RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

January 20, 1978

Subject: Monitoring Report #1

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81

Date of Monitoring: January 13, 1978 (working day 264)

Actions taken:

- Reviewed current status of expanded soak facility and new garage and lab building expansion
- Completed network model for expanded soak facility
- Completed general logic for garage and lab expansion

General Summary

The PG-E-22 program now in work at the Chrysler Chelsea proving grounds consists of several parts, including:

- Construction of an expanded soak facility (SF) including a new stacker
- Construction of a new garage and lab facility (GL)
- Relocation of the photo lab into the new garage and lab area
- Renovation of the old photo lab to a new evap shed
- Relocation of the existing instrument lab into the new garage and lab area
- Installation of two new dynomometer rolls at the old instrument lab area
- Renovation of the gas bottle storage area
- Construction of a new mileage accumulator

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The programs presently being planned are the expanded soak facility, the new garage and lab and the accompanying remodeling of the photo lab and instrument lab areas. Target completions have been set for all of these various areas by Chrysler and our present efforts are to plan the projects so that we can complete them as close to these target dates as possible.

At this diagramming and planning session we were able to complete the network model for the expanded soak facility, including the front end work (D series - D for detailing and delivery), and to make it ready for final drafting and computer runs. This plan is shown on sheets 1, 2 and 3, Issue #2, dated January 13, 1978. Diagramming of the garage and lab building was carried through preparation of logic for each of the sectors of the facility and a brief review of the front end work (D series) with the present information available. We were not able to assign durations at this session but this will be done over the next few days by the contractors involved.

A brief review of each project is given below.

Expanded Soak Facility (SF)

(Monitored from Issue #2 dated January 13, 1978)

Currently some work is being done on installation of the exterior underground natural gas service and attempts are being made to obtain the building permit. It is planned to start footings and foundation walls by January 18, 1978 (working day 267). Foundation work is expected to proceed concurrently with preparation of the existing building for the new structural steel and thawing of the stacker area sub-base. It is desired that the stacker floor slab on grade be completed prior to erection of structural steel.

Building structural steel is due to start by February 22, 1978 (working day 292) and will be erected along with the stacker structural steel. Following erection of the high bay steel with the stacker steel, the remaining structural steel for the building can be put in place.

The major critical item on the project is delivery of metal siding, presently scheduled for May 5, 1978 (working day 344). This is a very important item since it closes in the building and allows finish trades to complete their operations.

The preliminary network calculations show a completion date at the expanded soak facility of July 18, 1978 (working day 394). This is slightly later than had been desired and a detail review of the network will now be made by the contractors to see where improvements can be made. It should be kept in mind that network calculations are preliminary and subject to check as the final computer runs are made.

We also diagrammed sub-station work which is a part of the expanded soak facility construction although located in another sector of the building.

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It is expected the new sub-station can be energized by June 14, 1978 (working day 371).

At our diagramming session we were able to make a full set of calculations on the network, as well as prepare the diagram for final drafting and computer runs. I shall proceed to have the computer runs made for issue and monitoring purposes.

Considerable discussion was held at the planning session regarding turn-around on shop drawings since they will be a critical item for both major buildings. It was assumed a total of 19 working days would be used as the standard turn-around cycle on shop drawings from the time they are received by the general contractor to the time they are returned to the sub-contractor. A breakdown of the shop drawing approval time is given on sheet 1 of the expanded soak facility network.

Garage and Lab Building Expansion (GL)

Work is proceeding on foundations of the garage and lab building readying it for expected delivery of structural steel in February. There was some concern about delivery of steel but it is presently expected to have foundations ready for major erection. As part of the early field activities, it will be necessary to rework the existing electrical room by lowering the roof. This involves new roof framing at the existing electrical room, reworking of cable tray, ductwork and conduit and installation of a new lower roof so the upper roof can be removed. This will allow erection of the main structural steel for the garage and lab addition. Our preliminary network model shows that we should be complete with this very critical operation by February 17, 1978 (working day 289) at which point it is anticipated by the contractor he can begin erection of structural steel.

The diagramming of the project considered a breakdown into four major areas - the lab area (L), the stock area (ST), site work (S) and the garage area (G). It is anticipated that once the lab area is complete, the photo lab and instrumentation lab can be moved into their new quarters. Remodeling of the vacated portion of the existing building can then proceed as noted above. No durations were assigned to the tasks at this session since the contractor requested he be allowed to review it in detail to check the logic and make a studied assignment of durations, along with rechecking of key delivery dates.

An item that will be of major importance in the close-in of the garage and lab addition will be selection of a masonry unit and delivery to the job site. It is to be stressed this is a very important sequence since it is the key to unlocking delivery of needed exterior wall materials to the project. Our preliminary network shows that a decision on the masonry unit should be forthcoming no later than January 16, 1978 (working day 265) which will allow us to build a brick panel wall for approval by February 6, 1978 (working day 280). Allowing 12 weeks for delivery of brick after approval has brick on the job by April 10, 1978 (working day 325). This is probably later than fully desirable and whatever can be done to compress this time would be of assistance.

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It will require an additional planning session to complete the diagramming of the work on the garage and lab building. I shall be in touch with Mr. Leppanen regarding this next session shortly.

* * * * * *

We have now completed full planning for the expanded soak facility and completed the logic for the garage and lab expansion. I shall make a computer run for the expanded soak facility. This computer run will follow a format which will allow preparation of project status reports identifying responsibilities and current work status according to regular monitoring inspections and reviews. I shall go over this document in detail with the parties involved in the projects as soon as it is available. Meanwhile, we shall monitor the projects from the rough network diagrams for the two facilities. These have been distributed to the major parties on the project team.

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RJS
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To: Mr. Norbert Leppanen
(Original and 1 copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

February 8, 1978

Subject: Monitoring Report #2

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81

Date of Monitoring: February 2, 1978

Target dates for completion: Discussed with each major program sector

Actions taken:

- Monitored expanded soak facility
- Monitored garage and lab building
- Prepared network model for substructure and superstructure of new mileage accumulator

Expanded Soak Facility (SF)

(Monitored from Issue #2 dated January 13, 1978)

A major current difficulty at the expanded soak facility is that no building permit has been able to be obtained. Apparently there is a need for a variance on the stacker in respect to area ordinances. Active investigation is proceeding on this matter but there is currently no indication as to when it will be resolved.

Meanwhile, miscellaneous work is proceeding in the field on relocating air and gas lines, along with relocation of existing electrical conduit. Also, processing of shop drawings and fabrication of material is in work. Structural steel is available but being held until the building permit problem is resolved and foundations installed.

Anchor bolts are available on the job. Fabrication of the stacker pans and electronics is in work and all other items are moving generally in accordance with the Issue #2 network dated January 13, 1978. However, of course, field work will soon come to a total halt until the permit can be obtained and active construction of foundations started.

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The Issue #2 network dated January 13, 1978 anticipated a completion date of the evening of July 17, 1978 (working day 394). The completed drafting and computer printouts based upon that target were issued at our meeting and will be revised later when firm starting targets can be set.

The building permit was due to be obtained no later than January 18, 1978 (working day 267) and thus, the current lag as of the monitoring on February 2, 1978 (working day 278) was 11 working days. This lag will, of course, increase for every day the permit is not available.

Garage and Lab Building

(Monitored from Issue #2 dated January 13, 1978)

Field work on the garage and lab building is moving well with most foundation work meeting target dates. Structural steel is due to be started in the field by February 20, 1978 (working day 290) and it appears this date will be met.

The contractor reported that they are studying the problem of installing new roof framing at the existing electrical room and that a redesign is being prepared. This redesign should aid considerably in expediting erecting structural steel. Presently the electrical area is not considered a major deterrent to erection of the building frame.

The target dates being held for the garage and lab area are August 31, 1978 (working day 426) for the garage and September 21, 1978 (working day 440) for the lab area. The stock area is due to be completed about August 2, 1978 (working day 405). These dates are still tentative, pending receipt of additional information on deliveries and approval of some of the minor logic. I issued copies of the manually computed network, Issue #2, dated January 13, 1978 to Chrysler and to the general contractor. The contractor will review the material in depth and forward me a copy with additional durations filled in and any revisions noted.

New Milage Accumulator - Dynamometers 13 through 24

(Monitored from Issue #1 dated February 2, 1978 - Note: the working day base for the mileage accumulator is January 3, 1978)

We began preparing the network model for the new mileage accumulators and completed a share of the D series front end work on sheet 1. We also

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were able to prepare a preliminary network for foundation construction, erection of the structure through close-in at the control building and through installation of masonry and roofing, along with the slab on grade at each of the dynamometer areas, the north and south.

It is the intent to obtain a building permit as quickly as possible. This is expected to be available about March 2, 1978 (working day 43). Meanwhile, on February 16, 1978 (working day 33), it is the intent to begin the relocation of the overhead power line and whatever work is needed to make the primary power changeover on Memorial Day. The current target date for this changeover is the Memorial Day weekend - May 27 and 28 (working day 105).

Construction of buildings is expected to start at the control building (CB) and work to the south first and then move sequentially to the north. There were several items discussed which, in construction of the existing mileage accumulators, caused field difficulties. Frequent reference was made to the earlier project and it was suggested that perhaps the records dealing with field work on the existing facility would be helpful to the contractors, as well as to the architect/engineer. Mr. Leppanen will make these records available if possible and desired.

One of the major difficult areas is expected to be in installation of underground utilities, particularly electrical, at the north and south dynamometer slabs on grade. There is a considerable amount of complex work under the slab and it must be related carefully to the exhaust duct and the dynamometer pits.

We also spent considerable time discussing the submittal of shop drawings and their approval. It was decided that the general contractor would receive shop drawings, log them in, they would then be transmitted to the architect with review and approval there expected to take approximately 7 working days. Once the architect/engineer had approved these drawings, they could either be submitted to Chrysler for review or sent directly back to the general contractor. In most cases, particularly on critical shop drawings, it was decided to send them back immediately to the general contractor. The time sequence for shop drawing approvals is expected to take 16 working days normally or at the most, if they do go back to Chrysler, 25 working days.

Copies of sheets 1, 2, 3, 4, Issue #1 dated February 2, 1978 were made and distributed to the owner, the architect/engineer and the contractor. All will study them carefully to see where and if compression of time can occur since the sequence appears to be slightly longer than had been originally anticipated. It was urged that we be realistic about the times it will take to do the various activities since this is an extremely critical

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March 8, 1978

Subject: Monitoring Report #3

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: March 3, 1978 (working day 44)

Note: All dates from this point will be on a 1978 working day base. January 3, 1978 is working day #1. This will put all three projects on the same calendar.

