COPY

RALPH J. STEPHENSON. P.E., P.C.
CONSULTING ENGINEER

April 6, 1991

Subject: Monitoring Report #1

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Joseph Kavanagh - Project manager
Richard Wever - Construction superintendent
Jim Simons - Project representative

From: Ralph J. Stephenson - Consultant

RJS project: 91:14

Date of monitoring: April 2, 1991 (wd 320)

Location: MSU Physical Plant - East Lansing, Michigan

Monitored from:
- Sheet #P1F, issue #3, dated March 15, 1991 (wd 308)

Note: We are using a working day (wd) calendar having a base date (wd 001) of January 2, 1990.

Key dates:
- March 28, 1991 (wd 317) - Site work & foundation package released for bids
- April 26, 1991 (wd 339) - Site work & foundation bids due
- June 7, 1991 (wd 367) - MSU Board approve award of site work & foundation work
- January, 1994 - Completion date - to be confirmed
- Other dates to be set as project planning proceeds

Those attending
- Robert Nestle - MSU engineer - in meeting part time
- Dick Wever - MSU construction superintendent - in meeting part time
- Joe Kavanagh - MSU project manager - in meeting part time

- Bob Ellerhorst - MSU director of utilities - in meeting part time
- Doug MacDonald - MSU design coordinator - in meeting part time
- Jim Simons - MSU project representative
- Ralph J. Stephenson - consultant

Actions taken:

- Reviewed Black & Veatch's proposal packages issued to date.
- Identified proposal packages yet to be issued.
- Reviewed design revisions needed to issue construction packages.
- Prepared summary network model of Board approval, award of contract and installation of foundation work
- Simulated methods of making and approving design revisions to proposal packages

General Summary

As part of the early discussions concerning job organization some preliminary broad definitions of the role of the various parties on the project at Michigan State University were informally defined. A summary of these is given below for reference purposes only. It should be kept in mind these are not necessarily official duties.

- Joe Kavanagh - project manager
  - Official contact between MSU and B&V
  - Channel for all design and construction contract related matters
  - Responsible for program plan and schedule
  - Responsible for maintaining program budget
  - Resident senior electrical engineer

- Bob Ellerhorst - director of utilities
  - Technical pass through between MSU and project
  - Is the ultimate owner and user

- Doug MacDonald - design coordinator
  - Maintains liaison between parties relating to owner including
    - Black & Veatch
    - Bob Ellerhorst

Engineering
Relations with the construction group are yet to be defined
- Consult on mechanical items
- Works with project team to help resolve design issues
- Work on details as directed by Bob Ellerhorst

- Jim Simons - project representative
  - Responsible for all field operations during construction
  - Responsible for expediting owner purchased equipment
  - Is the contact between MSU and all contractors on project
  - Signs all request for payments

- Dick Wever - construction superintendent
  - Jim Simons reports to Dick Wever
  - Approves actions required of Jim Simons

- Electrical inspector
  - Works with Jim Simons to inspect electrical construction work

- Lennie Naeyert - student assistant
  - Registered engineer
  - Taking master's and doctor's work at MSU
  - Will be the general field administration assistant for MSU

We next discussed the design and procurement activities currently in work, and those completed to date on the project. We also began to interrelate early procurement awards with the site and foundation work package and field operations.

Several proposal packages have been issued, or are soon to be issued by Black & Veatch. Contract award dates should be reviewed carefully since some design commitments are linked to these.

The status of the proposal packages as of April 2, 1991 (wd 320) are as follows:

- 62.3401 - Steam generator - furnish & erect - Awarded to Tampella

Keeler in November, 1990

- 62.1001 - Turbine generator - furnish & erect - Awarded to General Electrical in November, 1990

- 62.0601 - Cooling tower - furnish & erect - Awarded to Thermal Dynamics in February, 1990

- 62.0203 - Fabric filter - awarded to Environmental Elements Corporation in February, 1990

- Distributed control system (dcs) - furnish only with start up service.

  Awarded by purchase order to Bailey Control Company on March 14, 1990 (wd 307). Includes purchasing, modification & start up of motor control centers

- 71.0402 - Site work & concrete foundations
  - Released for bids March 28, 1991 (wd 317)
  - Bids due April 26, 1991 (339)

- 61.4001 - Structural steel
  - Not yet issued for bidding
  - Current plan is to present to Board in July, 1991

- 71.0403 - Architectural and building enclosure
  - Not yet issued for bidding
  - Was planned for presentation to Board in December, 1991
  - May be presented at October, 1991 Board meeting

- 72.0200 - Mechanical construction - intent of MSU is to have this contractor be the prime contractor
  - Not yet issued for bidding
  - Was planned for presentation to Board in December, 1991
  - May be presented at October, 1991 Board meeting
  - The latest will be at the December, 1991 Board meeting

April 6, 1991

- 73.0200 - Electrical construction
  - Not yet issued for bidding
  - Was planned for presentation to June, 1992 Board meeting
  - May be presented earlier

- Electrical equipment
  - May be procured by purchase order
  - Partial list of items included
    - Switch gear
    - Transformers
    - Low voltage sub stations
    - Lighting sub stations?
  - Was planned for presentation to June, 1992 Board meeting
  - May be presented earlier

- Special electrical work in existing plant
  - Not yet issued for bidding
  - No date information available at this meeting

During our meeting in the morning a detailed discussion was conducted about how the design revisions required as major equipment contractors refined their design and installation plans would be incorporated into the construction packages. Therefore during the late morning and early afternoon period Mr. Simons and I reviewed three of the major contract document packages and abstracted what appears to be the contract dates for revised design data to be provided to Black & Veatch. This information is subject to further analysis since it may be that earlier time commitments were actually given to members of the project team by the major suppliers.

The dates from the contracts by which this design data was to be available are given below. They should be further checked.

- 62.3401 - Steam generator
  - Contract date 3/11/91 (wd 304).
  - Design data to be provided in 45 calendar days.

- 62.1001 - Turbine generator
  - Contract date 3/1/91 (wd 298).
  - Design data to be provided in 70 calendar days.

- 62.0601 - Cooling tower
  - Information not available.

- 62.0203 - Fabric filter
  - Contract date 3/19/91 (wd 310).
  - Design data to be provided in 90 calendar days.

There is some difference of opinion about the start dates for design revision times specified above. This is a critical matter since it could affect how and when revisions are to be made to drawing packages, particularly the site and foundation work #71.0402, and the structural steel package #61.4001. This in turn could affect the date of presentation to the MSU Board and release of the contract award.

Mr. Simons and I prepared 3 different network model scenarios to better identify the alternatives. Rough hand marked copies were made and discussed at our monitoring session. Mr. Wever took these for his file. I have made some minor cosmetic revisions subsequent to our meeting. The revised networks, sheets Asm1, Bsm1, and Csm1 dated April 2, 1991 (wd 320) are attached.

It is of great concern that the approval of the Board must come at dates which, after the July, 1991 meeting, are more widely spaced than now. Since submittal of recommendations from the physical plant staff is required at least three weeks before the Board meeting care must be exercised to hit this narrow window.

Mr. Nestle and all the others noted above were involved in the discussions of the revision plans and are aware of the need to move promptly to obtain design data from the major equipment suppliers that affects the early construction packages.

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April 6, 1991

Due to the need for the alternative issue analyses we did not do as much work on the master summary network for the project as had been intended. Therefore at our next planning and monitoring session we shall concentrate on this phase of our work.

I shall be in touch with Mr. Wever and Mr. Simons with whom I am working directly to set the time and place of this next meeting.

Monitoring reports will be sent to Mr. Kavanagh, Mr. Wever and Mr. Simons directly. Further distribution will be by them as they desire.

Ralph J. Stephenson PE

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May 5, 1991

Subject:	Monitoring Report #2
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - Project manager Richard Wever - Construction superintendent Jim Simons - Project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disk #:	253
Date of monitoring:	April 23, 1991 (wd 335)
Meeting location:	MSU Physical Plant - East Lansing, Michigan

Monitored from:

• Sheet #Asm1 - Scenario A summary network for processing package 71.0402, site and foundation work - Issue #1 dated April 2, 1991 (wd 320)

Key dates:

• March 28, 1991 (wd 317) - Site work & foundation package released for bids
• May 6, 1991(wd 345) - Site work & foundation bids due
• June 7, 1991 (wd 367) - MSU Board approve award of site work & foundation work
• January, 1994 - Completion date of total project - to be confirmed

Those attending:

• Robert Dowding - acting director contracts & grants - in meeting part time
• Joseph Kavanagh - MSU project manager - in meeting part time
• Richard Wever - MSU construction superintendent - in meeting part time
• Robert Ellerhorst - MSU director of utilities - in meeting part time
• James Simons - MSU project representative
• Douglas MacDonald - MSU design coordinator - in meeting part time
• Ralph J. Stephenson - consultant

Actions taken:

• Identified MSU Board of Trustees meeting dates
• Reviewed and evaluated current status of project.
• Reviewed current package definitions for scope and processing
• Discussed currently set intermediate dates
• Prepared summary network models of the issue and proposal process for each contract package

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- Identified key long lead items for entire project
- Reviewed and discussed methods of processing and tracking changes
- Discussed prime contractor selection

MSU Board of Trustees meeting dates:

Friday, February 1, 1991 (wd 278)
Friday, April 5, 1991 (wd 323)
Friday, July 26, 1991 (wd 401)
Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Current Project Status:

- **Site work and foundations - package 71.0402 -** Monitored from Sheet Asm1, issue #1 dated April 2, 1991 (wd 320)

Currently contractors are preparing proposals for the site and foundation package. Proposals are due May 6, 1991 (wd 345).

