RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

March 17, 1981

Subject: Monitoring Report #1

Additions and Alterations to Ingham Medical Center

Lansing, Michigan

The Christman Company - construction managers

Project: 81:07

Date of Monitoring: March 10, 1981 (working day 48)

Monitored from Issue #2, dated January 28, 1981 (working day 19)

Starting date of field work: February 9, 1981 (working day 27)

Target completion date: to be finally confirmed at a later date

Actions taken:

- Inspected project
- Reviewed current job status with Mr. Reniger and Mr. Carlson
- Made complete review of entire structural steel sequencing and floor pour plan
- Established target dates for start of construction at key areas

General Summary

The field forces moved on the job site February 9, 1981 (working day 27) and work since then has been concentrated on construction of mechanical room foundations along with installation of footings at the vacated existing linen room. The five footings to be installed at the linen room are complete with anchor bolts ready for setting the structural steel girder at column line 2b. This girder is expected on the job March 17, 1981 (working day 53) and should be set and in place by March 27, 1981 (working day 61). Major structural steel for the various portions of the project is anticipated on the job anywhere between late May and mid-June, 1981. Procurement is in excellent shape for early items with practically all resteel shop drawings in and approved. Anchor bolts are on the job and all structural steel shop drawings have been received, approved, and fabrication is in work for each area.

The components of the project include the following:

NA - North Addition column line B to F and 1 to 5

EC - East connector - column line DD1 to D and 1a to 3a

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SA - South addition - column line BE1 to C and 3a to 6a

LD - Linen dock - column line AA2 to BC and 6a to 15

MR - Mechanical room column line AA5 to A and 15 to 18

The general sequence of steel erection will move from the east connector (EC) to the north addition (NA) to the south addition (SA) to the linen dock (LD) and then to the mechanical room (MR).

At present construction of footings for the south addition is being held until the new oxygen system can be activated and the temporary linen dock can be put into service. It might be possible to do some work on south addition footings prior to this point, but the major work depends upon these activities being completed. In addition, we also must do whatever abandoning and relocation of yard facilities are necessary in the present service yard area before footing work at SA can be completed.

Today we focused intensely on a review of the oxygen system installation, the relocation and removal of the existing utility lines in the yard, and construction of the temporary linen dock. Work on the dock has been held due to the proximity of the dock foundations to the existing 1 1/2" copper oxygen line. This oxygen line is a very delicate pipe and easily damaged. Since it is the only line for oxygen into the hospital it therefore must be maintained and carefully protected.

Thus, our present thrust is to get a field order issued for the new oxygen farm. This is expected to be done tomorrow March 11, 1981 (working day 49). It will take 2 to 5 working days to get material on the job for installation of the new oxygen line both underground and inside the building.

Present plans are to construct the new oxygen tank base, build the truck apron, and concurrently install the underground temporary oxygen line from the existing tank to the existing building along with the new oxygen line from the new tank location to the existing building. At the building they will be joined by a cutoff valve and the new inside oxygen line will be run from that point through and around to the existing utility tunnel. Inside the utility tunnel a cutoff valve will be installed which connects the existing system to the new system. Once this installation is made the new tank can be set, hooked up, and activated. Present plans are for the tank to be fully on line by April 3, 1981 (working day 66).

It is important to check delivery of the new oxygen tank since obviously this is a critical part of the installation work.

Once the new oxygen system is activated we can construct the new temporary linen dock (minus its canopy), and it should

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be available by April 24, 1981 (working day 81). Concurrently an evaluation of the yard utility status is being made and if any redesign is necessary this will be done immediately with a bulletin issued to be priced, a change order issued, and the yard utility materials brought to the job site.

We had anticipated that by about March 30, 1981 (working day 62) we should be able to start utility work in the yard with the relocation and abandonment of existing waste lines, removal of the blacktop, and preparation of the site for footings. Although this series of tasks has a small amount of float time (about 5 working days) I suggest it be completed just as quickly as possible since it, along with the temporary linen dock, best be available in order to start major work on the wall and column footings for the south addition.

Present plans are to begin these footings on or before April 24, 1981 (working day 81). The underpinning at column line 3a/DD has been completed and this should be helpful in reducing the amount of time it takes to construct the SA footings. Present plans are to have the footings done including the strap girders at the east connector by early June, 1981; thus, being ready to receive east connector structural steel when it arrives on the job site.

I again stress that it is imperative we follow the oxygen farm work, the yard utility work, and linen dock construction very closely on a day to day basis to insure that any problems that appear are resolved promptly. The field work is not overly complicated but making certain that the supportive activities are given proper and continuous attention could prove somewhat difficult.