Monitored from Issue #2 dated January 13, 1978

Issue #2 target date for completion: Evening of July 17, 1978 (working day 139)

Actions taken:

- Reviewed project with Mr. Paul Rose
- Evaluated current job status

General Summary

A variance has been granted as of March 2, 1978 (working day 43) which will allow obtaining a full building permit. A partial permit has been received which released construction of the main building to begin on March 2, 1978 (working day 43).

Some early utility relocation and installation are complete, with the air line relocated, the existing propane gas line relocated, the relocated natural gas line activated and the existing 3/4" electrical conduit relocated.

Some work has started on interior and exterior footings and foundation walls with active concrete pouring to start shortly. Mr. Rose reports it will not be necessary to construct the stacker floor slab on grade prior to erection of building structural steel and the stacker frame. This should allow some lost time to be picked up.

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It was originally intended that footings and foundation walls would begin on January 18, 1978 (working day 12). They actually did start on March 2, 1978 (working day 43) which is a lag of about 31 working days in foundation work. Although it is presently too early to determine if and how much of this lag can be recaptured, it appears that a portion of it can be made up over the next few weeks providing the weather cooperates.

The critical activity on this job will be to maintain continuing close attention to front end work (D series approvals and deliveries) to make certain that material and equipment arrive on the job site when needed.

A brief review of the major D series front end items is given below.

- Electrical substation is still due on the job May 12, 1978 (W/D 94).

- Structural steel is available as needed.

- Stacker pans and electronics are available.

- No problem expected in delivery of roof insulation.

- Metal siding still being held for delivery on May 4, 1978 (W/D 89). Shop drawings have been reviewed and approved and it is possible delivery could be improved if the building can be made ready.

- Roof top units being held at delivery on April 25, 1978 (W/D 83). Shop drawings are approved.

- Sprinkler shop drawings are in for approval and currently there is some concern that this work will be delayed. Sprinkler work is normally very critical to projects of this type and I suggest special attention be given it.

- Early sheet metal work is being fabricated and expected on the job soon.

- Substation structural steel shop drawings have been reviewed, approved and steel is available as needed.

- Electrical equipment - generally in good shape, however, because of difficult deliveries usual on equipment of this type, it would be wise to keep a close check on each major piece of electrical equipment.

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Mr. Rose and I, after evaluating the current status of the project, discussed an updating of the Issue #2 network to reflect delays. Mr. Rose will mark up his network and send me a revised copy to indicate updating items to be incorporated.

I shall plan soon to set regular monitoring trips to the site to evaluate job status by on-site inspections and shall be in touch with Mr. Norbert Leppanen regarding this.

Ralph J. Stephenson, P.E.

RJS
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To: Mr. Norbert Leppanen
(Original and 1 copy)

Mr. Paul Rose
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P. O. Box 1103
Ann Arbor, Mich. 48106
(1 copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

April 5, 1978

Subject: Monitoring Report #4

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: April 3, 1978 (working day 65)

Monitored from Issue #2 dated January 13, 1978

Note: There was a subsequent issue #3 which reflected updating information and brought the target completion to August 17, 1978 (working day 162). This was not noted on the computer runs and drawings. It would be appreciated if such a note would be made that the current monitoring issue is Issue #3. In subsequent reports it will be indicated as Issue #3.

Issue #3 target date for completion: Morning of August 18, 1978 (W/D 162)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks
- Evaluated current job status
- Prepared project status report for period from April 3, 1978 (working day 65) to May 1, 1978 (working day 85)

General Summary

The project is well in work with stacker steel being erected and structural steel expected on the job by April 10, 1978 (working day 70). Most deliveries are in fair shape with items not yet on the job in fabrication. The only late delivery item presently outstanding is structural steel which was due to be on the job no later than March 30, 1978 (working day 63). It will be delivered, as noted above, on April 10, 1978 (working day 70) which will give it a 7 working day lag. However, Mr. Parks says he will erect structural steel concurrently with stacker structural steel and will attempt to maintain the current target completion for building steel by May 1, 1978 (working day 85). This will bring the project back in line with the current network plan. Start of metal siding is still planned for May 5, 1978 (working day 89).

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There was a change in logic after Issue #3 was distributed concerning the floor slab on grade at the stacker. Originally it was felt this slab on grade would be needed to start erecting stacker structural steel. However, it was found not to be needed and therefore, will show up as being late in the project status report. However, it is no longer a critical area and stacker steel has proceeded ahead of it.

At the electrical substation, platform miscellaneous iron has been erected and the existing cable tray and cable have been relocated. Some secondary electrical distribution work has been installed. Distribution will be completed when the new substation has been delivered and set at the platform. Currently substation work is well in line with target early and late starts and finishes.

In summary, the project at this time lags by from 3 to 7 working days in erection of structural steel at the stacker. However, as pointed out by Mr. Parks, once the building structural steel arrives, it will be erected concurrently with the stacker steel and should be able to be completed at our current target end date for steel.

It should be pointed out that the stacker pans and electronic components will be needed on the job sometime shortly. They are not yet critical but it would be wise to make certain they are available when they are to be installed.

As part of this monitoring, I prepared a project status report which measures mathematically the current status of the job against the network model. It should be noted that this evaluation is a relatively exact comparison of the project to the model and shows, for instance, the slab on grade at the stacker as being late. It should be used judiciously and in conjunction with the written monitoring report to make a true evaluation of the total project.

I shall be in touch with Mr. Leppanen to set the next monitoring inspection shortly.

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May 2, 1978

Subject: Monitoring Report #5

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: April 28, 1978 (working day 84)

Monitored from Issue #3 dated March 1978

Issue #3 date for completion: Morning of August 18, 1978 (working day 162)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks
- Evaluated current job status
- Prepared project status report for period from April 28, 1978 (working day 84) to May 30, 1978 (working day 105)

General Summary

Stacker steel is substantially erected and building structural steel is totally complete. It is expected metal siding can begin May 5, 1978 (working day 89) on schedule. Roof metal deck is in work and is slightly ahead of its projected start date.

As noted in the previous monitoring report, the floor slab on grade at the stacker has been held until later since it was found it was not needed for stacker erection.

Work at the new substation is moving quite well with the substation being set and the secondary electrical distribution system in work. It is still anticipated it can be energized by the present target of June 13, 1978 (working day 115).

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Thus, currently field work is moving well in accordance with targets between early and late starts and finishes. Deliveries are in fairly good shape but there are some minor problems which should be cleared. These are discussed below.

- Stacker electronics

  The stacker pans and miscellaneous iron are on the job now. However, Mr. Parks reports there is no word on stacker electronics. The project will soon be ready for installation of these and I suggest a firm delivery be set for them.

- Sprinkler work

  There have been problems with approval of the sprinkler system. Sprinkler elements were due to be on the job no later than May 2, 1978 (working day 87). These are now being held by lack of an approval. This matter should be checked immediately.

- Primary switch

  No current word was available. This item should be watched closely.

- Miscellaneous iron

  There is considerable miscellaneous iron to be erected along with the metal siding. This is to be included in the siding erection activity.

As part of this monitoring we prepared a project status report from April 28, 1978 (working day 84) to May 30, 1978 (working day 105). This will be issued concurrently with the monitoring report.

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To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

May 31, 1978

Subject: Monitoring Report #6

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: May 26, 1978 (working day 104)

Monitored from Issue #3 dated March 1978

Issue #3 date for completion: Morning of August 18, 1978 (working day 162)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks and Mr. Allen Parker
- Evaluated current job status
- Prepared project status report for period from May 26, 1978 (working day 104) to July 6, 1978 (working day 131)

General Summary

Floor slabs on grade at both the stacker and the low building have been poured and some additional work has been done on the stackers over the past month. Metal roof deck and metal siding have not yet started in full production although some roof panels have been laid. There have been problems with getting miscellaneous iron installed and this has delayed start of metal siding. We had established a target starting date for metal siding of May 5, 1978 (working day 89) and we had made this critical artificially to get the building in the dry.

The lag over this date is about 15 working days. However, the major long sequence on the project was originally identified as through rough overhead work in the building. There, sheet metal ductwork, mechanical piping and rough electrical were due to begin no later than May 3, 1978 (working day 87). It is expected by Mr. Parks to begin this work on June 1, 1978 (working day 107) so the lag will be about 20 working days.

Mr. Parks feels he will be able to pick up considerable time in installation of rough work and is still intending to complete the facility, ready for occupancy, by August 18, 1978 (working day 162). Because of the current lag on the project this will be a hard date to meet but it is possible.

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At the new substation, all major equipment is either on the job or available except the new primary switch. This switch will be on the job by June 22, 1978 (working day 122). It is intended that once the substation is connected and the new primary switch is installed the new substation will be energized. This is a critical changeover point and should be meshed carefully with the owner's requirements at the proving grounds.

In summary, the project currently lags by from 15 to 20 working days, primarily in interior rough work and exterior closure. If work at the building can proceed aggressively over the next month and a half or so it is possible some of this time will be picked up. There is a chance of a work stoppage by June 1, 1978 (working day 107) of the steel workers and the sheet metal workers. These are the critical trades at present on the job and could serious hamper regaining lost time.

As a result of our monitoring I prepared a project status report for the period from May 26, 1978 (working day 104) through July 6, 1978 (working day 131). This will be issued concurrently with the monitoring report. I shall be in touch with Mr. Norbert Leppanen shortly to set the next monitoring session on the project.

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To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

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July 6, 1978

Subject: Monitoring Report #7

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77;81 (SF)

Date of Monitoring: June 30, 1978 (working day 128)

Monitored from Issue #3 dated March 1978

Issue #3 date for completion: Morning of August 18, 1978 (working day 162)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks and Mr. Allen Parker
- Evaluated current job status
- Prepared project status report for period from June 30, 1978 (working day 128) to July 27, 1978 (working day 146)

General Summary

Sheet metal ductwork installation is just beginning after the sheet metal strike. The strike started June 1, 1978 (working day 107) and was over June 28, 1978 (working day 126). The strike also delayed installation of metal siding and other related sheet metal activities on the job. Thus, there has been very little work done on the project over the past month.

Roofing is now underway and installation of above floor rough sheet metal ductwork should start shortly. Mr. Parks anticipates that he can pick up a portion of the lost time since we had allowed generous installation times for interior sheet metal ductwork.

