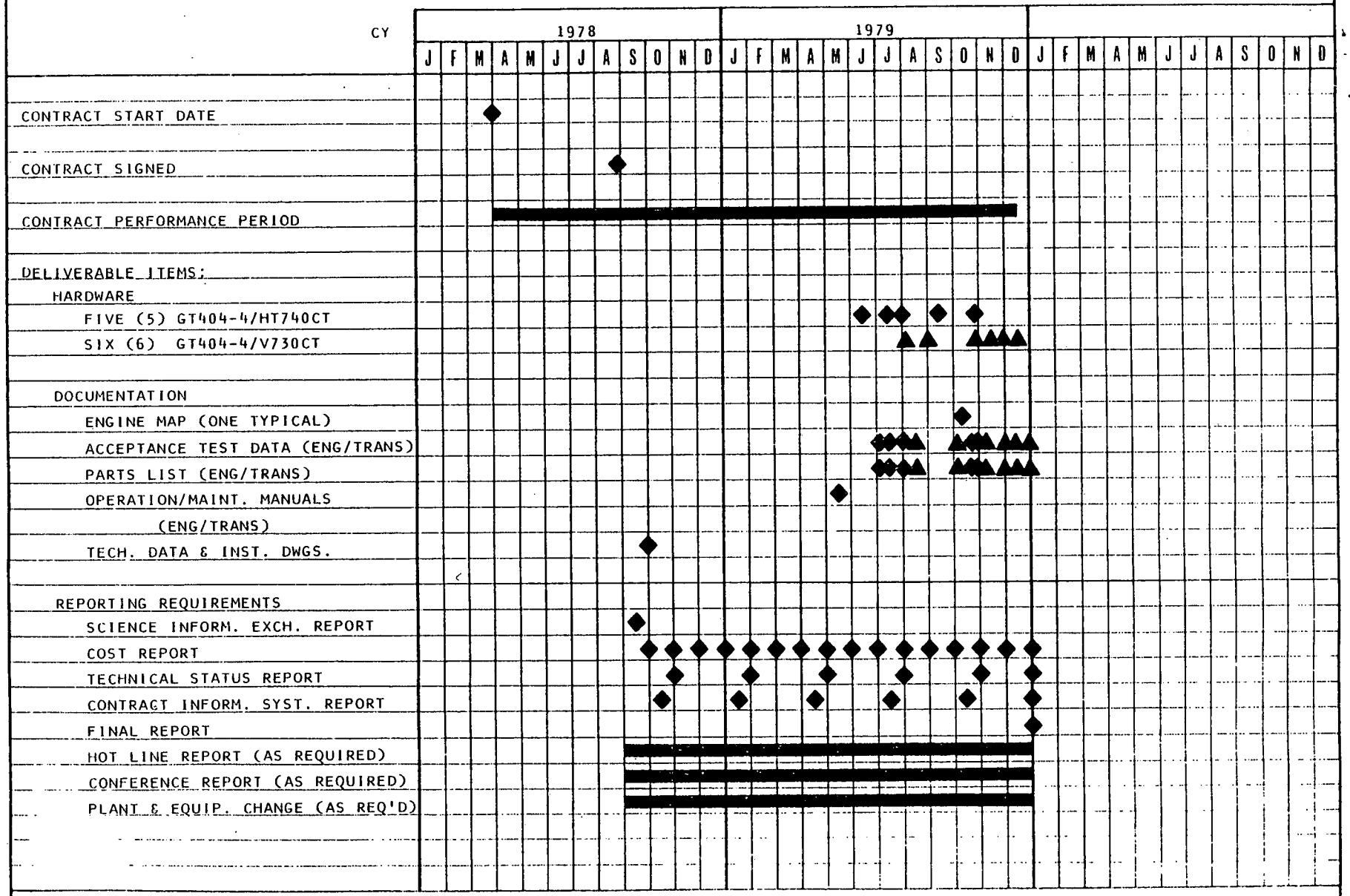
1978
1979
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
ADVANCE RELEASED EIGHT (8) ENGINES
5 GREYHOUND / 3 TRANSIT
RELEASED 3 ADDITIONAL TRANSIT ENGINES
RELEASED ELEVEN (11) TRANSMISISONS
5 HT740CT / 6 V730CT
ENGINE SCHEDULE
GREYHOUND ENGINE 404T5
GREYHOUND ENGINE 404T6
GREYHOUND ENGINE 404T7
GREYHOUND ENGINE 404T8
GREYHOUND ENGINE 404T9
TRANSIT ENGINE :: 404T10
TRANSIT ENGINE 404T11
TRANSIT ENGINE 404T12
TRANSIT ENGINE 404T13
TRANSIT ENGINE 404T14
TRANSIT ENGINE 404T15
::ENGINE TO TRANS. ENGRG. FOR TRANS.
ACCEPTANCE TEST
TRANSMISSION SCHEDULE
ACCEPTANCE TEST/SHIP HT740CT TO PLT 8
ACCEPTANCE TEST/SHIP V730CT TO PLT 8

DOE ENGINE/TRANSMISSION HARDWARE PROGRAM SCHEDULE