As part of our work we also made a complete evaluation of the planned sequence for erection of the east connector structural steel and construction of the supported deck. In discussions with Mr. Carlson and Mr. Reniger it was agreed that discussions with the owner were important to initiate regarding the conditions that will exist as work at the east connector proceeds. The reason for this is that there is a great deal of heavy construction activity going on around and above the very crucial areas at the east connector. These areas that could be affected are the doctor's library and at the 2nd floor the intensive care lounge and the adjoining areas along with the outpatient prep room. These are very important areas for the hospital operation and if there is any need to relocate them temporarily, particularly for an extended period of time, this matter should be covered in detail now since there only remain about 64 working days to the anticipated start of east connector superstructure work.

On Sheet #2 a sequence for the east connector structure is shown in detail in the small sub-network at the lower left

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hand corner of the sheet. This diagram is summarized in the building diagram shown above in the middle of the sheet.

With the present plan of work we expect that we will be able to close in the entire facility by mid or late December, 1981 or possibly earlier. This is a very important date to make for many reasons, primarily because we must have the facility closed in to winter weather in order to continue work on both rough and finish trades. In addition, I suggest that we begin analysis of the method by which either temporary or permanent heat is to be provided to the facility since it will be needed about mid-November, 1981.

The present concrete pour sequence proposed at the south addition is to construct the roof and penthouse deck first, next moving down tothe 1st floor and then up to the 2nd and from there to the 3rd. At the north addition, the sequence proposed is to start at the roof deck then pour out the 2nd and then the 1st floors. These sequences are subject to revisions as job conditions may require.

Another item to be watched carefully is spray on fireproofing. That work is due to begin as soon as structural steel is up and decks are available. Overall, the plan of work we now show on sheets #1, #2, and #3 Issue #3, dated March 10, 1981 (working day 48) is a workable plan provided we can quickly free up the building area for the south addition. It is imperative that this work be followed closely on a day to day basis and I have suggested to Mr. Carlson that he post a copy of sheets #1, #2, and #3 in the job trailer and color code these on a regular basis, preferably once every two to five days. The color coding system which I reviewed with Mr. Carlson is the standard green, orange, blue, and yellow codes, the key to which is shown on sheet P-1, Issue #3, dated March 10, 1981 (working day 48).

I shall be in touch with Mr. Frederickson shortly to set the next planning session. However, I recommend that the job be well under way in the field prior to the next session so that we can concentrate fully on doing the interior work planning with some assurance that the work proceeding the interior work start has been tied to a set of predictable dates. This should probably be sometime within the next 3 to 6 weeks.

Meanwhile, I again recommend strongly that the owner be involved now in a discussion of the occupancy requirements during construction of the new east corridor. This could prove to be a difficult move situation for the owner and the more lead time he has available to plan, the better can he accommodate the needs of the construction process and the needs of the hospital.

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I left the tracings, sheets #01, #02, P-1, #1, #2, and #3 with Mr. Carlson for printing and distribution. He will retain them in his files.

Ralph J. Stephenson, P.E.

RJS:sps

To: Mr. Phil Frederickson

cc: Mr. Curt Carlson
Mr. Bud Reniger

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July 20, 1981

Subject: Monitoring Report #2

Additions and Alterations to Ingham Medical Center

Lansing, Michigan

The Christman Company - construction managers

Project: 81:07

Date of Monitoring: July 15, 1981 (working day 137)

Monitored from Issue #3, dated March 10, 1981 (working day 48)

Starting date of field work: February 9, 1981 (working day 27)

Target completion date: to be finally confirmed at a later date

Actions taken:

- Inspected project
- Reviewed job status with Mr. Reniger and Mr. Carlson
- Measured current progress against Issue #3 network
- Rediagrammed close in and added parking area diagram (sheet #4, Issue #4, dated July 15, 1981 (working day 137)
- Prepared network model for third floor interior work (sheets #5 and #6, Issue #4, dated July 15, 1981 (working day 137)

General Summary

As of July 15, 1981 (working day 137) the project is in good condition measured against the Issue #3 network model dated March 10, 1981 (working day 48). Structural steel is erected, plumbed, and bolted at the linen dock and mechanical room and at the north addition. At the south addition structural steel is substantially erected and well along in plumbing and bolting with about 7 working days remaining to total completion. The target date for concluding plumbing and bolting of the south addition was August 4, 1981 (working day 151); thus, this work is currently ahead of the projected early completion. In addition a portion of the main roof slab has been poured out which should allow picking up some additional time on remaining floor pours.