Exterior siding will probably begin July 5, 1978 (working day 130) and although this is two months later than had been anticipated, we had set a desired start target of metal siding on May 5, 1978 (working day 89) so as to clear the area for other work to proceed. However, in relation to actual work yet to be

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installed, siding should not be a serious restraint on getting it complete in time. Therefore, although the late work on metal siding interferes with effective sequencing of work at the soak facility, it is not a true delay of two months.

Mr. Parks feels that it is still possible to maintain a target end date very close to the Issue #3 network target of August 18, 1978 (working day 162). This will be somewhat difficult to achieve but at our next monitoring we will have a better handle on whether or not it can be met.

Electrical work is moving well at the soak facility and it is anticipated the new substation will be energized Sunday, July 2, 1978 (working day 129). The original intent was to energize it on June 13, 1978 (working day 115).

In summary, the project,although it has been affected by the strike of sheet metal workers, still has enough time reserve in tasks remaining so it is possible the present target end date of August 18, 1978 (working day 162) could remain a valid target. There may be some delay beyond this but field activities are geared toward this goal.

As a result of the monitoring, I prepared a project status report for the period starting June 30, 1978 (working day 128) through July 27, 1978 (working day 146). This will be issued concurrently with the monitoring report.

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Mr. Stan Davis (one copy)
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July 31, 1978

Subject: Monitoring Report #8

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: July 27, 1978 (working day 146)

Monitored from Issue #3 dated March 1978

Issue #3 date for completion: Morning of August 18, 1978 (working day 162)

Actions taken:

- Inspected project
- Reviewed project status with Mr. Allen Parker
- Evaluated current job status
- Prepared project status report for period from July 27, 1978 (working day 146) to August 26, 1978 (working day 168)

General Summary

As of July 27, 1978 (working day 146) stacker electronics are being installed and most pans are in place with final connections for the equipment being made. There was some question about the availability of maintenance manuals for this equipment and I suggest since it is a rather sophisticated piece of machinery that arrangements be made with the suppliers and contractors to provide maintenance manuals and recommendations for upkeep.

Siding is about 70% complete and probably will be finished within the next week. At the interior of the building sheet metal ductwork is on the job but not yet started. It lags by about 56 working days. However, as pointed out in the previous monitoring, the time allocated for installation of sheet metal work was generous and therefore, this lag probably is not a true measure of the current position of the job. Mechanical piping work and rough electrical work are moving fairly well and appear to lag by about 16 working days. This perhaps is a better measure of the job status.

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CONSULTING ENGINEER

There was no current word as to whether the project can maintain a completion target of August 18, 1978 (working day 162). However, from the current job position, it appears that this is not probable. I suggest we consider the project presently as 15 to 20 working days behind this target date. If the time can be picked up in installation of interior rough and finish work, then this, of course, would be a distinct and pleasurable occurrence.

It should be noted that as of July 31, 1978 (working day 148) there is a possibility of strikes in the trades of carpentry, laborers, trowel and sprinkler fitters. Their contracts expire the end of July and no settlements have been reached as yet. This could affect work progress at the soak facility.

As part of the monitoring I prepared a project status report for the period between July 27, 1978 (working day 146) and August 26, 1978 (working day 168). This will be issued concurrently with the monitoring report. I shall be in touch with Mr. Norbert Leppanen shortly to set the next monitoring session.

Ralph J. Stephenson, P.E.

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Mr. Stan Davis (one copy)
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RALPH J. STEPHENSON, P.E.
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August 22, 1978

Subject: Monitoring Report #9

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: August 18, 1978 (working day 162)

Monitored from Issue #3 dated March 1978

Issue #3 date for completion: Morning of August 18, 1978 (working day 162)

Actions taken:

- Inspected project
- Reviewed project status with Mr. Allen Parker and Mr. John Parks
- Evaluated current job status
- Prepared project status report for period from August 18, 1978 (working day 162) to September 18, 1978 (working day 182)

General Summary

As of August 18, 1978 (working day 162) the major lag is in installation of sheet metal ductwork. The strike delay to the job earlier is now causing serious problems since there are sizable amounts of ductwork yet to be installed vertically and horizontally in the stacker unit.

Mr. Parks said that presently the sheet metal contractor is working overtime and on weekends and probably will complete his work about August 25, 1978 (working day 167). Mr. Parks further estimates it will take two or three weeks following to complete painting the entire interior of the building. This would bring completion to somewhere between September 18, 1978 (working day 182) and September 25, 1978 (working day 187), a lag of 20 to 25 working days.

I suggest we consider these to be present realistic targets for completion of the soak facility. If any improvement can be made in them, naturally this would be of help to the project.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

I shall plan to briefly inspect the project at the next monitoring although by that time work should be substantially complete at the facility.

As part of the monitoring this time I prepared a project status report for the period between August 18, 1978 (working day 162) and September 18, 1978 (working day 182). This will be issued concurrently with the monitoring report.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

September 18, 1978

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Monitoring Report #9

Chrysler Corporation Expanded Sonk Facility (SF)

Date of Monitoring: September 15, 1978 (working day 181)

Monitored from Issue #3 dated March, 1978

Issue #3 Date for Completion: Morning of August 15, 1978 (working day 162)

Actions taken

- Inspected project
- Reviewed project status with Mr. Allan Parker
- Evaluated current job status

Note: No project status report was prepared for this monitoring.

General Summary

As of September 15, 1978 (working day 181) the project is in its final stages of stacker adjustment and painting. There was no authentic information available from the field staff regarding the amount of work remaining, however, in my opinion there are from 7 to 12 working days to finish up what work is visibly incomplete and clean up the area and move out. It should be pointed out that this observation is based only upon a brief inspection of the project. By this reasoning, completion should be somewhere about September 29, 1978 (working day 191) or perhaps slightly earlier.

The project is presently at a stage where most scheduling is on a day-to-day basis in the field. Since the building is nearly complete, a project status report was not prepared for this monitoring session. I shall not monitor the job subsequently unless special conditions make it advisable.

Ralph J. Stephenson, P.E.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

October 19, 1978

Subject: Monitoring Report #11

Chrysler Corporation Expanded Soak Facility (SF)

PG-E-22 Program, Proving Ground, Chelsea, Michigan

Project: 77:81 (SF)

Date of Monitoring: October 13, 1978 (working day 201)

Monitored from Issue #3 dated March 1978

Actions taken:

- Inspected project
- Reviewed current project status with Mr. John Parks and Mr. John Schick
- Evaluated current job status

Note: No project status report was prepared for this monitoring.

General Summary

As of October 13, 1978 (working day 201) stacker controls are still being installed. Also, there has been some difficulty in controls on the roof unit heater and a steam activator is being flown in to correct the difficulty in maintaining temperatures. This is expected on the job today or tomorrow. Probably within the next week the building will be totally complete and ready for use.

No further monitoring will be made unless requested.

Ralph J. Stephenson, P.E.

RJS/m

To: Mr. Norbert Leppanen, P.E. (orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

March 8, 1978

Subject: Monitoring Report #3

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: March 3, 1978 (working day 44)

Note: All dates from this point will be on a 1978 working day base. January 3, 1978 is working day #1. This will put all three E-22 projects on the same calendar.

Monitored from Issue #2 dated January 13, 1978

Target completion dates: Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185)

Stock areas - about August 2, 1978 (working day 150)

Note: Base date references have been revised to 1978 reference point

Actions taken:

- Reviewed project with Mr. Paul Rose
- Evaluated current job status

General Summary

As of March 3, 1978 (working day 44) foundation work is substantially complete and structural steel erection has started. Presently field work on the project is meeting critical early start and finish dates. Revamping of the existing electrical room has been completed and will not delay ongoing erection of structural steel.

We carefully reviewed the D series (front end work) and a brief review is given below.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

- Auto hoists and equipment - presently in fabrication
- Early hollow metal frames - in fabrication
- Hollow metal doors - deleted
- Roof metal deck - in fabrication, need roof opening locations as soon as possible. This could be a very important element.
- Metal siding - in fabrication
- Roofing materials - available as needed
- Roof top units - in fabrication
- Condensate pump - in fabrication
- Circuit breaker - in fabrication
- Bus duct shop drawings - not yet submitted
- Overhead door - in fabrication
- Brick masonry - units have been approved and ordered and are available as needed
- Miscellaneous iron - in fabrication
- Sash - in fabrication
- Irrigation system - shop drawings have been submitted and are presently being reviewed
- Color schedules - owner is preparing these and they should be available shortly. The color schedule will be important to expediting ongoing work.
- Computer floor - shop drawings have not yet been received.

Overall, with some minor exceptions, the front end work appears to be moving extremely well and again, as with all other E-22 projects, it is imperative that deliveries and approvals be expedited.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

I now have all of the network data required to prepare the computer runs for the diagram and I will do so and plan to monitor the project in the field on a regular basis. Networks and the computer runs will be issued as available.

I shall be in touch with Mr. Norbert Leppanen to set the next meeting.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen
(Original and 1 copy)

Mr. Paul Rose
Jeffress-Dyer, Inc.
2378 E. Stadium Blvd.
Ann Arbor, Mich. 48106
(1 copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

April 5, 1978

Subject: Monitoring Report #4

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: April 3, 1978 (working day 65)

Monitored from Issue #2 dated January 13, 1978

Target completion dates:

Garage - August 31, 1978 (working day 171)
Lab - September 21, 1978 (working day 185)
Stock areas - about August 2, 1978 (working day 150)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks
- Evaluated current job status
- Prepared project status report for period from April 3, 1978 (working day 65) through May 1, 1978 (working day 85)

General Summary

As of April 3, 1978 (working day 65) structural steel is substantially erected, trimmed and bolted. Underground utility work is in progress and demolition of existing paving is moving fairly well. There have been some minor difficulties with delivery of miscellaneous iron. It was due on the job March 27, 1978 (working day 60). It now will be on the job April 10, 1978 (working day 70). However, Mr. Parks does not feel it should materially hold up major work progress. Structural steel, it should be pointed out, was erected well in line with target early and late starts and finishes. Roof metal deck is due on the job momentarily and erection will start as soon as it is available.

Mr. Parks said that he will defer start of work on the tank farm until better sub-soil water conditions can be expected. Presently the tank farm shows as starting no later than March 13, 1978 (working day 50). The decision to defer start of tank farm work will not affect work progress on the job.

Shop drawings, reviews and approvals, and fabrication and delivery of major items appear to be well in line with the targets set in the Issue #2 network. It should be pointed out that color and finish schedules should be provided as quickly as possible so all materials can be brought to the job site at an early date.

In summary, the project is currently moving very well with the only potential delay being in erection of miscellaneous iron. It is expected this will not affect the project in a major fashion.