There were some minor design data revisions from the major contract parties already selected. These include the steam generator contractor, the turbine generator contractor, the cooling tower contractor and the fabric filter contractor. Items requiring resolution were clarified in bid pack addenda #1, issued April 12, 1991 (wd 329) and #2 issued April 19, 1991 (wd 334).

Current plans are being held to put consideration of proposals on the MSU Board of Trustees agenda of June 7, 1991 (wd 367) and to move on the site by the AM of June 20, 1991 (wd 376).

- **Structural steel - package 61.4001** - no monitoring network prepared as yet.

Package 61.4001 includes the following:
Structural steel
Steel stairs
Steel platforms
Roof deck
Floor deck

Design work is currently 90 to 95% complete and is in for preliminary owner review. The final review of the steam generator platform arrangement and its impact on structural steel design is to be made on April 30, 1991 (wd 340) by B & V with TPC. This will then allow a final check to be made by the owner.

Present plans are to present structural steel contractor recommendations to the MSU Board on July 26, 1991 (wd 401). To meet this date the MSU staff recommendations must be submitted by July 5, 1991 (wd 387). The current proposal due date is PM June 14, 1991 (wd 373). The pre bid meeting is set for May 21, 1991 (wd 355). This means the proposal package must be issued about May 7, 1991 (wd 346).

Care must be taken to inform the structural steel contractor of anchor bolt sizes and locations.

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• **Distributed control system - package 64.0212** - no monitoring network prepared as yet.

This is a furnish only contract with start up services included. The design kick off meeting is to be held on May 7 and 8, 1991 (wd 345 and 346).

• **Architectural and building enclosure - package 71.0403** - no monitoring network prepared as yet.

No date has yet been set for the issue of the architectural and building enclosure package. However it is currently the intent to present the package for contractor approval at the Board meeting on October 11, 1991 (wd 455).

• **Mechanical construction - package 72.0200** - no monitoring network prepared as yet.

No date has yet been set for the issue of the mechanical construction package. This is a very important package since the successful proposer may be appointed the prime contractor. The matter of a prime contractor selection is still under consideration and will be discussed on a continuing basis.

It is currently the intent to present the mechanical construction package at the October 11, 1991 (wd 455) Board meeting.

• **Electrical construction - package 73.0200** - no monitoring network prepared as yet.

No date has yet been set for the issue of the electrical construction package.

• **Electrical equipment - package 63.0000** - no monitoring network prepared as yet.

This package includes:
Switch gear - package 63.3600
Transformers - package 63.3800
Low voltage substations - no designation available at monitoring
Lighting substations - no designation available at monitoring

No date has been set for the electrical equipment package issue. A scheduled turbine outage is to be implemented in late winter/early spring of 1992, 1993. Installation of electrical equipment under this package is to be made during the outage

• **Electrical configuration package - package number information not available at this meeting** - no monitoring network prepared as yet.

The electrical configuration package is closely related to the electrical equipment package 63.0000. Content of the configuration package is yet to be determined.

Proposal packages already awarded

The status of proposal packages already awarded was not discussed in detail at this session. Awarded packages included the following:

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• 62.3401 - Steam generator - furnish & erect - Awarded to Tampella Keeler (now known as Tampella Power Corporation - TPC) in November, 1990

• 62.1001 - Turbine generator - furnish & erect - Awarded to General Electrical in November, 1990

• 62.0601 - Cooling tower - furnish & erect - Awarded to Thermal Dynamics in February, 1990

• 62.0203 - Fabric filter - awarded to Environmental Elements Corporation in February, 1990

• Distributed control system (dcs) - awarded by purchase order to Bailey Control Company on March 14, 1990 (wd 307). Includes purchasing, modification & start up of motor control centers

Intermediate contract dates currently set and to be set:

Several intermediate dates have been set in contracts already awarded and it appears currently to be the intent to continue setting intermediate dates in future contracts. The dates presently established are listed in the data base file attached to this report (items B & C). I shall keep this list current as contract packages are prepared.

Issue and proposal process for contract packages:

The timely and complete issue of design packages, solicitation of proposals, selection of a contractor and award of contracts is a critical element in the entire management process of this project. The project team and I have prepared several simulation templates of the process with the one currently in use, entitled *Contract Award Template* (item D), enclosed with this report.

We shall continue to review this standard sequence at each planning and monitoring meeting and make revisions as they seem appropriate to the project team.

Long lead items:

Several long lead delivery items have already been identified. I suggest we maintain constant tracking of these items on contracts already awarded as well as those to be awarded. The need for this tracking process is especially critical in staged award delivery systems such as is being used on the Unit 4 Addition. I shall begin to build a data base file of long lead items and their characteristics. The initial issue (item E) of this tracking log is attached to this report.

Processing revisions to the project:

It is anticipated presently that there will be two major types of revisions to the project - design changes by suppliers and contractors who design their installations, and construction changes by various parties during the regular field construction process.

These changes will usually be processed by a system of three documents, a bulletin request, a bulletin and a change order. At our planning meeting we prepared a network model showing a simulation of the issuance and approval sequence. A copy of this model was given to those attending the meeting.A copy is attached to this report for ease of reference (item F).

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Bulletins, which are a request for a contractor quote for proposed revisions to the work, will be issued as required or in response to approved bulletin requests. Bulletins will be numbered consecutively within the total project to assist contractors to properly track bulletin issues. Bulletin documents are to be sent to all prime contractors.

Those contractors whose work costs are not affected by the bulletin will be required to respond that the proposed bulletin work will result in no change to the amount of their contract. Those contractors whose costs are affected by the bulletin changes will respond with a quote for the work.

Once the bulletin is received and accepted a change order is to be prepared and issued by the University and its architect and engineer. Change orders will be numbered consecutively within the prime contract affected.

It was also decided that if any transmitted revision related document is sent to multiple parties concurrently, the distribution is to be noted on the transmittal.

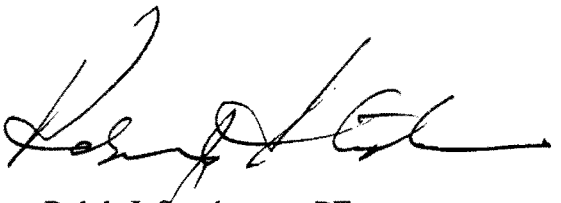
General

Please note that item A attached to this report is a preliminary list of abbreviations that I will use for various purposes during the project. This list will be kept up to date in conjunction with the project team.

During our meeting we covered several miscellaneous matters, one of which was the need to insure that the structural steel contract assignment to the project prime contractor was covered.

The project prime contractor is currently assumed to be the successful contractor proposing on the mechanical construction package (72.0200). However there is a question as to whether it might be appropriate to award such a contract, if it is to be awarded, at a date earlier than that now set for the mechanical contract package. This matter should be discussed in detail and a decision made soon.

This monitoring report is being sent to Mr. Joe Kavanagh, Mr. Dick Wever and Mr. Jim Simons. Further distribution will be by them as desired. I shall be in touch with Mr. Wever shortly to set the next planning and monitoring meeting.



Ralph J. Stephenson PE

(A)

abb	meaning	oen
abb	Abbreviation	8
all	Item located in several location of the project & not otherwise specifed	39
ctw	Cooling tower	37
dem	Demolition	61
des	Design	14
ecb	Electrical & chemical building	38
eqp	Boiler house major equipment	2
fen	Front end work - non construction action items not covered otherwise	49
ffb	Filter and fabric building	36
pro	Procurement	7
sbs	Substructure	16
sit	Site work	27

arranged in abb ascending alphabetical order

(B)

	date	wkg day	item	package #	package name	oen
1	6/20/91	376	Latest mobilization date (am)	71.0402	Site & foundation	34
2	11/15/91	481	Site grading complete (pm)	71.0402	Site & foundation	35
3	12/31/91	511	Power house & associated foundations complete (pm)	71.0402	Site & foundation	36
4	12/31/91	511	Turbine foundation complete (pm)	71.0402	Site & foundation	37
5	12/31/91	511	Site service complete (pm)	71.0402	Site & foundation	38
6	3/1/92	553	Begin steel erection (am)	61.4001	Structural steel	31
7	3/30/92	574	Complete steam drum lift (pm)	62.3401	Circulating Fluidized Bed System Generator	1
8	4/3/92	578	Cooling tower foundation complete (pm)	71.0402	Site & foundation	39
9	5/1/92	598	Complete steel erection - boiler room to support boiler erection (pm)	61.4001	Structural steel	32
10	5/4/92	599	Complete support steel (pm)	62.3401	Circulating Fluidized Bed System Generator	2
11	6/1/92	617	Start delivery of equipment (am)	62.0203	Fabric filter	21
12	7/1/92	640	Complete all work (pm) - structural steel	61.4001	Structural steel	33
13	8/14/92	671	Complete setting cooling tower on foundations (pm)	62.0601	Cooling tower	26
14	8/21/92	676	Complete fan alignments (pm)	62.0601	Cooling tower	27
15	8/23/92	676	Complete operational/functional verification (pm)	62.0601	Cooling tower	28
16	10/30/92	725	Complete setting of turbine generator foundations (pm)	62.1001	Turbine generator	14
17	11/30/92	745	Complete steam outlet headers (pm)	62.3401	Circulating Fluidized Bed System Generator	3
18	1/4/93	768	Complete air heater erection (pm)	62.3401	Circulating Fluidized Bed System Generator	4
19	1/4/93	768	Release economizer area (am)	62.3401	Circulating Fluidized Bed System Generator	5

arranged in ascending date order

(B)