At the east connection (EC), work is currently about 15 to 20 working days ahead of the projected schedule with steps 1

through 8 (shown on sheet S-12 of the working drawing) completed. At the north addition (NA), supported floor slabs at the 1st, 2nd, and roof levels are complete and as at other units this work is ahead of the projected early finishes.

Because of the overall ahead position it was decided with Mr. Reniger and Mr. Carlson that we would rediagram the close in of the entire structure. This was done and the information is shown on sheet #4, Issue #4, dated July 15, 1981 (working day 137). In this diagram, the south addition and east connection are closed in with exterior walls and roofing complete by November 16, 1981 (working day 224). This is considerably earlier than the Issue #3 projection of completion which was about January 5, 1982 (working day 257). In addition, close in of the north area along with the mechanical room can probably be completed earlier than that projected originally. The goal at present is to complete roofing in as large segments as possible. Mr. Reniger will set the schedule pattern for the roofer within the early and late start constraints.

We were also able to do a network model for the third floor of the south addition and the east connection. This is one of the more complex floors and will probably be one of the first floors in which finish work is started. The present intent if at all possible is to move finish work from the 3rd floor of the south unit and east connection on down, finishing out at the grade floor level. Concurrently interior work at the north addition will proceed. Remodeling work within the east corridor and the existing buildings will follow as space is freed up.

We briefly discussed the owner move sequences shown on sheets #01 and #02; however, no detailed analysis was made of the work except to confirm that the logic patterns are substantially correct. At our next session we will try to complete all interior finish work and, in turn, then try to project the various points at which existing areas will be freed up for remodeling.

In the analysis of the 3rd floor interior work, it appears that from the time the building is closed in and installation of gyp board can begin, it will take approximately 103 working days (about 5 months) to complete interior finish work at this area. We can then project by using a turnover cycle for the other floors what an approximate completion date might be. A turnover cycle on a medical building of this type usually ranges between 20 and 30 working days. This is the length of time it takes to complete a subsequent floor after the initial floor is completed. Using this analysis, it is possible to make rough approximations as to when various areas might be ready for move in. However, it is to be cautioned that partial

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move ins to medical facilities is always a complex procedure since quite often entire systems must be fully installed and operative before a smaller portion of the building can be occupied. Therefore, I recommend we complete our planning of interior work patterns and make a full evaluation of what is needed to operate the building before we assume that partial move in to any given area can be done prior to completion of the entire facility.

In addition there are often regulatory requirements on medical facilities that demand the entire facility be complete and have passed rigid inspections before a partial operation can be initiated. At our next session we should plan to evaluate this matter in some detail.

I have left the original tracings of sheets #1, #2, #3, #4, #5, #6, #01, #02, and P-1 with Mr. Carlson for printing. He will obtain copies of these and forward one set to me. I also left with him the marked up prints sheet R-1, task resources tabulation, in which we have identified interior finish work that should be installed at each level of the facility. We shall use this as our master checklist in future work.

I shall be in touch with Mr. Frederickson and Mr. Carlson shortly to set the date of our next monitoring and planning session. I recommend that this be held within the next one to two months to maintain continuity of planning thinking on the job. In addition, I have suggested to Mr. Carlson that he prepare for field use a series of short term bar charts in which he can show early starts, early finishes and late finishes (if desired) for tasks to be started over the next two to four weeks. Three weeks is a good short range schedule presentation and to assist in doing this it is helpful to draw the isoquant (line of equal quantity) line on the early start/early finish period for this period. If any tasks remain undone at the end of the three week period, they then should be incorporated into the next short term bar chart issue. These bar charts should be numbered and issue numbers along with the network model that they are derived from shown on the bar chart form.

In summary, the project is presently moving well and progress has been good over the past four months. Close in of the entire facility is about ready to start at the east corridor and north addition to be followed soon after by erection of exterior masonry at the south addition.

Ralph J. Stephenson, P.E.