As part of the monitoring, I prepared a project status report for the period from April 3, 1978 (working day 65) through May 1, 1978 (working day 85). This will be issued concurrently with the monitoring report.

I shall be in touch with Mr. Leppanen soon to set the next job inspection.

Ralph J. Stephenson, P.E.

RJS
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To: Mr. Norbert Leppanen
(Original and 1 copy)

Mr. Paul Rose
Jeffress-Dyer, Inc.
2378 E. Stadium Blvd.
Ann Arbor, Mich. 48106
(1 copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

May 2, 1978

Subject: Monitoring Report #5

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: April 28, 1978 (working day 84)

Monitored from Issue #2 dated January 13, 1978

Target completion dates:

Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185)

Stock areas - about August 2, 1978 (working day 150)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks
- Evaluated current job status
- Prepared project status report for period from April 28, 1978 (working day 84) to May 30, 1978 (working day 105)

General Summary

As of April 28, 1978 (working day 84) structural steel is complete and exterior masonry is underway. Underground utility work is well along and the sub-base is being readied for slab on grade work. Apparently there are some proposed changes to area layouts which could affect underground utilities and consequently, slabs on grade. I recommend this matter be cleared immediately since it is critical that the slab on grade proceed in timely fashion.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

With the present plan of work Mr. Parks was due to to begin fine grading and setting in-floor work for slab on grade by April 24, 1978 (working day 80), and make his first slab pour on May 1, 1978 (working day 85). Present projections are that the first pour will be made as late as May 19, 1978 (working day 99) giving the slab on grade work a projected lag of approximately 14 working days.

It is considered critical to get the slab down so above ceiling rough work (sheet metal ducts, mechanical piping and electrical) could be installed off the slab. It is possible this work could start without having a slab on grade although it would move much better if the slab were available. Again, any problems which delay start of slab on grade work should be cleared immediately.

Roofing will begin May 5, 1978 (working day 89), slightly ahead of the projected late start of May 8, 1978 (working day 90).

Exterior masonry lags by approximately 8 working days. However, it is possible that some of this time can be picked up over the next several days.

As noted in the previous monitoring, tank farm work will be deferred until the weather has dried considerably and work can proceed without the problems of wet sub-soil.

Reviewing front end items, deliveries of various materials show up as in good to excellent condition. There are no major lags in delivery items although those remaining to be brought to the job site will have to be watched carefully since the job is a tight and potentially difficult project. A job of this type which has a short duration and some relatively complex interior finish work can go awry quickly if careful attention is not paid to expediting deliveries.

As part of this monitoring, we prepared a project status report for the period from April 28, 1978 (working day 84) to May 30, 1978 (working day 105). I shall be in touch with Mr. Leppanen shortly to set the next monitoring date.

Ralph J. Stephenson, P.E.

RJS/m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

May 31, 1978

Subject: Monitoring Report #6

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: May 26, 1978 (working day 104)

Monitored from Issue #2 dated January 13, 1978

Target completion dates:

Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185) 185 31 (216)

Stock areas - about August 2, 1978 (working day 150)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks and Mr. Allen Parker
- Evaluated current job status
- Prepared project status report for period from May 26, 1978 (working day 104) to July 6, 1978 (working day 131)

General Summary

As of May 26, 1978 (working day 104) exterior masonry is substantially complete, sash is erected and about to be glazed, and roofing is in work. Underground utility work inside the building is still in process with transite being completed at the garage area. All existing paving has been substantially removed and the area is being made ready for concrete slab on grade.

Apparently there have been several revisions to the building interior layout which have affected underground work. This is a very disruptive delay and it was not clear at our meeting whether or not all revisions have been resolved and issued. I strongly recommend those responsible for the project make an immediate check on this matter and if there is anything delaying start of slab on grade work, it should be taken care of now. Slab on grade

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

work was due to begin no later than May 1, 1978 (working day 85). This then shows as a direct current 19 working day lag which, of course, will increase for every working day slab work is delayed. The major resulting problem from no slab on grade is that the above ceiling work, sheet metal, mechanical piping and rough electrical cannot start in any kind of production form since there is no hard surface to work from.

Rough trades were due to begin in the laboratory area no later than May 15, 1978 (working day 95) so they show a current lag of 9 working days. These lags are real times behind on the project and are going to be extremely difficult to pick up if there is any increase in them whatsoever. The amount of time left to the completion of the lab area on September 21, 1978 (working day 185) is presently only 81 working days. This is a very tight schedule to complete the sizable amount of complex work remaining.

Mr. Parks and I reviewed the front end work thoroughly and he feels that all submittals, approvals and deliveries are under control. They appear to be at this time.

In summary, the project currently lags by approximately 19 working days, with a very good possibility this lag will increase 5 working days more. I recommend that immediate action be taken to clear away any revisions that may be holding up the work and to take steps that will allow floor work to start immediately.

Mr. Parks pointed out it is possible that sheet metal work could be stopped June 1, 1978 (working day 107) due to potential strikes. If this does occur, it would be a serious problem to the job if the work stoppage is not resolved immediately. However, at present, it is essential to get the slab on grade down before any production sheet metal work can begin.

I shall plan to monitor the project again in June and will be in touch with Mr. Norbert Leppanen in respect to the date.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

July 6, 1978

Subject: Monitoring Report #7

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: June 30, 1978 (working day 128)

Monitored from Issue #2 dated January 13, 1978

Target completion dates:

Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185)

Stock areas - about August 2, 1978 (working day 150)

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks and Mr. Allen Parker
- Evaluated current job status
- Prepared project status report for period from June 30, 1978 (working day 128) through July 27, 1978 (working day 146)

General Summary

As of June 30, 1978 (working day 128) sheet metal workers are just returning from strike. The strike started June 1, 1978 (working day 107) and was over June 28, 1978 (working day 126). This was a very disruptive strike for the garage, lab and stock facility since it directly affected completion of the underground transite exhaust system at the garage and prevented above floor sheet metal ductwork from starting in the laboratory, garage and stock areas.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

This was further complicated by revisions to the lab area plan which were released in late June and caused some floor slab areas to be held.

Presently at the garage completion of slab on grade work is still waiting for release of drawings for the additional hoists at the southwest corner. This is holding completion of construction of this area and tends to disrupt the garage installation sequencing.

The total lag at the garage and lab building is presently about 31 working days over the targets given above. This is basically over the critical completion date at the lab.

Mr. Parks and I discussed the possibility of recapturing a portion of the lag and he feels it will be very difficult since the delay is directly in key trades and the current plan of work is very tight.

I suggest that following the next monitoring we evaluate whether an updating should be made of the network model or not. We can easily evaluate current progress from the Issue #2 model since the logic is relatively unchanged with only durations being modified.

A more detailed review of each area is given below.

Garage Area

A portion of the floor slab on grade has been poured out but as noted above, the underfloor transite exhaust duct must be completed before the rest of the slab can be constructed. No major overhead work has started at the garage as yet. Some interior masonry is in work. The major need now is to release areas where the new hoists are to be added and I recommend this be done at the earliest possible date.

Lab Area

Above floor piping and rough electrical work is underway and moving reasonably well. Sheet metal ductwork is just starting and of course, is the major delay item at the area. Sheet metal ductwork was due to begin at the lab no later than May 15, 1978 (working day 95). It has been in work one or two days and thus, the current lag is about 31 working days. As noted above, Mr. Parks feels this delay will be a very difficult lag to recapture but he will make every effort to gain back as much of it as possible.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

The total delay was caused by two or three factors, the major of which were revisions to the lab area and the sheet metal workers strike.

Adding 31 days to our present lab completion shows a potential completion now of November 3, 1978 (working day 216). As noted, we should plan to re-evaluate this at the next session and if required, to update the current network to reflect the new plan of action.

Some work at the stock area is in progress and removal of interior existing walls is underway.

Site Work

Mr. Parks expects to begin site work about July 10, 1978 (working day 133). This work is currently showing up in the project status reports as a lag item. However, it is anticipated there will be no problem completing it within the construction duration of the main facility.

General

As part of this monitoring, I prepared a project status report for the period from June 30, 1978 (working day 128) to July 27, 1978 (working day 146). This will be issued concurrently with the monitoring report. I shall be in touch with Mr. Norbert Leppanen shortly to set the next monitoring session.

Ralph J. Stephenson, P.E.

RJS/m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

July 31, 1978

Subject: Monitoring Report #8

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: July 27, 1978 (working day 146)

Monitored from Issue #2 dated January 13, 1978

Target completion dates:

Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185)

Stock areas - about August 2, 1978 (working day 150)

Note: These are the original targets. For various reasons as noted in this and other monitoring reports, these dates will probably not be met.

Actions taken:

- Inspected project
- Reviewed project status with Mr. Allen Parker
- Evaluated current job status
- Prepared project status report for period from July 27, 1978 (working day 146) through August 28, 1978 (working day 168)

General Summary

As of July 27, 1978 (working day 146) all trades are working and progress has been fair on the job over the past month. There is a possibility of additional strikes on July 31, 1978 (working day 148). Carpenters, laborers, trowel trades and sprinkler fitters have not yet settled and their contracts expire at the end of July. This, of course, could cause delays in addition to those already caused by the sheet metal strike.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

At the garage the underfloor transite duct is almost complete and within the next two or three days, the remainder of the floor slab will be poured out provided there is no strike of the trowel trades. All hoist work at the slab and below is installed and there are no foreseeable delays, according to Mr. Parker, to completing the work.

At the stock and lab areas, rough trades are far enough along so within a short time finish trades will be able to start. Lags at the garage, lab and stock area range between 10 and 30 working days with some isolated tasks lagging slightly more. As work proceeds, it is possible some additional time can be picked up although it should not be depended upon.

A more detailed review of each area is given below.

Garage Area

As noted above, the floor slab on grade should be poured out within a week provided no disruptions occur due to strikes. The lag at the garage currently is about 10 to 15 working days, primarily in completion of masonry and start of painting and other finish trades. Garage area work could possibly pick up some time over this delay. The current target finish is August 31, 1978 (working day 171) and if time could be picked up, this date might possibly be met. There is still a considerable amount of work to do in the overhead spaces and much will depend on how well this moves over the next two weeks.

Lab Area

Sheet metal ductwork, mechanical piping and rough electrical work are being installed and ceiling hangers are just now starting. In the finish trades, the partitions that go through to the roof are very few and therefore probably ceiling work will begin concurrently with the installation of the very few high partitions through the ceiling.