	date	wkg day	item	package #	package name	oen
20	1/29/93	787	Complete lube oil & control oil system flushes (pm)	62.1001	Turbine generator	15
21	3/1/93	807	Initial operation of cooling tower (am)	62.0601	Cooling tower	29
22	3/1/93	807	Release bottom ash area (am)	62.3401	Circulating Fluidized Bed System Generator	6
23	3/5/93	812	Complete turbine generator alignments (pm)	62.1001	Turbine generator	16
24	3/22/93	823	Complete furnace & convection pass hydrostatic testing (pm)	62.3401	Circulating Fluidized Bed System Generator	7
25	4/5/93	833	Complete air test (pm)	62.3401	Circulating Fluidized Bed System Generator	8
26	4/5/93	833	Complete chemical cleaning (pm)	62.3401	Circulating Fluidized Bed System Generator	9
27	4/30/93	852	Complete controls interface verification (pm)	62.1001	Turbine generator	17
28	5/3/93	852	First firing of steam generator (am)	62.3401	Circulating Fluidized Bed System Generator	10
29	5/3/93	853	Clear gas paths (pm)	62.0203	Fabric filter	22
30	6/1/93	873	Operation of steam generator for steam line blowout (pm)	62.3401	Circulating Fluidized Bed System Generator	11
31	7/23/93	910	Complete start up (pm)	62.0203	Fabric filter	23
32	7/23/93	910	Complete balancing & controls system operational/functional verification (pm)	62.1001	Turbine generator	18
33	8/2/93	916	Initial operation (am)	62.0203	Fabric filter	24
34	8/2/93	916	Initial operation of unit (am)	62.1001	Turbine generator	19
35	8/2/93	916	Initial operation of unit (pm)	62.3401	Circulating Fluidized Bed System Generator	12
36	9/7/93	940	Commercial operation (am)	62.0203	Fabric filter	25
37	9/7/93	940	Commercial operation (am)	62.0601	Cooling tower	30
38	9/7/93	940	Commercial operation of unit (am)	62.1001	Turbine generator	20

arranged in ascending date order

(B)

	date	wkg day	item	package #	package name	oen
39	9/7/93	940	Commercial operation of unit (am)	62.3401	Circulating Fluidized Bed System Generator	13

arranged in ascending date order

(c)

	package #	package name	Item	date	wkg day	oen
1	61.4001	Structural steel	Begin steel erection (am)	3/1/92	553	31
2	61.4001	Structural steel	Complete steel erection - boiler room to support boiler erection (pm)	5/1/92	598	32
3	61.4001	Structural steel	Complete all work (pm) - structural steel	7/1/92	640	33
4	62.0203	Fabric filter	Start delivery of equipment (am)	6/1/92	617	21
5	62.0203	Fabric filter	Clear gas paths (pm)	5/3/93	853	22
6	62.0203	Fabric filter	Complete start up (pm)	7/23/93	910	23
7	62.0203	Fabric filter	Initial operation (am)	8/2/93	916	24
8	62.0203	Fabric filter	Commercial operation (am)	9/7/93	940	25
9	62.0601	Cooling tower	Complete setting cooling tower on foundations (pm)	8/14/92	671	26
10	62.0601	Cooling tower	Complete fan alignments (pm)	8/21/92	676	27
11	62.0601	Cooling tower	Complete operational/functional verification (pm)	8/23/92	676	28
12	62.0601	Cooling tower	Initial operation of cooling tower (am)	3/1/93	807	29
13	62.0601	Cooling tower	Commercial operation (am)	9/7/93	940	30
14	62.1001	Turbine generator	Complete setting of turbine generator foundations (pm)	10/30/92	725	14
15	62.1001	Turbine generator	Complete lube oil & control oil system flushes (pm)	1/29/93	787	15
16	62.1001	Turbine generator	Complete turbine generator alignments (pm)	3/5/93	812	16
17	62.1001	Turbine generator	Complete controls interface verification (pm)	4/30/93	852	17
18	62.1001	Turbine generator	Complete balancing & controls system operational/functional verification (pm)	7/23/93	910	18
19	62.1001	Turbine generator	Initial operation of unit (am)	8/2/93	916	19

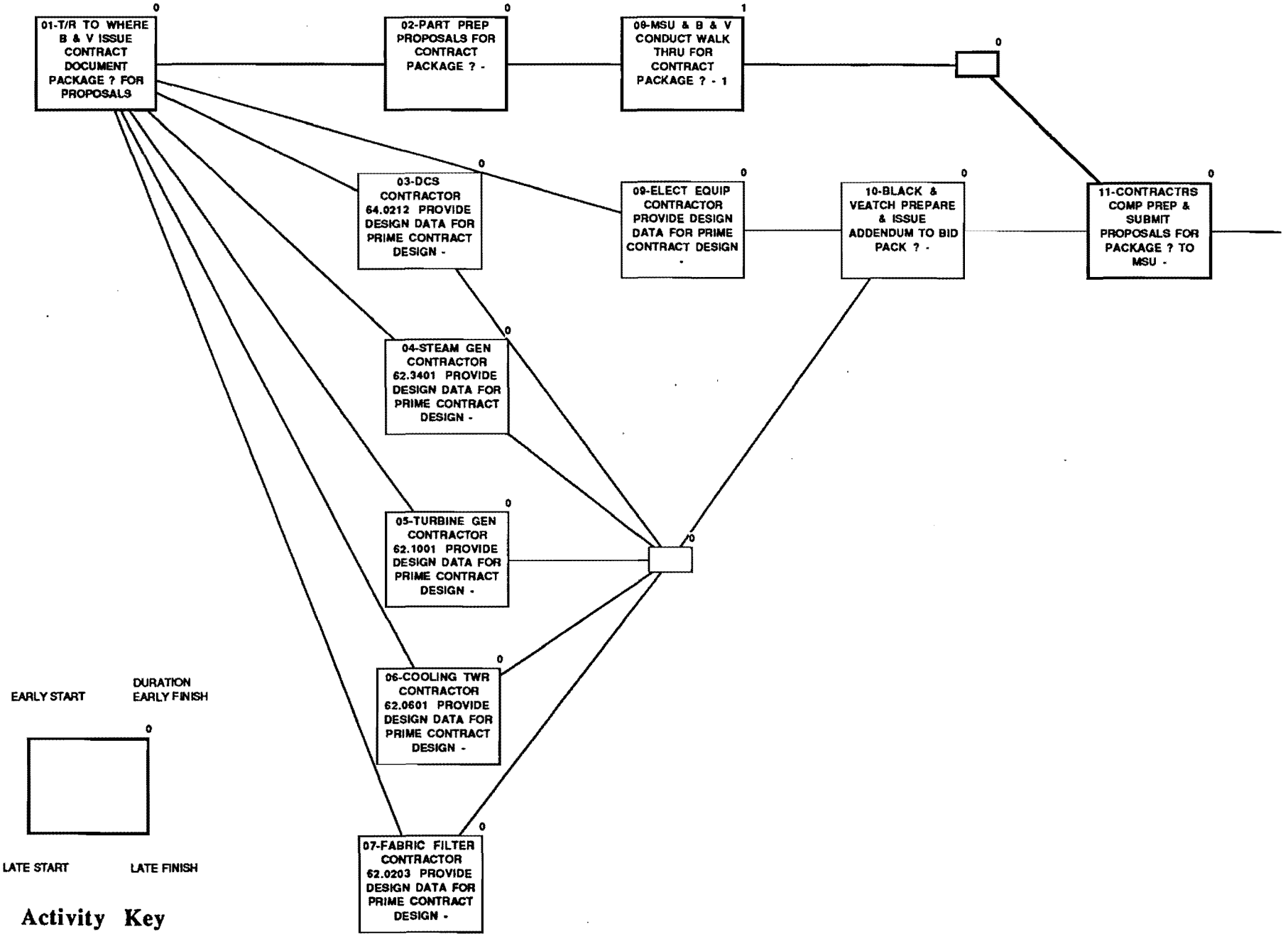
arranged in contract package and ascending date order

	package #	package name	item	date	wkg day	oen
20	62.1001	Turbine generator	Commercial operation of unit (am)	9/7/93	940	20
21	62.3401	Circulating Fluidized Bed System Generator	Complete steam drum lift (pm)	3/30/92	574	1
22	62.3401	Circulating Fluidized Bed System Generator	Complete support steel (pm)	5/4/92	599	2
23	62.3401	Circulating Fluidized Bed System Generator	Complete steam outlet headers (pm)	11/30/92	745	3
24	62.3401	Circulating Fluidized Bed System Generator	Complete air heater erection (pm)	1/4/93	768	4
25	62.3401	Circulating Fluidized Bed System Generator	Release economizer area (am)	1/4/93	768	5
26	62.3401	Circulating Fluidized Bed System Generator	Release bottom ash area (am)	3/1/93	807	6
27	62.3401	Circulating Fluidized Bed System Generator	Complete furnace & convection pass hydrostatic testing (pm)	3/22/93	823	7
28	62.3401	Circulating Fluidized Bed System Generator	Complete air test (pm)	4/5/93	833	8
29	62.3401	Circulating Fluidized Bed System Generator	Complete chemical cleaning (pm)	4/5/93	833	9
30	62.3401	Circulating Fluidized Bed System Generator	First firing of steam generator (am)	5/3/93	852	10
31	62.3401	Circulating Fluidized Bed System Generator	Operation of steam generator for steam line blowout (pm)	6/1/93	873	11
32	62.3401	Circulating Fluidized Bed System Generator	Initial operation of unit (pm)	8/2/93	916	12
33	62.3401	Circulating Fluidized Bed System Generator	Commercial operation of unit (am)	9/7/93	940	13
34	71.0402	Site & foundation	Latest mobilization date (am)	6/20/91	376	34
35	71.0402	Site & foundation	Site grading complete (pm)	11/15/91	481	35
36	71.0402	Site & foundation	Power house & associated foundations complete (pm)	12/31/91	511	36
37	71.0402	Site & foundation	Turbine foundation complete (pm)	12/31/91	511	37
38	71.0402	Site & foundation	Site service complete (pm)	12/31/91	511	38