RJS:sps

To: Mr. Phil Frederickson

cc: Mr. Curt Carlson
Mr. Bud Reniger

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

October 11, 1981

Subject: Monitoring Report #3

Additions and Alterations to Ingham Medical Center

Lansing, Michigan

The Christman Company - construction managers

Project: 81:07

Date of Monitoring: October 6, 1981 (working day 195)

Monitored from Issue #4, dated July 15, 1981 (working day 137)

Starting date of field work: February 9, 1981 (working day 27)

Target completion date: For new south addition and north addition - June 14, 1982 (working day 370)
For remodeled areas - to be established later

Actions taken:

- Reviewed job status with Mr. Reniger and Mr. Carlson
- Measured current progress against the Issue #4 network model
- Completed preparing network model for interior work at the south and north additions for floors 3, 2, 1, and ground floor
- Updated network model for owner moves, sheets #01 and #02 to Issue #5, dated October 6, 1981 (working day 195)

General Summary

As of October 6, 1981 (working day 195) the project is well on its way to being closed in by the target close in date of November 16, 1981 (working day 224). Presently it appears there is a chance of bettering that date, but we shall maintain the November 16, 1981 (working day 224) for control purposes while using the close in date for the south addition and north addition as the starting point for interior finish work in the new buildings.

In the new south addition sheet metal duct work and mechanical piping is in work at the third floor and moving fairly well. Plans are presently to begin erecting all studs and in wall

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work at the interior of the building within the next ten working days followed as soon as the building is weather tight (presently projected at November 5, 1981 (working day 217) by hanging and taping drywall. This brings completion of the third floor interior to a tentative target of April 9, 1982 (working day 325). The second floor is scheduled to follow by one month or 22 working days with the 1st floor and ground floor scheduled for completion 23 working days after the 1st floor or on our target completion for the full new facility of June 14, 1982 (working day 370).

Present planning indicates that no occupancy of the new facilities should begin until they are complete so as to avoid disruption of hospital services operating in the new building. There is always the possibility of conflicts in construction traffic with hospital use traffic, and frequently there is also a need to work on occupied area ceilings below spaces being finished. Therefore, our present plans are to consider that the new facility will be ready for start of move in by June 14, 1982 (working day 370).

From this point we concentrated on the sequence of move-ins as shown on sheets #01 and #02, updated Issue #5, dated October 6, 1981 (working day 195). One of the more complex of these moves is that for the existing nurse administration #1, which moves temporarily from the second floor of the east connector to the first floor of the north addition. This move will probably be made early so as to allow a new passage from the east connector to the south addition to be built concurrently with completion of above floor rough mechanical and electrical systems at the old lounge of the second floor east connector. It would be desirable to free the entire east connector 2nd floor for work at the same time, perhaps even earlier at the far north end existing lounge, so that the second floor of the new facility can be made operative as an intensive care floor by our present target completion plus whatever move in time is required.

A similar problem with completing the above floor mechanical and electrical systems may also be experienced at the 1st floor, and Mr. Carlson will investigate the special needs of that area.

However, we have now planned the owner moves and these will be reviewed in detail by Mr. Carlson and Mr. Reniger. When approvals have been gained we will plan to do additional detailed diagramming of the more complex remodeling at various areas.

I shall now have both the interior finish diagrams and the owner move diagrams drafted into final form for issue as

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quickly as possible. It is particularly important in my opinion to get the owner move diagram in the hands of those who must review and approve it in final form; therefore, we shall concentrate on that first.

There are some critical points concerning ongoing project work which must be observed in the next one or two weeks. Some of these include:

1. Color and finish schedules must be brought to final form immediately. We are faced with the need to identify several critical color items including quarry tile, paint, vinyl wall covering, ceramic, and possibly light fixtures. Also included are doors and hardware, corner guards, chalk and tack boards, mill work and trim, drapes and blinds, carpet, resilient floor tile, and all other such items. influenced or affected by a choice of color or material.

2. It is imperative we bring some form of heat on line by mid-November 1981. At that time we will be starting to install wall surfaces and therefore temperature control in the building is critical to avoid damage to installed and finished gyp board.

3. Discussions should be held with the mechanical and electrical contractors re the need for complete piping systems at the first and second floors. This deals with the connection of the east connector systems to the new south addition systems.

4. A check should be made on the Hubbard tanks to determine how long it will take to move them to the new facility. It is normally desired by a hospital to keep existing tanks in operation until the very last minute when the move must be made. This time frame should be decided upon sometime soon.

5. Occupying a hospital in this era has proven to be a sizable job even though the facility is for all intents and purposes complete. Occupancy permits, inspections by regulatory agencies, and the other approvals that are needed to obtain a certificate of occupancy sometimes require a considerable period of time. It should be understood that the <u>construction</u> operation for the new facilities is presently planned to be completed by June 14, 1982 (working day 370). This is the date on which the final check out to obtain the certificate of occupancy and the go ahead from the health department and fire marshall can begin. Mr. Carlson will begin to check on this approval sequence immediately.