Acoustic ceiling grid was due to begin no later than June 20, 1978 (working day 120) and it is just now starting with hangers. Therefore, the actual lag at the lab is probably about 26 working days in ceiling work provided continuous activity is carried through. This will, of course, depend upon how quickly the remaining above ceiling work can be finished off.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

Demolition work continues with a slight lag in installation of masonry at the stock and lab area boundry. Overall, the delay at the lab area should be considered to be between 20 and 30 working days.

Stock Area

Stock area work is proceeding concurrently with the lab area work. Presently the lag is in completion of masonry and relocation of existing stock area walls. The lag is about 20 to 30 working days also.

Site Work

There is no current word on when site work will be started.

General

As part of this monitoring I prepared a project status report for the period from July 27, 1978 (working day 146) to August 26, 1978 (working day 168). This will be issued concurrent with the monitoring report.

I shall be in touch with Mr. Leppanen shortly to set the next monitoring session.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

August 22, 1978

Subject: Monitoring Report #9

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: August 18, 1978 (working day 162)

Monitored from Issue #2 dated January 13, 1978

Target completion dates:

Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185)

Stock areas - about August 2, 1978 (working day 150)

Note: These are the original targets. For various reasons as noted in this and other monitoring reports, these dates will probably not be met.

Actions taken:

- Inspected project
- Reviewed project status with Mr. Allen Parker and Mr. John Parks
- Evaluated current job status
- Prepared project status report for period from August 18, 1978 (working day 162) through September 18, 1978 (working day 182)

General Summary

Progress at the garage and lab has been fair over the past three weeks and work there is now moving into finish trades. At the garage the floor slab is poured out and work is actively underway on finishing off interior spaces. At the lab area, ceiling work is well along with partition studs starting. At the stock area rough work is still being completed.

Lags range between 19 and 35 working days with the overall lag on the total facility probably about 20 working days. Mr. Parks indicated that his major target is to make every effort possible to deliver the lab

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

area by our current target of September 21, 1978 (working day 185). This is a very critical area and heavy field efforts are being focused upon it. The lag there presently is about 19 working days and recapturing of this total delay is going to be very difficult. However, efforts are going to be made to accomplish this.

A detailed review of each area is given below.

Garage Area

The floor slab on grade is now substantially complete at the garage area and work is actively moving on interior finish trades at the main garage space as well as in the small rooms and offices on the west wall.

The lag at the garage probably is best measured from the start of painting which was due to begin no later than July 19, 1978 (working day 140). Thus, the current lag there is approximately 22 working days. Applying this to the end target of August 31, 1978 (working day 171) gives a projected end date for the garage of about October 2, 1978 (working day 192). This could possibly be improved upon.

Lab Area

Most above ceiling rough work is done and a substantial portion of the ceiling grid is installed. The lag at the lab area is about 17 to 20 working days, primarily in installation of partition work. Mr. Parks stressed the importance of meeting the current target end date of September 21, 1978 (working day 185) and emphasized he is making every effort to meet this date.

The time lost during the sheet metal workers strike seriously affected this portion of the project and is probably directly responsible for the current lag.

Painting and other interior finish operations should begin shortly.

Stock Area

No finish work has started at the stock area. The present lag over a target completion of August 1, 1978 (working day 150) is 30 to 40 working days. Thus, completion probably will be close to completion of the lab and garage area.

Site Work

Work has now begun on installing the new fuel tank farm and apparently it is the intent to install the irrigation system, paving and landscaping concurrently. Generally exterior work will proceed on out to the end of the project.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

General

As part of this monitoring I prepared a project status report for the period from August 18, 1978 (working day 162) to September 18, 1978 (working day 182). This will be issued concurrently with the monitoring report.

I shall be in touch with Mr. Leppanen shortly regarding the next monitoring session.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

September 15, 1978

Subject: Monitoring Report #10

Garage and Lab Building (GL)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: September 15, 1978 (working day 181)
Monitored from Issue #2 dated January 13, 1978

Issue #2 Target Completion dates:

Garage - August 31, 1978 (working day 171)

Lab - September 21, 1978 (working day 185)

Stock areas - about August 2, 1978 (working day 150)

Note: These are the original Issue 2 dates.
They are modified, as noted below.

Actions taken:

- Inspected project
- Reviewed project status with Mr. Allan Parker
- Evaluated current job status

General Summary:

The major efforts at the garage and lab are presently to complete the lab area and turn it over to the owner the evening of September 22, 1978 (working day 187). This will then allow them to make a week-end move of their lab facilities to free up the area they now occupy for additional construction.

The lab area presently is being given intensive attention and based upon what appears to be projected for the scheduled work load during the next week, probably the contractor will be able to meet the move-in date. Undoubtedly there will be loose ends and work to be completed after the move has been made, but apparently it has been agreed that this would be satisfactory if required.

At the garage area, work is moving into final phases. It lags by about 39 working days over the target completion of August 31, 1978 (working day 171).

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

At the stock area, work is proceeding concurrent with the garage and lab and probably will be totally completed about the same time as the garage area, or earlier.

A brief review of each area is given below:

Garage Area

Finish work is now starting at the small rooms along the west wall with toilet room hard tile just starting. The lag there is 35 to 39 working days. This brings projected completion of the total area to mid or late October. There was no current word as to whether this plan of work is to be accelerated, however, undoubtedly if some of the original durations are reduced for finishing off the small office areas, or if a move can be made before they are totally complete, it is possible the move-in could take place in late September or early October.

Overhead work is well along, with light fixtures about 75% complete. Most of the work that remains is general work that should be done before occupancy occurs. Again, setting of the target for completion is now best left a field matter between the proving grounds and the general contractor.

Lab Area

The present target, as noted above, for completion of the lab area is the evening of September 22, 1978 (working day 187) with move-in scheduled over the week-end to free the present laboratory area by Monday, September 25, 1978 (working day 190).

Demountable partitions are well along, with doors and trim being installed, the computer floor installed, the acoustic grid ceiling well along, and light fixtures, grills and diffusers almost complete.

With a very intensive effort at this area, probably the September 22nd, 1978 (working day 187) date can be met. The original target for moving into the area was a start of September 7, 1978 (working day 175); thus, the present goal is about 12 working days later. In the original logic, however, 5 working days had been allocated for the move, with a 5 working day clean-up and move-out.

Stock Area

Painting has been started at the stock area, light fixtures are well along and presently the drywall closure at the masonry

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wall is being installed. This work will probably be finished out along with the garage and lab.

Site Work

Fuel tanks have been installed and are presently being back-filled. The irrigation system, according to Mr. Parker, has been started. No exterior paving or landscaping is in work yet and probably will not be initiated until the tank farm has been completely installed. Paving is essential to turning over the total facilities for owner use.

Ralph J. Stephenson, P.E.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

October 19, 1978

Subject: Monitoring Report #11

Garage and Lab Building (GL)

Chrysler Corporation PC-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (GL)

Date of Monitoring: October 13, 1978 (working day 201)

Monitored from Issue #2 dated January 13, 1978

Actions taken:

- Inspected project
- Reviewed project status with Mr. John Parks
- Evaluated current job status

Note: No project status report was prepared at this review

General Summary

The lab area was occupied the week end of September 23 and 24, 1978 (working day 187), the target date for completion of that facility.

The computer room was occupied the week end of October 7 and 8, 1978 (working day 197).

The remainder of the office and lab area is still not occupied but is basically ready for move-in according to Mr. Parks. There is no current word on when it will be occupied.

Chrysler moved into the first half of the garage the week end of October 7 and 8, 1978 (working day 197). It is expected that the remainder will be occupied early or mid next week.

There have been some problems with delivery of toilet partitions and these are expected on the job in early November 1978. However, it was agreed that the facility can be occupied without having these installed.

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At the stock area, demolition of the existing wall will not be able to start until the driver's facilities have been relocated to their new position. The driver's area was turned over to Chrysler on October 7, 1978 (working day 197). Furnishings for the area are expected on the job in early November at which time the move can be made.

As of this monitoring, it appears that the work at the garage and lab areas is well enough along so that monitoring can be on a day to day basis from here on. Therefore, I will not plan to monitor the job in subsequent sessions unless specifically requested.

It was a pleasure working on the job and I wish to thank the people involved for their assistance and help.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Herbert Leppmann, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

March 8, 1978

Subject: Monitoring Report #3

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: March 3, 1978 (working day 44)

Note: All dates from this point will be on a 1978 working day base. January 3, 1978 is working day #1. This will put all three E-22 projects on the same calendar.

Monitored from Issue #2 dated March 3, 1978 (working day 44)

Target dates for completion: Presently being established, will be set when final logic plan has been reviewed and approved by those concerned.

Actions taken:

- Completed preparing network plans for building work
- Reviewed instrumentation requirements for installation of dynamometers and control room
- Revised network to Issue #2 dated March 3, 1978
- Evaluated current job status

General Summary

Presently it is the intent to begin stripping the site on March 13, 1978 (working day 50). Some work is being installed at the job but the project is just now getting under way. It should be moving well within the next four weeks.

We completed planning building work and determined essentially that the close-in point for the control building could be achieved by July 5, 1978 (working day 130) with finish work to be completed at the control building basement by August 14, 1978 (working day 158).

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Interior building finish work should be complete at the control building first floor by September 8, 1978 (working day 176).

In the dynamometer areas the present target for full completion of building work is September 21, 1978 (working day 185). A projection of the north dynamometer area has not yet been made and is in work.

As a result of our evaluation of the control building and the south dynamometer area, we also made a full evaluation of how the first dynamometer to be installed could best be brought into operation. It appears there is a strong desire by Chrysler to have the first dynamometer installed and debugged by September 20, 1978 (working day 184). We then worked backward in the logic plan for its installation and determined the various points at which certain work in the space would be needed. These we called condition points. The condition points and early dynamometer installation logic is shown on sheet D1, Issue #2A dated March 3, 1978.

A brief review shows it is the intent to have one or more dynamometer packages on the project by the end of July or in early August. The major elements in this package are the SCR's, fans and motors, isolation transformers and miscellaneous iron. There are some additional control elements but these go with the total package.

To set an SCR in the SCR room, it will be necessary to have the secondary electrical service equipment installed and for all items to have the control building and the dynamometer wing substantially protected from weather. To set the fan and motor it will be necessary to have the floor slab on grade poured out at the dynamometer to be selected for initial installation. In order to set the isolation transformers, the basement area slab on grade will have to be poured and as noted above, the building closed in. For miscellaneous iron work, it is essential to have the slab on grade available and the building up at the south dynamometer area.