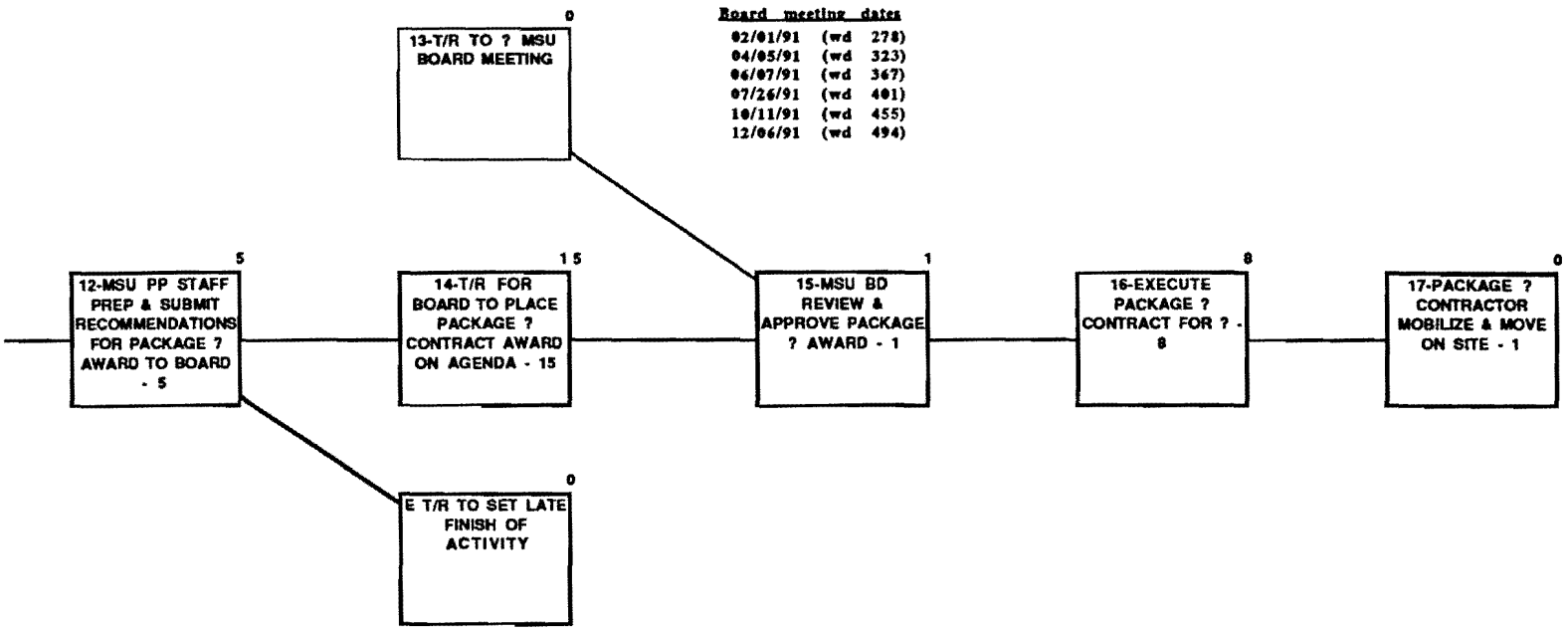
arranged in contract package and ascending date order

	package #	package name	item	date	wkg day	oen
39	71.0402	Site & foundation	Cooling tower foundation complete (pm)	4/3/92	578	39

arranged in contract package and ascending date order


01-T/R TO WHERE B & V ISSUE CONTRACT DOCUMENT PACKAGE ? FOR PROPOSALS
02-PART PREP PROPOSALS FOR CONTRACT PACKAGE ? -
08-MSU & B & V CONDUCT WALK THRU FOR CONTRACT PACKAGE ? - 1
03-DCS CONTRACTOR 64.0212 PROVIDE DESIGN DATA FOR PRIME CONTRACT DESIGN -
09-ELECT EQUIP CONTRACTOR PROVIDE DESIGN DATA FOR PRIME CONTRACT DESIGN -
10-BLACK & VEATCH PREPARE & ISSUE ADDENDUM TO BID PACK ? -
11-CONTRACTRS COMP PREP & SUBMIT PROPOSALS FOR PACKAGE ? TO MSU -
04-STEAM GEN CONTRACTOR 62.3401 PROVIDE DESIGN DATA FOR PRIME CONTRACT DESIGN -
05-TURBINE GEN CONTRACTOR 62.1001 PROVIDE DESIGN DATA FOR PRIME CONTRACT DESIGN -
06-COOLING TWR CONTRACTOR 62.0601 PROVIDE DESIGN DATA FOR PRIME CONTRACT DESIGN -
07-FABRIC FILTER CONTRACTOR 62.0203 PROVIDE DESIGN DATA FOR PRIME CONTRACT DESIGN -
EARLY START
DURATION
EARLY FINISH
LATE START
LATE FINISH
Activity Key

(2)



Board meeting dates

02/01/91	(wd	278)
04/05/91	(wd	323)
06/07/91	(wd	367)
07/26/91	(wd	401)
10/11/91	(wd	455)
12/06/91	(wd	494)

Contract Award Template

Network Model for T. B. Simon Power Plant Unit 4 Michigan State University East Lansing, Michigan

Reserved Activity Numbers

041	046
042	047
043	048
044	049
045	050

lan 001
han

Issue #1 - April 23, 1991
Issue #2 - May 6, 1991
contract award tmplt
disk 253

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive
Mt. Pleasant, Michigan 48858
ph 517 772 2537

Sheet #CA1

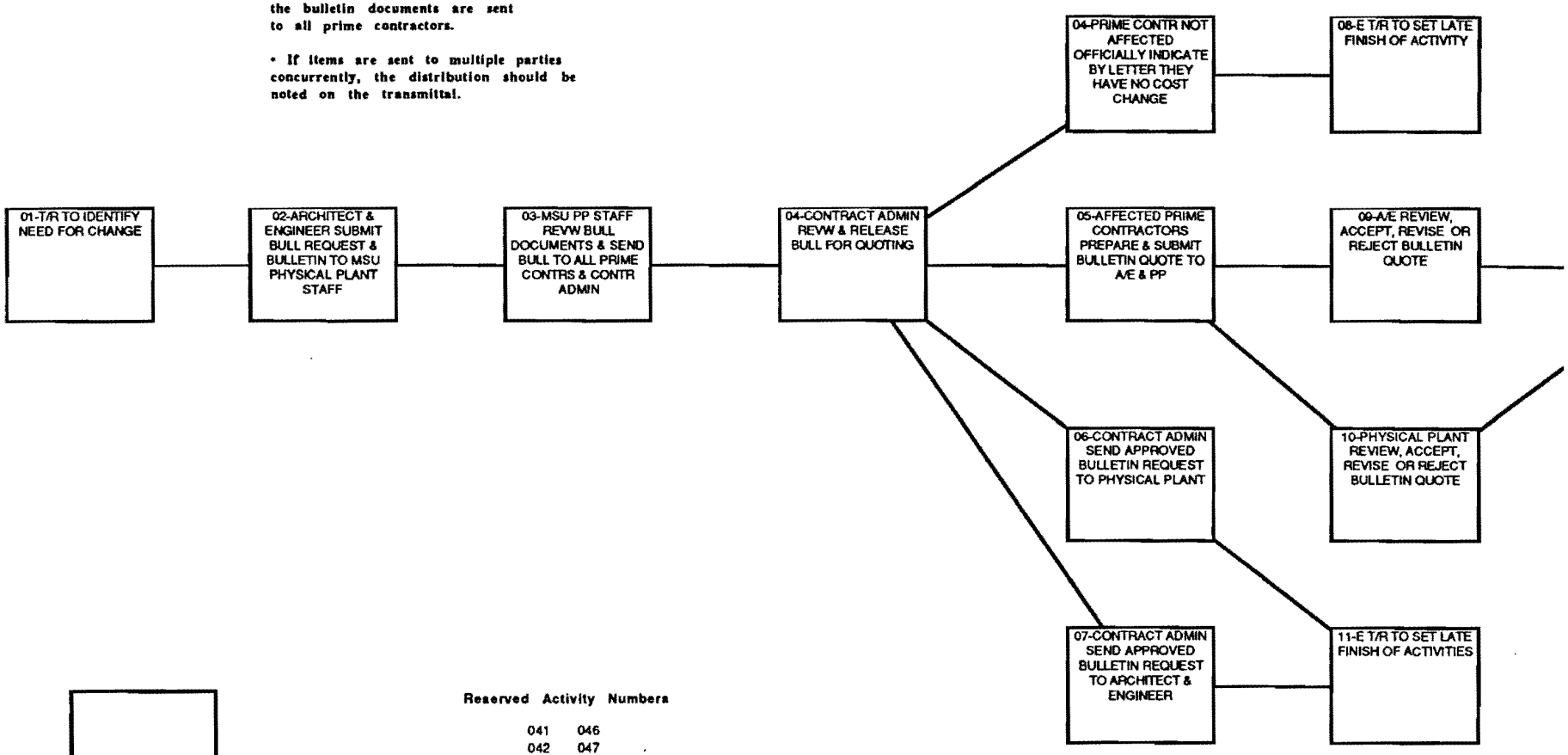
procurement item	package id	location	oen
Anchor bolts & related accessories		pp4/ffb/ctw/ecb	15
Ash silo			94
Attemperator water pumps			31
Boiler		pp4	1
Boiler feed pumps			97
Bus duct			96
Chilled water piping			26
Conc mix designs (piles, caps, footings, wlls, fls)			30
Conduct pile tests and submit results			68
Construction fencing material			32
Contractor prep & submit ash pit temp retaining wall design			92
Control panels			98
Controls		pp4	5
Cooling tower		pp4	4
Determine piling loading, size, length and reinforcement			72
Electical duct bank materials			28
Electrical vault resteel			29
Elevator		pp4	17
Fabric (bag) filters & ffb equipment		ffb	6
Face brick			95
Fans		pp4	11
Feed systems			99
Fire protection piping			25
Foundation concrete embeds		pp4/ffb/ctw/ecb	19
Grating			104
Grounding system		pp4/ffb/ctw/ecb	23
High pressure valves			100
Induced draft fans			101
Limestone			102
Metal deck			103