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As other items for decision come up they should be identified and disposed of as quickly as possible. I shall plan to monitor the project regularly from here on and will draft the current networks into final form and possibly process them by computer depending upon the complexity of the final diagrams. I shall be in touch with Mr. Carlson shortly to set the next monitoring and planning sessions.

Ralph J. Stephenson, P.E.

RJS:sps

To: Mr. Phil Frederickson

cc: Mr. Curt Carlson
Mr. Bud Reniger

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

November 24, 1981

Subject: Monitoring Report #4

Additions and Alterations to Ingham Medical Center

Lansing, Michigan

The Christman Company - construction managers

Project: 81:07

Date of Monitoring: November 17, 1981 (working day 225)

Monitored from Issue #5, dated October 6, 1981 (working day 195)

Starting date of field work: February 9, 1981 (working day 27)

Target completion date: For new south addition and north addition - June 14, 1982 (working day 370)
For remodeled areas - to be established

Actions taken:

- Inspected project with Mr. Reniger and Mr. Carlson
- Evaluated current status of project
- Color coded network models
- Distributed dated logic plans sheets #4 through #12, Issue #5, dated October 6, 1981 (working day 195)
- Briefly reviewed owner move diagram sheet 01 Issue #5, dated October 6, 1981 (working day 195)

General Summary

Mr. Carlson has reviewed the owner move diagram as we had discussed in our previous monitoring session and has suggested some revisions to the logic, particularly in respect to the move of the existing emergency into new emergency and remodeling of the existing building space at the old pharmacy. Time did not permit a full evaluation of this logic revision, and I suggest that Mr. Carlson, Mr. Reniger, and I revise the current move logic plan at our next monitoring session. I shall set this with him in the very near future.

At the new building areas, work is proceeding well and a detailed review of each section is given below:

Close in

The south and north additions (SA,NA) are substantially closed to weather. Caulking has not yet been installed and this may pose some leakage problems. However, caulking is due to begin November 18, 1981 (working day 226) and will probably require about 10 working days to complete. It may be difficult to finish this work prior to the onset of colder weather, but it is very important that the caulking get done now or it will not be able to be done except during mild periods over the winter.

Heat is not yet available from the permanent system in the building but is expected to be brought on line about November 30, 1981 (working day 233). Heat will be needed by the time the building is ready for plastering so careful attention must be given on a continuing basis to provision of heat throughout the entire structure.

The roofs on all buildings are presently to a point where ballast and flashings can be installed and completed. There has been some delay in fabrication and delivery of flashings but these are expected on the job within the next several days. It would be wise to expedite this work so as to get all areas of the roof closed in quickly.

Third floor

Third floor work is moving relatively well, particularly in respect to erection of wall studs and installation of in-wall work. Studs and sheet metal duct work have proceeded concurrently which has allowed the wall stud operations to maintain conformity to early start/early finish dates.

Present plans are to begin drywall November 23, 1981 (working day 229). It was originally due to have started November 5, 1981 (working day 217). Thus, there is a projected lag in hanging board of 12 working days. This lag could be picked up over the next few weeks if drywalling moves as rapidly as presently anticipated. We have allowed 25 working days for hanging and taping drywall at the third floor and it is possible this duration can be reduced. We shall better be able to evaluate the progress that can be made once the drywaller actually starts on the floor.

Second floor

The major lag at the second floor is in sheet metal duct work which is presently being installed concurrently with wall studs and in-wall work. Sheet metal duct work was due to have been about 50% complete no later than November 6, 1981 (working day 218). However, again studs have moved

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concurrently and are presently meeting early start/early finish targets. Thus, probably over the next four weeks the current lag could be eliminated at the floor. However, if drywall work is delayed, the lag at the second floor could possibly extend from 5 to 10 working days over target late start/late finish dates.

First floor

Sheet metal work is just beginning at the first floor and currently lags from 3 to 5 working days. However, studs, as at other floors, have been installed ahead of the projected targets and thus, have brought the floor into fairly good alignment with early and late finish starting dates.

It should be cautioned that at all floors sheet metal duct work must be substantially complete prior to starting any major continuous operation on drywall, otherwise there is bound to be interferences and difficulties that will be difficult to resolve.

Other work at the first floor interior is moving well including rough electrical and mechanical piping.

Ground floor

Ground floor interior work is presently meeting targets between early and late starts and finishes. This area is in relatively good condition. Some masonry has had to be left incomplete to allow access to setting the cartwasher. The cartwasher is due to be delivered in mid or late December, 1981.