It is the intent to set the SCR's, the fan and motor, the isolation transformers and the dynamometers along with setting and storing the miscellaneous iron concurrently with setting the control console at the building and the control package. To set the control console it is necessary to have the building closed in and most above ceiling work completed in the control building. Resilient floor tile may be necessary.

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Once all of the dynamometer package elements are in place, wire will be pulled for one of the dynamometers and once it is pulled, the connection process will begin for that dynamometer. It should be understood that wire will likely be pulled for six dynamometers at a time. However, after the first day of wire pulling, it is expected that power wiring and control wiring for one dynamometer can be connected. This will take about 5 working days for the power wiring and about 5 more working days for the control wiring.

Thus, our present plan shows that on about August 24, 1978, (working day 166) the first dynamometer could be available for GE to calibrate. After two days of calibration, the owner is expected to install their work and debug the dynamometer on a six day week basis. This will probably take about 3 weeks for the first dynamometer.

Once the first is debugged, then control wiring for the remaining dynamometers can proceed. While the first dynamometer is being calibrated, installed and debugged, work can be proceeding up to the control wiring connection point for other dynamometers. However, it is only after the first dynamometer is debugged that control wiring for the remaining dynamometers will be hooked up.

We discussed with the instrumentation team from Chrysler the turnover cycle they expected to maintain on the dynamometers after debugging the first. Their plans are to generate a ten working day turnover cycle for the remaining eleven dynamometers. There is additional study underway of sheet P1 to determine if this should and can be improved.

Presently I am having the building network and installation of a single dynamometer drafted to issue as the initial planning package.

Mr. Paul Rose is reviewing the logic plan for the steel erection to see if some improvement can be made to early dates for making the buildings available. He will mark up a blueline and send it to me showing his suggested improvements.

As part of our monitoring, we made a detailed review of the front end work being accomplished on the project now. A brief recap is given below.

- Hollow metal doors and frames - shop drawings have been approved and fabrication will be starting shortly

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- Structural steel - shop drawings will be submitted shortly. Efforts are being made to improve fabrication and delivery of steel since it is a critical element on the project.

- Precast plank - There was considerable discussion about first floor construction at the control building. It will be essential to closely tie the precast plank design and shop drawings to the openings required for the consoles. This matter should be given top priority attention. Precast shop drawings are being prepared.

- Metal roof deck - shop drawings are in work and will be submitted shortly.

- Porcelain panels - shop drawings have been submitted and are being reviewed.

- Sash - shop drawings are submitted and being reviewed.

- Acoustic panels - Shop drawings have been approved and fabrication of the panels is in work.

- Early miscellaneous iron - shop drawings are expected in March 6, 1978 (working day 45). This item is critical to construction of the dynamometer pits. It should be expedited.

- Roofing bills of material - to be submitted shortly.

- Fan anchor bolts - No current word on these. There is some confusion about what they restrain. If they have to be placed in any sub-base foundation work, then we should have them available at an early date. The project team will check this matter.

- Brick - Samples are expected to be available March 13, 1978 (working day 50). No difficulty anticipated in obtaining brick.

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- Transite exhaust duct - no current problems anticipated

- Electrical manhole - shop drawings are in for approval. Fabrication and delivery expected by April 10, 1978 (working day 70).

Overall, the condition of front end work is fairly good. It should be again cautioned that precast plank should be detailed as carefully as possible to minimize field coring. The parties concerned with this item should follow it carefully to insure that no time is lost in field modifications to the deck as it is being erected.

There are some potential early revisions to the current plan of work. Mr. Rose will evaluate these and their impact upon the job. Meanwhile, I shall monitor from Issue #2 dated March 3, 1978 and will set a regular job inspection sequence. I shall be in touch with Mr. Leppanen shortly to determine the next monitoring date.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen
(Original and 1 copy)

Mr. Paul Rose
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2378 E. Stadium Blvd.
P. O. Box 1103
Ann Arbor, Mich. 48106
(1 copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

April 5, 1978

Subject: Monitoring Report #4

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: April 3, 1978 (working day 65)

Monitored from Issue #2A dated March 3, 1978

Target dates for completion: Presently the project goal is to allow owner to have the first dynamometer debugged and available by September 20, 1978 (working day 184). This target date is presently being checked against a slightly revised structural steel erection sequence.

Actions taken:

- Inspected project
- Reviewed project progress with Mr. John Parks
- Analyzed current job status

General Summary

Currently work is in progress on the south dynamometer area with mass excavation started, some underground utilities at the dynamometer pit installed and a portion of the dynamometer pit base mat constructed. The job is currently meeting targets between early and late starts and finishes. It is too early to fully evaluate the current status relative to the completion targets;however, the job at present is moving relatively well.

Mr. Parks and I reviewed the current status of deliveries and most processing of front end work looks to be in reasonably good condition.

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Structural steel shop drawings have not yet been fully approved and these are late. However, as of today, we are holding a delivery of structural steel at the control building of May 10, 1978 (working day 92). All other structural steel should be delivered at about the same time.

There have been some revisions to the sequencing of the project that Mr. Rose requested be made. These are being incorporated into the revised network and the project is being drafted and readied for issue. It probably will be ready sometime late this week or early next since it is necessary to check the revised plan carefully against the proposed installation of one dynamometer.

We will issue the initial network showing the installation up to completion of debugging the first dynamometer for one piece of equipment only. Later, after a full evaluation has been made of the sequence and the job is further along, we will add in remaining dynamometer installations.

The current target is to be ready to receive the first dynamometer package on or about the end of July and to have the first dynamometer debugged and available by September 20, 1978 (working day 184). We shall continually monitor against this set of objectives.

Since the computer run is not yet completed, there was no computerized project status report prepared at this session. However, when the run is complete, I will be issuing regular project status reports measured against the network model by late start dates. Meanwhile, the narrative monitoring reports should serve to provide a good insight into the current job progress.

I shall be in touch with Mr. Leppanen shortly to set the next monitoring session.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen
(Original and 1 copy)

Mr. Paul Rose
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2378 E. Stadium Blvd.
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(1 copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

May 2, 1978

Subject: Monitoring Report #5

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77;81 (MA)

Date of Monitoring: April 28, 1978 (working day 84)

Monitored from Issue #2A dated March 3, 1978

Target dates for completion:

First dynamometer debugged and available - Sept. 21, 1978 (W/D 185)

All dynamometers debugged and available - March 12, 1979 (W/D 304)

Actions taken:

- Inspected project
- Reviewed project progress with Mr. John Parks
- Analyzed current job status
- Prepared project status report for period between April 28, 1978 (working day 84) and May 30, 1978 (working day 105)
- Prepared network model for instrumentation and installation of dynamometers 13 through 17 and 19 through 24 with Chrysler staff

General Summary

As of April 28, 1978 (working day 84) the south dynamometer pit is almost complete and pedestals are being built. The pedestals are slightly late since it was decided to build pit walls first. Thus, a note about these

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being late will appear in the project status report; however, there should be no problem with the change in sequence, as the current lag of the south dynamometer pits, walls and pedestals is minimal. Work at control building footings is in work and walls are just starting up. Construction of the control building lags currently by 4 to 7 working days.

The basic problem at the control building, as well as at the other dynamometer building areas, has been very wet weather and difficulty of installing footings under adverse moisture conditions. Mr. Parks feels now that the weather has cleared, progress will pick up considerably and the present lag will be recaptured.

Mr. Parks and I made a detailed review of the front end work and below is a brief summary of our discussion.

- Structural steel - will be on the job as needed.
- Precast plank - available as needed. (The Chrysler staff reports that the necessary openings and chases will be fabricated into the precast plank at the plant.)
- Metal deck - in fabrication.
- Porcelain panels - in fabrication.
- Sash - in fabrication.
- Acoustic wall panels - in fabrication.
- Early miscellaneous iron - on site and some installed.
- Roofing materials - available.
- Brick masonry - on the job.
- Transite exhaust duct - on the job.
- Precast electrical manhole - available.
- Anchor bolts - on the job.

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Following field monitoring I met with the Chrysler staff and we completed diagramming installation of dynamometers 13 through 17 and 19 through 24. (The network model shown on sheet DY-1, Issue #2 dated March 3, 1978 is for #18 dynamometer.)

Consistent with decisions arrived at in our monitoring meeting on March 3, 1978 (working day 44) the contractor does not plan to start control wiring connections on dynamometer 13 until dynamometer 18 is debugged. Based on the information available from that meeting, we completed diagramming installation of the remaining dynamometers. This plan of work is shown on sheet DY-2, Issue #3 dated April 28, 1978. Copies of this network were prepared by the Chrysler staff and distributed internally. I shall obtain bluelines of the sheet DY-2 for my use and send five copies to Mr. Paul Rose for his evaluation and distribution.

I would like to request by way of this monitoring report that the contractors review the information contained in the remaining dynamometer installation network (sheet DY-2) carefully and confirm it is a satisfactory method of proceeding.

We attempted to incorporate in it all procedural requests that were brought out in the original diagramming session at which we prepared the dynamometer #18 network.

In summary, the project presently is in fair condition and shows promise of reducing the current lag over the next several weeks. Again, as with the other two PG-E-22 projects, being of short duration, it will be necessary to keep close watch to insure they are kept on schedule and moving. This involves a team effort from all parties to the program.

As part of this monitoring, I prepared a project status report for the period from April 28, 1978 (working day 84) to May 30, 1978 (working day 105). This will be issued concurrent with the monitoring report. I shall be in touch with Mr. Leppanen shortly to set the next monitoring session.

Ralph J. Stephenson, P.E.

RJS/m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)

Mr. Stan Davis (one copy)

Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

May 31, 1978

Subject: Monitoring Report #6

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: May 26, 1978 (working day 104)

Monitored from Issue #2A dated March 3, 1978

Target dates for completion:

First dynamometer debugged and available - September 21, 1978 (working day 185)

All dynamometers debugged and available - January 15, 1979 (working day 264)

(Note: This date is from the network model, Issue #4, dated May 6, 1978, sheet DY2 prepared in conjunction with the Chrysler Proving Ground and Instrumentation staff. The network has been provided to responsible parties at Chrysler and at the contractor's for review with no comments regarding it received to date. Therefore, I shall plan to issue it, manually computed, and dated, to serve as a proposed plan of action for installation of dynamometers 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, and 24.)

Actions taken:

- Inspected project
- Reviewed project progress with Mr. John Parks and Mr. Allen Parker
- Analyzed current job status
- Prepared project status report for period between May 26, 1978 (working day 104) to July 6, 1978 (working day 131)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

General Summary

As of May 26, 1978 (working day 104) pedestals and walls at the south dynamometer are substantially complete. Control building concrete walls are complete, however, no masonry has begun there as yet.