arranged in alphabetical order

procurement item	package id	location	oen
Motor control centers		pp4	10
Motor control centers			105
Pile cap and footing restl		pp4/ffb/ctw/ecb	22
Piling		pp4/ffb	20
Piling restl		pp4/ffb	21
Power lift		pp4	18
Primary air fans			106
Pumps		pp4	12
Review & apporve ash pit temp retaining wall design			93
Review and approve pile test results			70
Secondary air fans			107
Sewer piping			24
Slate			108
Structural steel			109
Switch gear		pp4	9
Temporary utilities to construction site			35
Transformers			55
Turbine generator		pp4	3

Notes:

- **Bulletins are to be numbered consecutively within the total project to assist contractors to properly track bulletin issues.**
- **Change orders are to be numbered consecutively within the prime contract.**
- **Note that activity #03 specifies the bulletin documents are sent to all prime contractors.**
- **If items are sent to multiple parties concurrently, the distribution should be noted on the transmittal.**



Reserved Activity Numbers

041	046
042	047
043	048
044	049
045	050

lan 001
han 021

Activity Key

Network Model for T. B. Simon Power Plant Unit 4 Michigan State University East Lansing, Michigan

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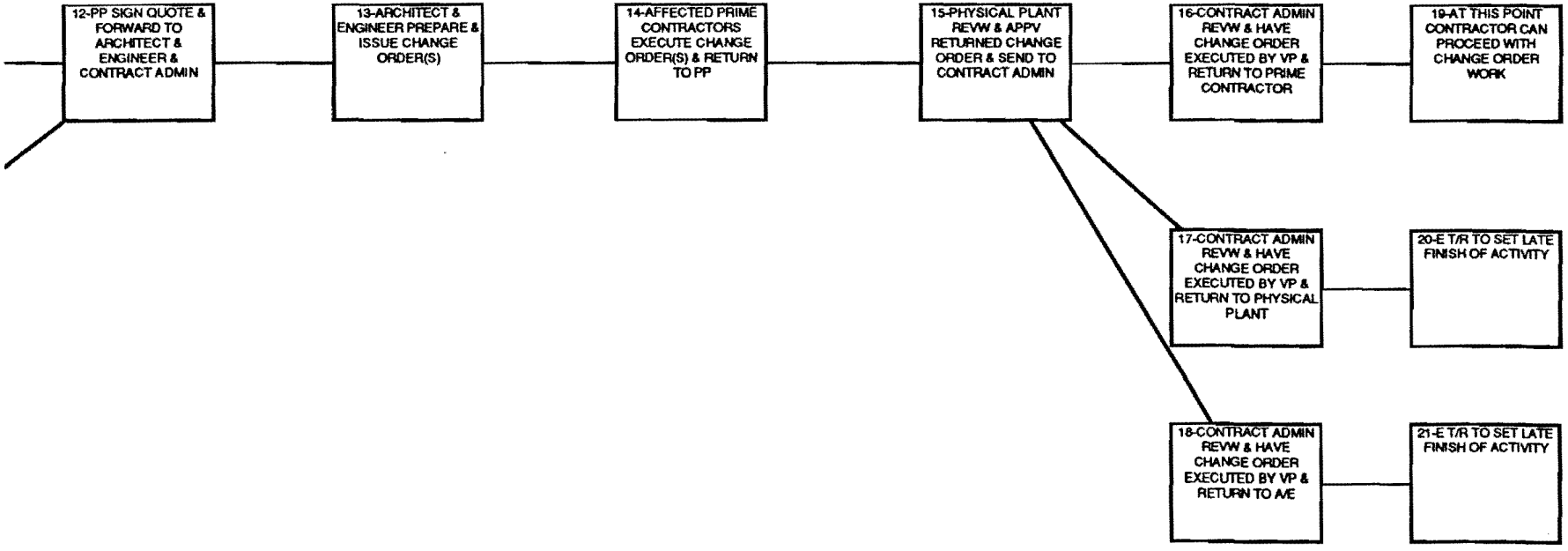

Issue #1 - April 23, 1991
Issue #2 - May 6, 1991
bull/change order tmplt

Sheet #cor1

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
May 13, 1991

Subject:	Monitoring Report #3
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - Project manager Richard Wever - Construction superintendent Jim Simons - Project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disk #:	253
Date of monitoring:	Wednesday, May 8, 1991 (wd 346)
Meeting location:	MSU Physical Plant - East Lansing, Michigan

Monitored from:

- Sheet #Asm1 - Scenario A summary network for processing package 71.0402, site and foundation work - Issue #1 dated April 2, 1991 (wd 320)
- Sheet #cor1 - Bulletin - change order processing network - Issue #2 dated May 6, 1991 (wd 344)

Key dates:

- March 28, 1991 (wd 317) - Site work & foundation package released for bids
- May 6, 1991(wd 345) - Site work & foundation bids received
- June 7, 1991 (wd 367) - MSU Board approve award of site work & foundation work
- June 20, 1991 (wd 376) - Site & foundation contractor mobilize & move on site for start of contract package 71.0402 work.
- January, 1994 - Completion date of total project - to be confirmed

Those attending: some were in meetings part time only

- Robert Nestle - MSU engineer
- Robert Dowding - MSU acting director contracts & grants
- Joseph Kavanagh - MSU project manager
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Kent Pollins - Black & Veatch - Senior project manager
- Bruce Van Heest - Black & Veatch - Lead civil & structural engineer
- Philip Dimitry - Black & Veatch - Industrial marketing & project manager
- Ralph J. Stephenson - consultant

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May 13, 1991

Actions taken:

- Prepared Power Plant #4 decision tree analysis for selection of prime project manager (ppm)
- Briefly reviewed current status of project.
- Reviewed and updated summary network models of bulletin to change order process - Sheet #cor1 issue #2 dated May 6, 1991 (wd 344)
- Reviewed methods of processing and tracking changes

MSU Board of Trustees meeting dates:

Friday, February 1, 1991 (wd 278)
Friday, April 5, 1991 (wd 323)
Friday, June 7, 1991 (wd 367)
Friday, July 26, 1991 (wd 401)
Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Current Project Status:

- **Site work and foundations - package 71.0402 -** Monitored from Sheet Asm1, issue #1 dated April 2, 1991 (wd 320)

Proposals have been received from contractors and discussions are being initiated with the apparent low bidder. Present plans call for a recommendation to be made to the Board of Trustees for contractor selection by May 15, 1991 (wd 351) with approval of contractor selection to be given at the Board meeting on Friday, June 7, 1991 (wd 367).

This schedule should allow the contractor to move on site for start of work by June 20, 1991 (wd 376).

- **Structural steel - package 61.4001** - no monitoring network prepared as yet.

Package 61.4001 includes the following:

Structural steel
Steel stairs
Steel platforms
Roof deck
Floor deck

The final review of the steam generator platform arrangement and its impact on structural steel design was made on April 30, 1991 (wd 340) by B & V with TPC.

Present plans (as of May 13, 1991) are to issue the package on Monday, May 20, 1991(wd 355). Contractor recommendations are to go to the MSU Board for their consideration at the board meeting on July 26, 1991 (wd 401).

- **Distributed control system - package 64.0212** - no monitoring network prepared as yet.

The design kick off meeting was held on May 7 and 8, 1991 (wd 345 and 346).

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May 13, 1991

• **Architectural and building enclosure - package 71.0403** - no monitoring network prepared as yet.

Not discussed at this session.

• **Mechanical construction - package 72.0200** - no monitoring network prepared as yet.

No date has yet been set for issue of the mechanical construction package. It is currently the intent to present the mechanical construction package at the October 11, 1991 (wd 455) Board meeting.

The method of selecting a prime project contractor is still under consideration.

• **Electrical construction - package 73.0200** - no monitoring network prepared as yet.

Not discussed at this session.

• **Electrical equipment - package 63.0000** - no monitoring network prepared as yet.

Not discussed at this session.

• **Electrical configuration package** - no monitoring network prepared as yet.

Not discussed at this session.

Selection of total project prime contractor:

The major topic of our meeting was alternative project delivery methods that could be used to manage construction of the entire project. There has been considerable thought given to appointing the successful contractor for package 72. 0200, the mechanical construction package, as the lead prime contractor for the entire project. However there could be some alternatives that might also be suitable in the selection of an organization for this pivotal role. It was the purpose of our review to identify these alternatives.

After lengthy discussion the group attending the meetings delineated and gave preliminary value ratings to 27 different methods of providing management to the total project. The general description of the firm or organization in that position was either as prime project manager or prime project contractor.