North addition

The north addition is substantially closed in; however, no interior work either at the 1st or 2nd floor has yet started. The interior work there is limited in nature and should be able to be completed so that the floors in the north addition will be finished out along with those at the south addition.

Linen dock and mechanical equipment area

These areas are closed in and a good share of the equipment set. Spray on is complete and all work appears to be in fair condition.

General

Overall, the project is moving well with the exception of sheet metal duct work and to a limited extent drywall. However, the current lags and projected lags could be

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regained depending to some extent upon how well hanging board proceeds within the next three weeks.

Overall, this project has proven to be one of the more complex sequencing jobs that I have been involved with over the last several years. The erection of the new south addition third floor over the existing east concourse was done with practically no disruption of hospital operations at the lower levels. Mr. Carlson has photos of the various stages in construction of the third floor over the east connector and also has written records of how the work progressed.

Since the work included many unique construction features including installation of a major girder in the basement and the needling of the floors with columns and reinforcing, it would be well to consider writing a paper on the method the Christman Company approached the problems and worked with the architect/engineer and owner in maintaining good relations and effective operations throughout the construction process.

I would recommend that any writing or publication whether it be in-house or external be accomplished as soon as possible so advantage can be taken of the fresh and recently completed knowledge that each of the Christman staff have of the way the project was handled. It is a significant construction achievement which, in my opinion, deserves to be given attention by those interested in good design and construction practices.

I shall be in touch with Mr. Carlson and Mr. Frederickson shortly to set the next monitoring session. Meanwhile, the computer runs that accompany the Issue #5 network model dated October 6, 1981 (working day 195) will be mailed this week and should be available by the end of the week. I have explained briefly to Mr. Carlson and Mr. Reniger how to use these network model printouts and will review them in detail at our next monitoring session.

Ralph J. Stephenson, P.E.

RJS:sps

To: Mr. Phil Frederickson

cc: Mr. Curt Carlson
Mr. Bud Reniger

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

January 14, 1982

Subject: Monitoring Report #5

Additions and Alterations to Ingham Medical Center

Lansing, Michigan

The Christman Company - construction managers

Project: 81:07

Date of Monitoring: January 6, 1982 (working day 258)

Monitored from Issue #5, dated October 6, 1981 (working day 195)

Starting date of field work: February 9, 1981 (working day 27)

Target completion date: For new south addition and north addition - June 14, 1982 (working day 370)
For remodeled areas - to be established

Actions taken:

- Inspected project with Mr. Reniger and Mr. Carlson
- Evaluated current status of project
- Color coded network models
- Prepared project status report for period from January 6, 1982 (working day 258) to February 15, 1982 (working day 286)
- Updated owner move diagram sheet #01 to Issue #6, dated January 6, 1982 (working day 258)

General Summary

Mr. Carlson and I reviewed revisions to the owner move model Issue #5, dated October 6, 1981 (working day 195) sheet #01. Revisions have now been made to this to reflect a more accurate move sequence than was possible to plan earlier. Mr. Carlson will review the sequence once again and then send me the rough network for incorporation into the final owner move plan.

I suggest that at our next monitoring session we incorporate the projected completion dates for the work onto this plan of operation, estimate the time required to do the various

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remodelings, and project for our own analysis, a tentative target completion for the entire job.

Also considerations should be given to reviewing this move sequence with the owner so he is fully familiar with what is planned. This will allow him to participate in identifying where potential difficulties may occur and also alert his staff to the needs of the remodeling process. It is particularly important that we do this in the near future since taking our current target completion of June 14, 1982 (working day 370) there remains only 112 working days from today until projected completion of the new facility. This does not give us a great deal of time to actually plan and obtain approval on the complex moves that will be necessary for getting into the new building.

In addition, we must take into account that there will undoubtedly be inspections and obtaining of certificates of occupancy required to move into the new space. Again, we should be making plans for this turnover sequence so that when the new building is complete the move in can be made as smoothly as possible.

In the new building work tends to lag by a somewhat greater amount than at the previous monitoring on November 17, 1982 (working day 225). Several problems that have contributed to this are processing bulletin #9 which is an extensive change to the job requiring revisions to partition layouts, hollow metal frames, ceilings, light fixtures, mechanical and electrical work and other related activities. The bulletin was received January 4, 1982 (working day 256) and is presently being quoted. Assuming it required about two more weeks to complete the quotes, three working days to approve it, and another 10 working days to fab and deliver new material for the change to scope of activities, we probably will not have some of the most critical material on the job until mid-February, 1982.