At the north dynamometer, walls are well in work with dynamometer pedestals about ready to be formed and poured.

Transite pipe at the south has been substantially installed and backfilled and work is about to begin on utilities above it. Front end work dealing with submissions, approvals and deliveries is in good condition and Mr. Parks does not feel there will be any problem providing all items needed as required on the job site.

The current lag on the project is greatest in the control building area. Here, masonry was due to begin to the first floor on May 3, 1978 (working day 87). It has not yet started and thus, the current lag is approximately 17 working days. This is a fairly serious lag, particularly since there is a possibility of a structural steel work stoppage on June 1, 1978 (working day 107) which could delay erection of structural steel. The project lag could increase considerably if there is a strike. Mr. Parks intends to begin masonry at the control building almost immediately.

Underground utility work at the control building in the basement has been completed and this may help recapture a portion of the lag if there are no further work delays.

Thus, the overall lag at the control building could be considered between 12 and 17 working days presently.

At the south dynamometer area underground utilities above the exhaust duct were due to begin no later than May 10, 1978 (working day 92). They are just now getting underway and thus, lag by about 10 working days. However, it is possible that the amount of time originally expected to be needed for this installation will be compressed and a portion of the lag regained.

At the north area construction of pedestals was due to begin no later than May 18, 1978 (working day 98). This work has just begun and there is a slight lag. However, it was anticipated in the Issue #2A network that the walls would be done following pedestals and they have now been substantially completed at the dynamometer pit. Therefore, work at the north dynamometer area is slightly ahead of the network plan.

In summary, the control building is experiencing a serious lag and will have to be picked up in tempo since this is the key area for getting initial dynamometers into work and debugged. The south dynamometer area lags by a small amount but it is not an overly serious difficulty. At the north, the dynamometer area is on schedule or slightly ahead and is in relatively good condition.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

On April 28, 1978 (working day 84) I met with the Chrysler staff to prepare Issue #3, sheet DY2 for installation of the new dynamometers 13 through 17 and 19 through 24. This original network was modified in subsequent phone discussions with the Chrysler staff and reissued to them and the contractors for comments. The final target completion for all dynamometers has been agreed to be January 15, 1979 (working day 264). It was requested that the connection of power wiring which has been established sequentually at five days per dynamometer be completed no later than November 6, 1978 (working day 217) so that in the event a compressed schedule for installation of dynamometers could be achieved they would be ready for work. I have had no comments regarding the revisions and therefore, will proceed to date this network for the dynamometer installation sheet DY2, Issue #4, dated May 6, 1978 and issue it to call concerned.

It should be pointed out that installation of dynamometer work, particularly the first dynamometer - #18 - is highly dependent upon having the control building closed in and all work there substantially complete. Therefore, the current lag in the control building is of concern and should be given a high priority of attention.

As part of this monitoring I prepared a project status report for the period from May 26, 1978 (working day 104) to July 6, 1978 (working day 131). I shall plan to monitor the project again in June and will be in touch with Mr. Leppanen to set the exact date.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

July 6, 1978

Subject: Monitoring Report #7

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77;81 (MA)

Date of Monitoring: June 30, 1978 (working day 128)

Monitored from Issue #2A dated March 3, 1978

Target dates for completion:

First dynamometer debugged and available - September 21, 1978 (working day 185)

All dynamometers debugged and available - January 15, 1979 (working day 264)

(Note: Sheet DY2 showing installation of dynamometers 13, 14, 15, 16, 17, 19, 20, 21, 22, 23 and 24 has been issued to all concerned)

Actions taken:

- Inspected project
- Reviewed project progress with Mr. John Parks and Mr. Allen Parker
- Analysed current job status
- Prepared project status report for period between June 30, 1978 (working day 128) and July 27, 1978 (working day 146)

General Summary

Overall, the project has moved very well during the past month except for activities affected by the strike of sheet metal workers. Sheet metal workers went on strike starting June 1, 1978 (working day 107) and returned to work June 28, 1978 (working day 126). This had a direct impact upon the installation of transite exhaust duct at the north dynamometer. This work is expected to begin shortly but it was delayed for the full period of the strike.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

Structural steel is substantially erected at the three building areas and masonry is proceeding well at all three areas. Current target dates are being held for start of installation at the first dynamometer (#18) by early August.

A more detailed review of each area is given below.

South Dynamometer Area (SD)

Most underground utilities are in and the filling, fine grading and installation of in-floor work is proceeding for the slab on grade. Structural steel has been erected and masonry walls are moving well.

Work at the south dynamometer is currently meeting or bettering most early starts and finishes.

Control Room

Exterior masonry is being completed at the control room. Structural steel is all erected and installation of interior rough work is about to begin. It is still Mr. Parks' intent to get this building closed in shortly and to substantially complete work at the control building by the present end target of September 12, 1978.

The basement floor slab has been poured and electrical work,which is a major share of the installation at the basement, will be starting shortly. Electrical work was due to begin no later than June 29, 1978 (working day 127).

Overall, although the control building lags slightly in minor rough interior items, it is conforming to the early and late starts and finishes on major tasks.

North Dynamometer (ND)

Work at the north dynamometer on structural steel,masonry and grade beams has proceeded well ahead of our current targets. However, transite exhaust duct has been delayed by the strike of sheet metal workers. It will start shortly, - it is late and will tend to delay the slab on grade work. With other trades proceeding ahead at the north dynamometer, it is possible that the lost time can be offset in part.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

Dynamometer Deliveries

No monitoring was made of dynamometer component deliveries at this session. I recommend a complete review of the projected deliveries to the job site be conducted shortly to insure that dynamometer components are in fabrication and will be available for delivery to the job.

Ralph J. Stephenson, P.E.

RJS
m

To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

July 31, 1978

Subject: Monitoring Report #8

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: July 27, 1978 (working day 146)

Monitored from Issue #2A dated March 3, 1978

Target dates for completion:

First dynamometer debugged and available - September 21, 1978 (working day 185)

All dynamometers debugged and available - January 15, 1979 (working day 264)

Actions taken:

- Inspected project
- Reviewed project progress with Mr. Allen Parker
- Analysed current job status
- Prepared project status report for period between July 27, 1978 (working day 146) through August 26, 1978 (working day 168)

General Summary

As of July 27, 1978 (working day 146) the project continues to move relatively well. The building is generally in the dry at the roof, the floor slab at the south dynamometer is being poured, office interior work is just beginning and underground utilities above the transite exhaust are just starting at the north building.

The first load of dynamometer packages arrived at the job site while we were monitoring. These were due in at an early date of July 27, 1978 (working day 146).

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

The floor slab on grade at the south dynamometer building is being poured out today and will be ready for receiving equipment shortly. Meanwhile, pits are ready for setting the dynamometers as required at the south and north.

The major problem facing the project appears to be a slow start of electrical work at the control building and the possibility of several work stoppages shortly. Expiration of several contracts is scheduled for the end of July including carpenters, laborers, trowel trades and sprinkler trades. Naturally a stoppage in any of these trades could have impact upon the job.

A brief review of each area is given below.

South Dynamometer (SD)

Floor slab on grade at the east of the building is being poured out today and within a short period of time should be available for setting equipment. Pits have been available for some time and the west half of the building exterior is being graded, therefore, access to set equipment from either side should be no problem.

Presently, with the exception of the floor slab on grade which shows a slight lag, work at the south dynamometer building is meeting all major targets between early and late starts and finishes.

Control Room

The control room building close-in is proceeding. Meanwhile some rough work is starting, both at the basement and the first floor. Although it is difficult to accurately determine the lag at the control room, it appears to be primarily in rough electrical work. Rough electrical work was due to begin by June 29, 1978 (working day 127). It has started but there still is considerably more to do. A rough estimate of the lag according to the present plan of work shows it to be between 10 and 15 working days. At the first floor, the lag in rough electrical work appears about 10 working days. It is probable that now the dynamometer equipment has begun arriving that some time will be picked up.

It will be better possible to evaluate the true position of electrical work over the next one to three weeks. In general, however, it appears the lag at the control building is about 10 to 15 working days.

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

North Dynamometer (ND)

Transite exhaust pipe at the north dynamometer has been installed and backfilling is about to start along with installation of utilities above the exhaust duct. Taking all factors into account including those activities that have proceeded ahead of the underground work such as the exterior grade beams, masonry walls and other such items, the lag at the north dynamometer is about 31 working days. This is measured directly by the target start of utilities above the exhaust duct. These were due to begin no later than June 16, 1978 (working day 118) and are just now starting. However, work further on down the line including grade beams and masonry walls totaling about 15 working days has been completed. Therefore, the total lag is about 11 working days at the north dynamometer area. If installation of utilities and backfilling can proceed at a good pace, it is possible some or all of this time can be picked up.

Dynamometer Installation

The first load of dynamometer packages arrived today, June 27, 1978 (working day 146) on schedule. Setting of the equipment will probably proceed immediately. A key target is that of the start of pulling wire for dynamometer #18, the first one set. This was due to begin no later than August 10, 1978 (working day 156).

As noted above, it is going to be important to increase the tempo of electrical installation to meet this target. Electrical progress should be reviewed in depth by field forces to insure that dynamometer elements can be brought on line as originally planned. The intent is to move directly from the first dynamometer installed into installation of each of the subsequent units. Dynamometer installation is critical to the owner and must be maintained as close as possible.

General

Overall, work at the mileage accumulator is moving fairly well despite the very disruptive sheet metal workers strike. Electrical work is tending to lag slightly but probably some pickup in this can be accomplished over the next one or two weeks. Dynamometer equipment is arriving on the job and installation work will be proceeding immediately.

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As part of our work at this monitoring I prepared a project status report for the period between July 27, 1978 (working day 146) and August 26, 1978 (working day 168). This will be issued concurrently with the monitoring report.

I shall be in touch with Mr. Norbert Leppanen shortly regarding the next monitoring session.

Ralph J. Stephenson, P.E.