The 27 systems were evolved from a set of decision trees starting from seven basic premises. The premises were as follows:

- **A** Do nothing and let present process continue
- **BA** Retain separate manager liable for total project cost
- **BB** Retain separate manager not liable for total project cost
- **C** Appoint MSU in house staff member as prime project manager
- **D** Appoint earlier awarded construction contractor as prime project contractor liable for total project cost
- **F** Appoint equipment supplier as prime project contractor liable for total project cost

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May 13, 1991

• **G** Retain a general contractor as prime construction contractor liable for total project cost

Within each of these seven base actions those at the meeting developed a series of assumptions leading to an end point for each branch that would allow a rating of each of the 27 courses of action that resulted. The analysis resulted in a graphic decision tree (item A). Copies of this document were left with the group.

The rating of each path was done by the entire group (eight people) on a scale of one to ten. A rating of one indicated the lowest possible rating of the selection, while a rating of ten indicated the highest possible rating for the path. Taking into consideration all ratings given from the eight people giving their opinions, the lowest rated delivery systems received a total rating of 8 x 1 = 8, while the highest rating consisted of 2 sixes, 2 sevens, and 4 eights for a total of 58.

The ratings were summarized in a data base file, a copy of which is attached (item B).

Further discussions were to be held by the MSU Physical Plant executive and project staff to make a final determination on the method to be used.

All material prepared on white board and flip charts were left for the MSU executive discussion.

Revisions to the project:

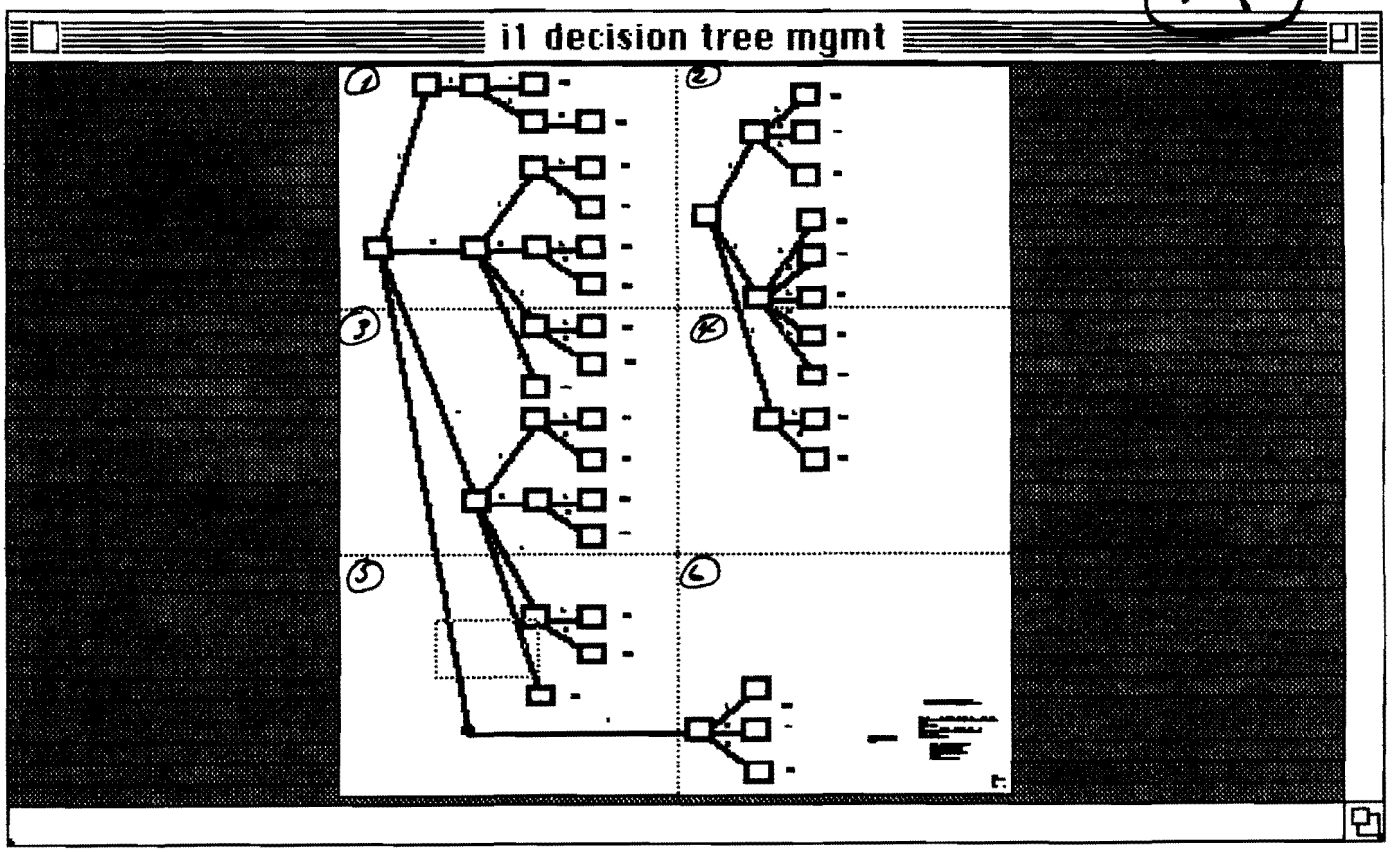
The group consisting of both MSU and Black & Veatch staff carefully reviewed bulletin and change order processes to be used on the project. These were discussed from the network model prepared at our previous monitoring meeting. A copy of the model was given to those attending the meeting. This model was updated from issue #2 to issue #3 as a result of our discussions. Most of the key elements of the process were approved by the group. A copy of the updated issue of Sheet #cor1 is attached to this report (item C).