Bulletin #9 primarily affects work at the 1st and 2nd floors although there is a slight impact upon 3rd floor work. Revisions at this point in the job tend to be very difficult to accommodate since in many cases it may require already installed work to be torn out and replaced. Of course, the delays that accompany revisions extend completion targets which is costly and disruptive to the subsequent owner move schedule work which is very important.

Taking into account the current and projected lags it appears now that we might be faced with a completion target of 15 to 20 working days later than our desired target for

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the new building of June 14, 1982 (working day 370). This would bring completion of the new building now to a point in mid-July, 1982. I suggest that careful attention be given now to the problem of revisions, to determine if there is some way these can be moderated particularly as interior work continues on installation of rough and finish trades.

There is still some minor difficulty in closing in the new building at the boundaries where flashings and trim for the roof system are still not installed nor on the job site. Apparently fabrication and coloring of the material has taken longer than anticipated and this, in turn, is delaying completion of perimeter roofing work. Thus, we have some local leaks in the building particularly at the 3rd floor that are undesirable and must be plugged as soon as possible. The building temperature is fairly comfortable and the temporary system is turned on at night which warms and building sufficiently for the trades to work well during the daytime.

A brief review of each major area is given below:

3rd floor

The lag at the 3rd floor presently is in plaster and skim coating. This work was due to have begun about December 1, 1981 (working day 234). It is presently projected it will begin about January 11, 1982 (working day 261). This is a direct lag of 27 working days and does not fully take into account the possible impact of bulletin #9 on the job.

Since the target completion date for the 3rd floor was April 8, 1982 (working day 324) there is some float time available in this floor's interior work. However, it should be pointed out that the finishes for each floor were staggered so that there would be a successive completion series. This was done to avoid excessive buildup of manpower on interior finish trades. Care must be taken not to be doing the same work at all floors at all times since both space and manpower are limited.

2nd flopr

The lag at the 2nd floor is 15 to 20 working days, primarily in completion of sheet metal work and insta lation of drywall and wall studs. This lag could be reduced slightly due to the fact that some work that was to have originally been done later has already been completed.

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The target completion date at the 2nd floor was May 10, 1982 (working day 346). If we assume a lag of 17 working days (adjusted for later work already done) we find that the new projected target completion is about June 3, 1982 (working day 363). Again, care must be taken not to bunch trades and to allow successive completion of other similar areas. Bulletin #9 will have an impact upon the 2nd floor work and an evaluation of this can only be made once the full scope of work has been identified.

1st floor

At the first floor the lag is primarily in completion of sheet metal duct work and installation of drywall surfaces. Presently it appears that it will start in about 10 working days or by January 20, 1982 (working day 268). This gives a lag of about 7 working days independent of any impact that might be caused by the issue of bulletin #9. If we add an additional 10 working days for this impact the lag could be as much as 17 working days. Using a 17 working day lag brings the target completion date for 1st floor work to July 8, 1982 (working day 387) since the 1st floor is the last floor to be completed.

Ground floor

Ground floor work is currently meeting targets between early and late starts and finishes. This area is a relatively unfinished space, and there should be no major difficulty in completing it by the present target late finish of June 14, 1982 (working day 370). However, it should be cautioned that some of the activities are beginning to approach late starts and finishes. This, in turn, could cause delays beyond the desired target completion.

The cartwasher was to have been brought in in December or early January. However, due to the difficult access it might be wise to delay installation of this equipment until some of the machinery has been cleared from the access path. Mr. Reniger and Mr. Carlson are reviewing this presently.

North addition

Interior work is just starting at the north addition but there are changes being made to partitions there. Although no bulletins have been issued as yet probably there will be formal changes incorporated in the work. Again, these should be minimized to avoid delays even though this area is a relatively small section of the entire project.

Ralph J. Stephenson, P.E.

RJS:sps

To: Mr. Phil Frederickson

cc: Mr. Bud Reniger, Mr. Curt Carlson

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

February 16, 1982

Subject: Monitoring Report #6

Additions and Alterations to Ingham Medical Center

Lansing, Michigan

The Christman Company - construction managers

Project: 81:07

Date of Monitoring: February 11, 1982 (working day 284)

Monitored from Issue #5, dated October 6, 1981 (working day 195)

Starting date of field work: February 9, 1981 (working day 27)

Target completion date: For new south addition and north addition - June 14, 1982 (working day 370)

For remodeled areas - to be established

Working days remaining to completion shown in Issue #5, dated October 6, 1981 (working day 195) - 86

Actions taken:

- Inspected project with Mr. Reniger and Mr. Carlson
- Evaluated current status of project
- Prepared project status report for period from February 11, 1982 (working day 284) to March 29, 1982 (working day 316)
- Reviewed owner move diagram prepared by Mr. Carlson

General Summary

Overall, the project has moved well during the past five weeks and in some instances has picked up a small amount of time over the previous monitoring. The heat has been turned on in the building, and temperatures are presently being maintained at adequate levels for interior finish work to proceed without difficulty.