RJS
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To: Mr. Norbert Leppanen, P.E. (Orig. & 3 copies)
Mr. Stan Davis (one copy)
Mr. Paul Rose (One copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

August 22, 1978

Subject: Monitoring Report #9

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: August 18, 1978 (working day 162)

Monitored from Issue #2A dated March 3, 1978

Target dates for completion:

First dynamometer debugged and available - Sept. 21, 1978 (working day 185)

All dynamometers debugged and available - Jan. 15, 1979 (working day 264)

Actions taken:

- Inspected project
- Reviewed project progress with Mr. Allen Parker and Mr. John Parks
- Discussed electrical progress with Mr. Glen Schaner, electrical superintendent
- Participated in brief meeting re electrical work and dynamometer installation
- Analyzed current job status
- Prepared project status report for period from August 18, 1978 (working day 162) to September 18, 1978 (working day 182)

General Summary

As of August 18, 1978 (working day 162) the south and north dynamometer areas continue to move relatively well. However, control room installation of dynamometer equipment and installation of electrical work is beginning to lag severely. On an overall basis, the present projected lag on the job is between 20 and 25 working days in work that leads directly to debugging of the first dynamometer. On a total basis relative to a complete target end date of January 15, 1979 (working day 264), the delay potential appears to be less. Adequate information is not now available to make a prediction as to how much of the total 20 to 25 working day lag can be picked up. Undoubtedly some of it will be regained.

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In part, the lag in field installation of contract work for the building must be attributed to the approximate one month sheet metal worker strike. However, equipment deliveries have lagged also and it is essential that equipment be brought to the job in continuous timely fashion so the pulling of wire can proceed as soon as possible.

Delivery of dynamometer equipment presently is set as follows:

- One SCR unit expected on the job today, August 18, 1978 (working day 162).

- The next SCR unit on the job in 15 working days.

- Two complete dynamometer packages on the job September 5, 1978 (working day 173).

  Note: The supplier and the owner said that these packages could be interchanged and that the SCR units in any package could be substituted into any other package.

- Two complete dynamometer packages will arrive on the job September 18, 1978 (working day 182)

- Two complete dynamometer packages will arrive on the job September 30, 1978 (working day 212)

- The last two complete dynamometer packages will arrive on the job October 16, 1978 (working day 202).

This schedule of deliveries should be examined carefully to determine whether it is adequate for the owner to develop continuity of installation and debugging.

A brief review of each area is given below.

South Dynamometer (SD)

Dynamometers are being set at the pit and in-floor electrical installation is about complete. Acoustic ceiling is about ready to begin at the south dynamometer and this presently is the gage by which status can be measured there aside from the dynamometer installation itself. Acoustic ceilings at the south dynamometer area were due to begin no later than August 16, 1978 (working day 160). There was no word today as to when they will start.

At the special meeting on dynamometer equipment, a brief discussion ensued about which dynamometer would be brought on line first. It was generally agreed that by the time wiring is to begin that all six of the dynamometers

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would be set at the south area and that a choice could be made then of which to wire up for initial running. Since there is some impact upon how the controls are set in respect to which is done first, I recommend that a decision be made now as to which dynamometer is to be installed and operating first.

North Dynamometer (ND)

Nearly the entire lag at the north dynamometer area has been regained by intensive field work over the past three weeks. Underground utility work is done and installation of electrical work and in-floor work is well along. It is anticipated that floors probably will be started there next week. The first slab on grade was due to be poured out beginning on August 18, 1978 (working day 162). Thus, the lag is now a minimal one or two working days. Taking into account that much of the work following the slabs, basically exterior masonry, the lag at the north dynamometer area has been nearly eliminated. Performance there has been excellent.

Control Room

Control room work is the key to the job and presently lags by 20 to 25 working days in instrumentation and electrical work needed to begin pulling wire for the first dynamometer package. At the basement, insulation is just being put on the slab at the first floor and considerable work still remains at this level. At the first floor sheet metal ductwork is well along, as is piping, cable tray is being installed and the job is waiting for control consoles and console packages to be set.

The lag at the first floor and basement can be measured by the amount of time presently required before the start of pulling wire. It was estimated at our sessions today that this activity was between 15 and 20 working days away. The lag can be measured by comparison to the projected start of pulling wire. In Issue #2A dated March 3, 1978 this date was August 10, 1978 (working day 156). Using a 20 working day time from the current date indicates that wire pulling will begin about September 18, 1978 (working day 182) - a direct lag of 26 working days. This is serious and I suggested to those attending the special meeting that every effort be focused now on starting this work earlier.

Attempts are being made continuously by the electrical contractor to improve deliveries on key electrical elements, and deliveries of dynamometer components are being expedited to the greatest possible extent by the supplier.

General

Presently the major thrust must be on getting dynamometer installation work and electrical connections underway. Present lags can be measured directly in this work and its deviation from the expected standard of performance shown in Issue #2 A dated March 3, 1978.

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I shall plan to monitor the project again in September and shall be in touch with Mr. Norbert Leppanen shortly regarding the next session.

As part of this monitoring, I prepared a project status report for the period between August 18, 1978 (working day 162) and September 18, 1978 (working day 182). This will be issued concurrently with the monitoring report.

Ralph J. Stephenson, P.E.

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Mr. Paul Rose (one copy)

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

September 15, 1978

Subject: Monitoring Report #10

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: September 15, 1978 (working day 182)

Monitored from Issue #2A dated March 3, 1978

Issue #1 target dates for completion: First dynamometer debugged and available September 21, 1978 (working day 185). All dynamometers debugged and available January 15, 1979 (working day 264)

Actions taken:

- Inspected project
- Reviewed project progress with Mr. Allan Parker and briefly with Mr. Glenn Schaner, electrical superintendent
- Evaluated current job status

General Summary:

As of September 15, 1978 (working day 181) the heavy emphasis is on pulling wire and getting the first dynamometer (18) in operation for calibration and debugging. Present estimates are that the system will be energized September 25, 1978 (working day 187), which is approximately one month later than the original target of August 25, 1978 (working day 167).

If the current planned durations hold for calibration at 2 working days, installation by owner at 11 working days (based on a 6 day week) and debugging at 5 working days (based on a 6 day week) the first dynamometer should be available on October 19, 1978 (working day 205). This is one month later than the original target.

There still is difficulty in getting SCRs on the job and to date only one has arrived. Mr. Schaner expects another 4 will be on the job Monday, September 18, 1978 (working day 182). There is no present word on delivery of the remainder.

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CONSULTING ENGINEER

So far as the rest of the building is concerned, it does not appear presently that there will be any difficulty staying ahead with the work on other dynamometer installations.

A brief review of each area is given below.

South Dynamometer

Most equipment is set, sprinkler piping is installed and mechanical piping is substantially complete. Acoustic ceilings in the dynomometer area have not arrived on the job and porcelain facia panels should be on the job Monday, September 18,1978 (working day 182).

The lag in building work at the South Dynamometer is from 15 to 20 working days over the target completion of September 1[illegible],1978 (working day 180). This would bring completion of building work, provided all materials are available, to about October 5,1978 (working day 195).

North Dynamometer

All slabs on grade have been poured out, sprinkler piping is installed and mechanical piping is substantially complete. No acoustic ceiling panels have been installed.

Presently work there is meeting building targets between early and late starts and finishes and should be completed on its present target date of October 20,1978 (working day 206).

Control Building

At the basement major work presently is in setting mechanical equipment and completing installation of electrical work. It appears there is probably 5 more working days to complete above floor rough electrical work there.

It appears that completion of the basement will move concurrently with other areas of the building and probably will be done by early or mid-October.

At the first floor the acoustic ceiling has been installed, resilient floor tile is well along and the control consoles have been set. One SCR unit is installed and some miscellaneous electrical equipment is also in place. Work there from here on will depend to a large extent upon delivery of SCRs and progress in electrical work.

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General

Overall the project appears to lag about 20 working days over the original targets in Issue #2A dated March 3, 1978. Every effort is being made presently to energize the dynamometer #18 system by September 25, 1978 (working day 187).

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October 19, 1978

Subject: Monitoring Report #11

Mileage Accumulator (MA)

Chrysler Corporation PG-E-22 Program

Proving Ground, Chelsea, Michigan

Project: 77:81 (MA)

Date of Monitoring: October 13, 1978 (working day 201)

Monitored from Issue #2A dated March 3, 1978

Issue #1 target dates for completion: First dynamometer debugged and available September 21, 1978 (working day 185). All dynamometers debugged and available January 15, 1979 (working day 264).

Actions taken:

- Inspected project
- Reviewed project progress with Mr. John Parks and Mr. Glenn Schaner
- Evaluated current job status

Note: No project status report was prepared as of this monitoring since most work from here out will be monitored and scheduled on a day to day basis

General Summary

As of October 13, 1978 (working day 201) dynamometer #18 has been calibrated by GE and dynamometer #17 was turned over by the electrical contractor to Chrysler the morning of October 13, 1978 (working day 201). Power wiring is being connected now for dynamometer #16. Mr. Schaner pointed out that the sequence of installation on the dynamometers at the south area has been changed, perhaps temporarily. At present the sequence shown on DY2, Issue #4 dated May 6, 1978, indicates that the dynamometers at the south addition would be installed from 13 through 14, 15, 16 and 17. This has been revised as of today to sequence of 17, 16, 15, 14 and 13. There may be a further revision of the sequence as manpower increases on the job; however, for the time being, the latter sequence will be used.

The second dynamometer control wiring package was due to be connected no later than September 27, 1978 (working day 189). It was turned over on

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October 13, 1978 (working day 201) according to Mr. Schaner. This is a lag of approximately 12 working days. Thus, it appears that there is a slight pickup in the turnover.

The first dynamometer was calibrated, according to Mr. Schaner, by October 6, 1978 (working day 196). It was due to have been calibrated no later than August 28, 1978 (working day 168). Thus, there will be a lag until calibration work picks up on subsequent dynamometers. This is expected to happen.

Ten of the twelve SCR's are now on the job and ten of the twelve dynamometers are also on the project and set in place.

So far as building work is concerned, interior finish trades at the central building are still being installed but Mr. Parks says this is not interfering with dynamometer installation work.

At the south dynamometer structure, the acoustic ceiling is in, sprinkler work is done and light fixtures are installed. Presently the exterior fascia is being completed and painting is in work. Generally building work at the south dynamometer is well along and almost complete. At the north dynamometer acoustic walls panels are up, light fixtures are installed, sprinklers are in and the ceiling is being installed. Work there is also in good condition.

In summary, overall the project presently lags by between 10 and 20 working days, primarily in installation of dynamometers. It appears that as installation proceeds and bugs are worked out progressively that a portion of this time can be picked up.

We are still maintaining a total completion date for all dynamometers of January 12, 1979 (working day 264).

Generally building work and a good share of the early electrical and dynamometer work is either well along or complete, therefore, I do not feel it necessary to continue monitoring these elements of the project. However, it may be wise to replan subsequent dynamometer installation and debugging and I shall check with Mr. Leppanen to see what he wishes to do in this matter.

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