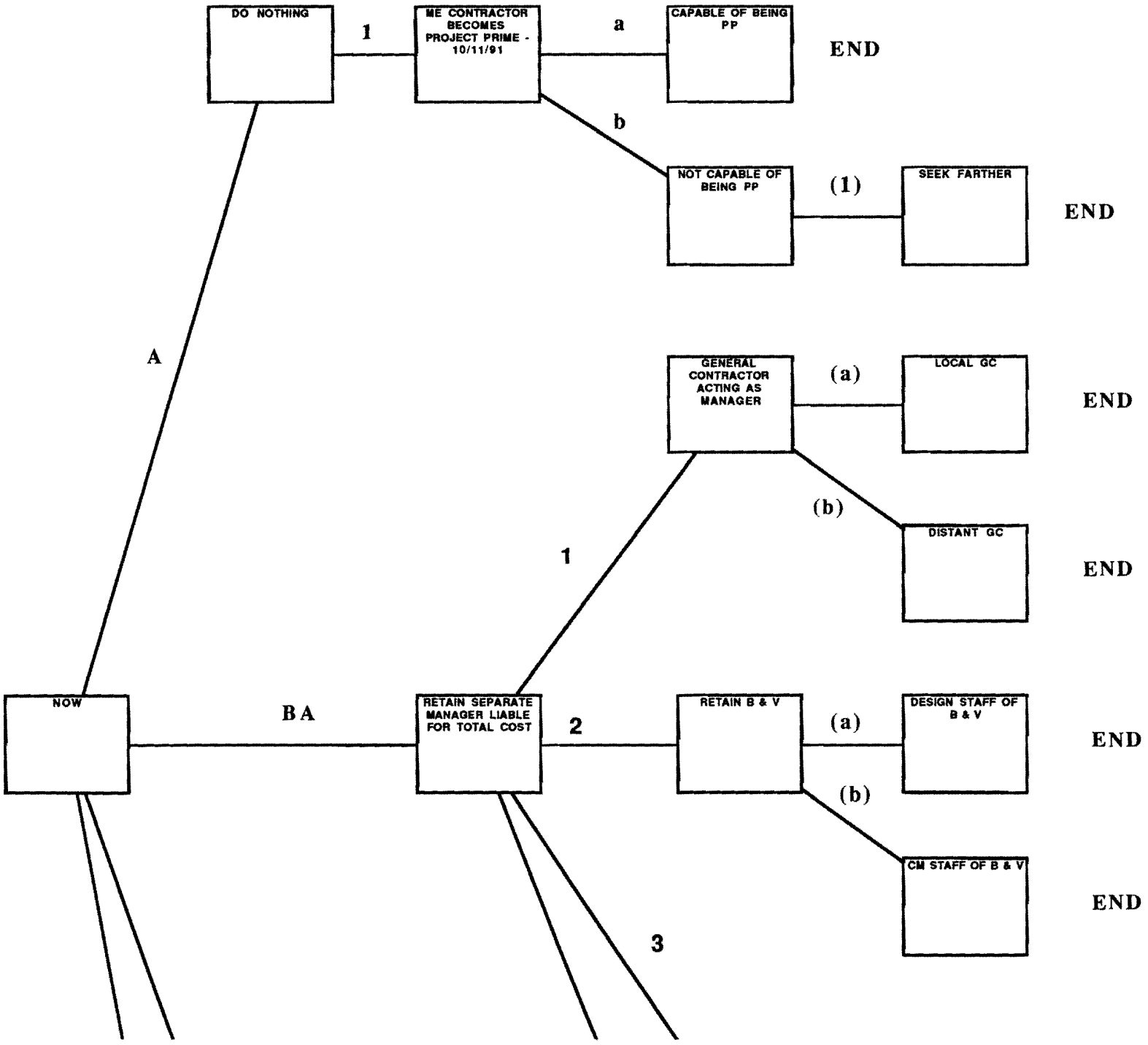
General

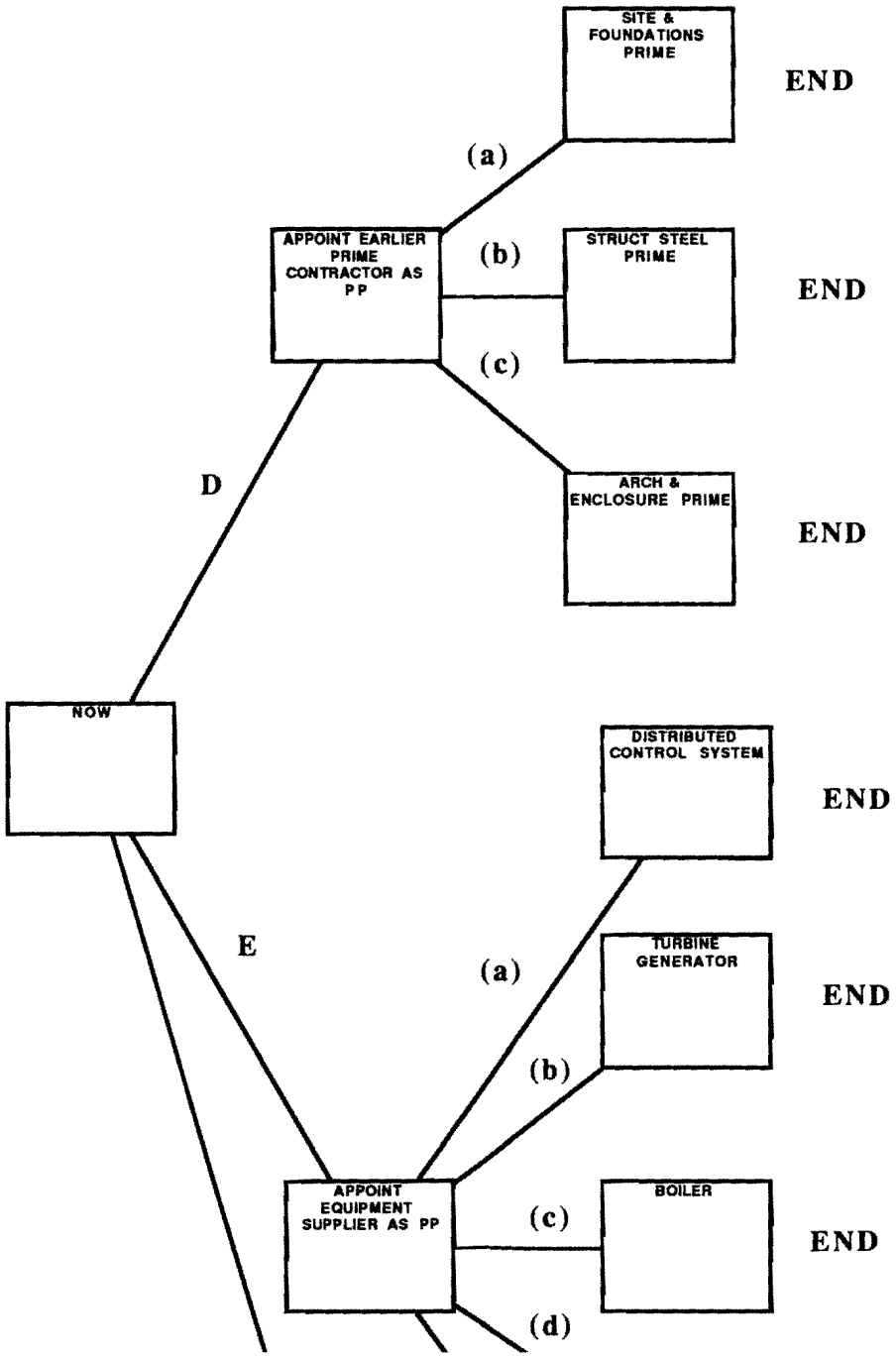
This report is being sent to Mr. Joe Kavanagh, Mr. Dick Wever and Mr. Jim Simons. Further distribution will be by them as desired. I shall be in touch with Mr. Wever shortly to set the next planning and monitoring meeting. At this meeting I recommend we begin preparation of summary network models showing and interrelating the work to be done under each contract.