Mr. Carlson has redone the owner move diagram, and at this session it had been our intent to insert estimated durations into this diagram for remodeling work. However, there were

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several additional activities that had to be accomplished during our session which prevented us from giving this matter the attention it was planned to have. Therefore, in our next session I suggest that Mr. Reniger, Mr. Carlson, and I assign these durations, calculate the owner move diagram, and determine a target total completion for the entire project.

Apparently Mr. Carlson is satisfied that this owner move diagram is acceptable to all concerned although it is to be cautioned that a constant review of it with those involved in the turnover of the building is essential. Conditions do change and sometimes in these types of move ins it is important to maintain constant attention to the anticipated plan of move in so that the information remains authentic. Also, it should be kept in mind that prior to move in that inspections and certificates of occupancy will be required. Acquiring these always is a very critical phase of the work.

A brief review of each major area is given below:

3rd floor

The basic lags at the 3rd floor are in acoustic ceiling work, installation of ceramic tile, and painting. Overall, it appears that interior finish work at the 3rd floor lags by about 26 working days. This compares to an estimated lag in the previous monitoring report of about 27 working days. However, since the target completion for the 3rd floor is April 9, 1982 (working day 325) there does remain some float time available over the total completion time at this floor. However, the intent is always to avoid build up of critical trades near the end of the project, and therefore wherever possible time should be picked up now on the lagging trades.

The progress at the 3rd floor since our last monitoring has been good and does show a trend toward improved performance. It might be that some additional time can be picked up over the next few weeks.

It should be remembered in the physical therapy areas that the existing Hubbard tanks will have to be relocated from their present position. This work will have to be done, probably concurrently with closing in the exterior of the building at the present hoist location. The move in to physical therapy could be somewhat difficult and is critical since the department is a very important part of the hospital operation.

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2nd floor

The current lag at the 2nd floor is about 19 working days, primarily in completion of skim coat work. This is about the same lag as had been measured at our previous monitoring on January 6, 1982 (working day 258). Here as with the 3rd floor the anticipated completion against which this lag is being measured is earlier than the total target completion. Scheduled completion at the 2nd floor is May 11, 1982 (working day 347). The lag added to the target completion still provides a projected completion for the floor at about our total target date. Also, however, as with the 3rd floor if no time can be picked up soon indications are that interior finish work will be overlayed upon each other near the end of the job creating heavy demands for manpower.

1st floor

The current lag at the 1st floor is primarily in hanging drywall and is about 13 working days. This measures against a lag reported in the previous monitoring of 7 to 17 working days trending toward the latter amount. Therefore, it appears that there has been a slight improvement in the performance at the 1st floor from our previous monitoring evaluation. The target completion date shown for 1st floor work is June 14, 1982 (working day 370) which is the actual target completion date for the total project.

Ground floor

There has been only minimal work done at the ground floor since our previous monitoring. This area should be given attention soon since the present lag is about 11 working days over a late finish of June 11, 1982 (working day 369). This would indicate it is time to begin the finishing off of the ground floor even though it is a relatively rough interior work area. Mr. Carlson and I discussed this matter briefly, and he will review it with Mr. Reniger for a suggested course of action.

North addition

Not monitored at this session.

General

Overall, the lag in the project is probably from 5 to 12

working days over the projected target completion of June 14, 1982 (working day 370). This lag may be difficult

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to pick up since there now remains only 86 working days to completion. Nevertheless, with most of the revisions cleared away and with clear sailing ahead for installation of finish trades it is possible portions of the present lag could be recaptured.

As a part of this monitoring I prepared a project status report for the period from February 11, 1982 (working day 284) to March 29, 1982 (working day 316). I shall issue this project status report with the monitoring report. Meanwhile, I shall be in touch with Mr. Carlson shortly to set the next monitoring session.

Ralph J. Stephenson, P.E.

RJS:sps

To: Mr. Phil Frederickson

cc: Mr. Curt Carlson
Mr. Dud Reniger