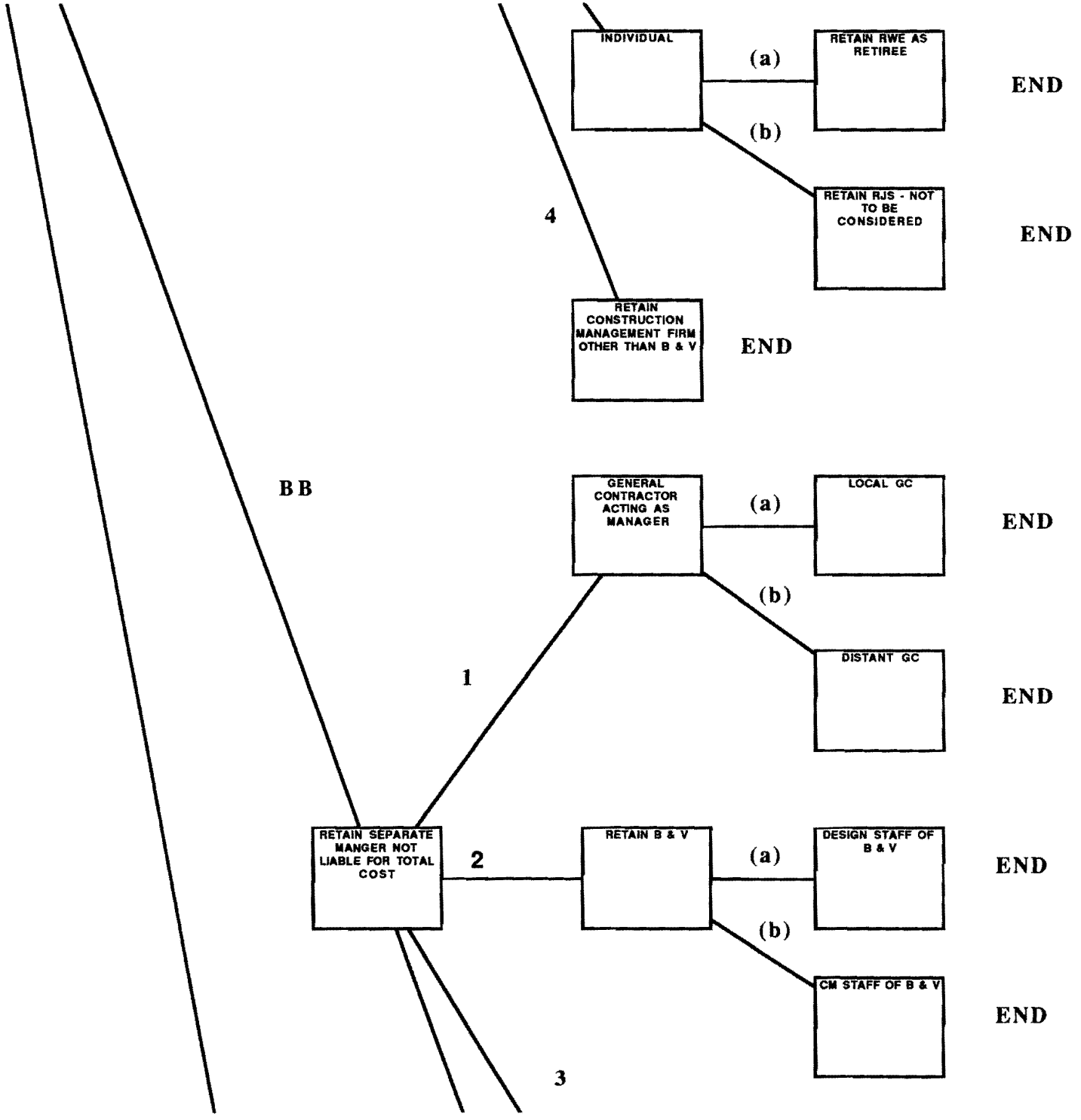
Ralph J. Stephenson PE

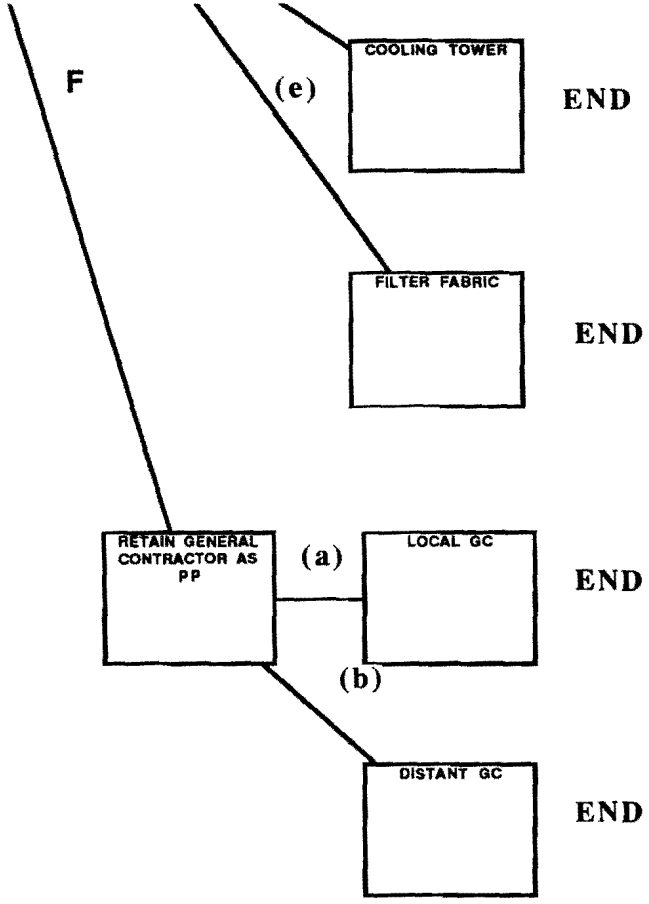
A

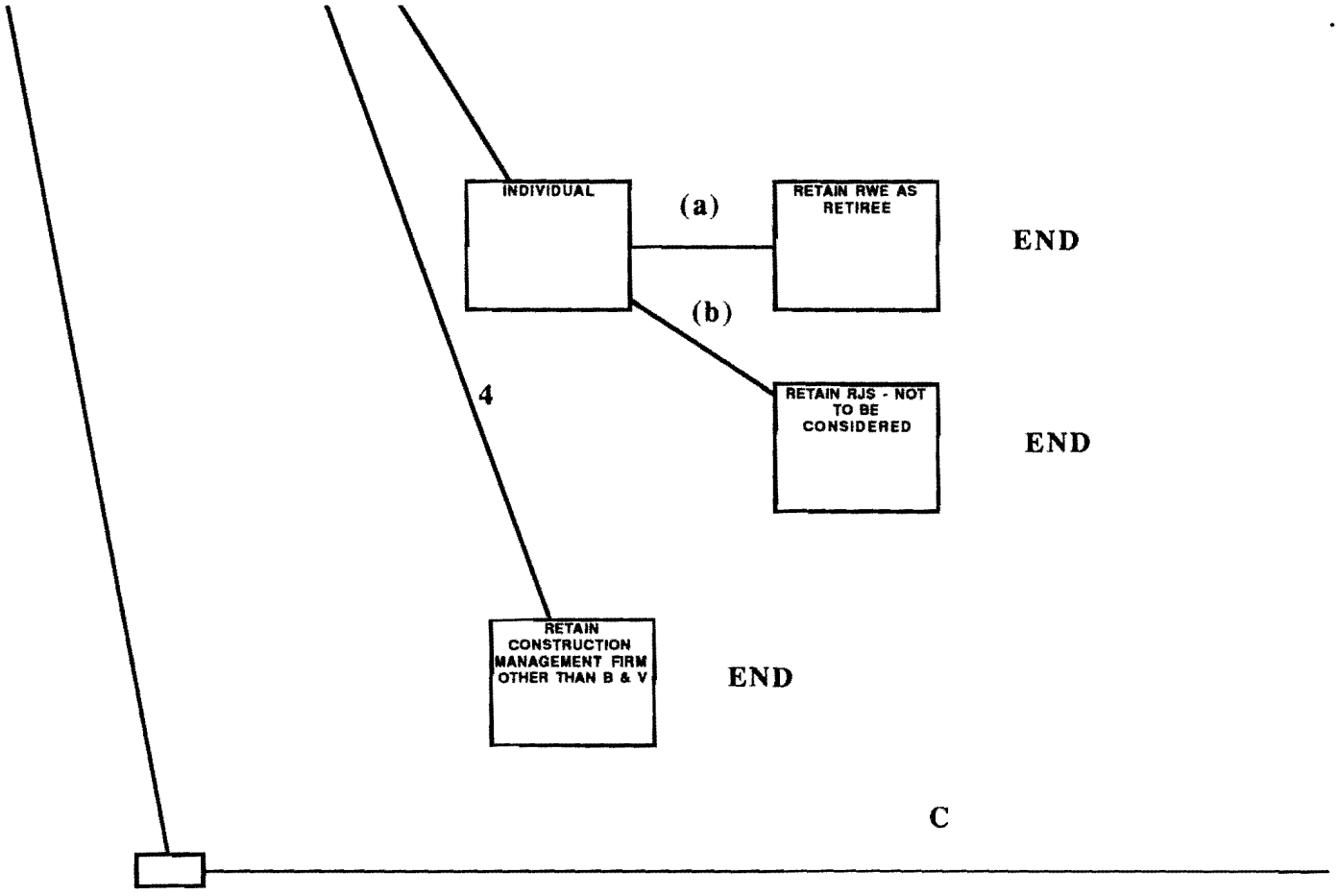


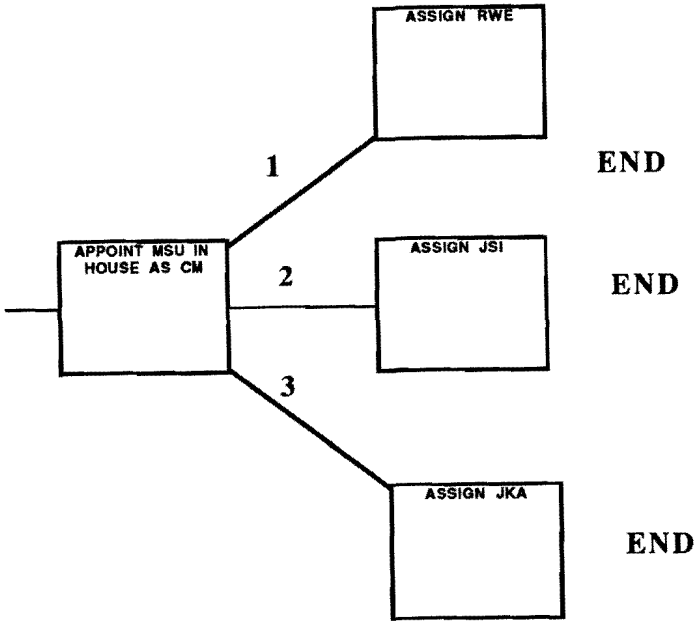

DO NOTHING
1
ME CONTRACTOR BECOMES PROJECT PRIME - 10/11/91
a
CAPABLE OF BEING PP
END
b
NOT CAPABLE OF BEING PP
(1)
SEEK FARTHER
END
A
GENERAL CONTRACTOR ACTING AS MANAGER
(a)
LOCAL GC
END
(b)
DISTANT GC
END
1
NOW
BA
RETAIN SEPARATE MANAGER LIABLE FOR TOTAL COST
2
RETAIN B & V
(a)
DESIGN STAFF OF B & V
END
(b)
CM STAFF OF B & V
END
3


SITE & FOUNDATIONS PRIME
END
(a)
APPOINT EARLIER PRIME CONTRACTOR AS PP
(b)
STRUCT STEEL PRIME
END
(c)
D
ARCH & ENCLOSURE PRIME
END
NOW
DISTRIBUTED CONTROL SYSTEM
END
E
(a)
TURBINE GENERATOR
END
(b)
APPOINT EQUIPMENT SUPPLIER AS PP
(c)
BOILER
END
(d)


INDIVIDUAL
(a)
RETAIN RWE AS RETIREE
END
(b)
RETAIN RJS - NOT TO BE CONSIDERED
END
4
RETAIN CONSTRUCTION MANAGEMENT FIRM OTHER THAN B & V
END
BB
GENERAL CONTRACTOR ACTING AS MANAGER
(a)
LOCAL GC
END
(b)
DISTANT GC
END
1
RETAIN SEPARATE MANGER NOT LIABLE FOR TOTAL COST
2
RETAIN B & V
(a)
DESIGN STAFF OF B & V
END
(b)
CM STAFF OF B & V
END
3


F
(e)
COOLING TOWER
END
FILTER FABRIC
END
RETAIN GENERAL CONTRACTOR AS PP
(a)
LOCAL GC
END
(b)
DISTANT GC
END


INDIVIDUAL
(a)
RETAIN RWE AS RETIREE
END
(b)
RETAIN RJS - NOT TO BE CONSIDERED
END
4
RETAIN CONSTRUCTION MANAGEMENT FIRM OTHER THAN B & V
END
C



Management Decision Tree for
Prime Project Management System

Network Model for T. B. Simon Power Plant Unit 4 Michigan State University East Lansing, Michigan

Issue #1 - May 8, 1991
Issue #2 - May 13, 1991
i2 decision tree mgmt-lsr
disk ?

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Sheet
#mt1

	description	rtg total	1st branch	2nd branch	3rd branch	rtg 1	rtg 2	rtg 3	rtg 4	rtg 5	rtg 6	rtg 7	rtg 8	oen
1	MSU retain local general contractor as a non liable (for total cost) prime project manager	58	BB	1	a	7	8	8	8	8	6	6	7	22
2	MSU retain local general contractor as a liable (for total cost) prime project manager	53	BA	1	a	7	7	9	8	3	8	6	5	3
3	MSU retain B & V construction mgmt staff as a non liable (for total cost) prime project manager	50	BB	2	b	6	4	8	8	8	7	6	3	25
4	MSU retain local general contractor as a liable gc	49	F	1		7	6	2	5	8	8	6	7	20
5	MSU retain B & V construction mgmt staff as a liable (for total cost) prime project manager	45	BA	2	b	6	6	6	4	3	5	7	8	6
6	MSU appoint jsi as in house staff member prime project manager	44	C	2		5	5	6	7	6	5	5	5	10
7	Mach contractor liable (for total cost) prime proj manager on 10/11/91 & is capable	38	A	1	a	6	5	5	5	5	7	4	1	1
8	MSU appoint rwe as in house staff member prime project manager	35	C	1		1	6	3	1	8	8	1	7	9
9	MSU retain const mgmt firm other than B & V as a non liable (for total cost) prime proj mgr	32	BB	4		5	3	4	3	7	4	5	1	27
10	MSU retain construction mgmt firm other than B & V as a liable (for total cost) prime proj mgr	31	BA	4	a	3	7	5	4	3	5	3	1	8
11	MSU retain rwe as a liable (for total cost) prime project manager	30	BA	3	a	1	5	2	6	6	8	1	1	7

in descending rating order (8 people-jka, rwe, jsi, rdo, rme, kpo, bva, pdi)

	description	rtg total	1st branch	2nd branch	3rd branch	rtg 1	rtg 2	rtg 3	rtg 4	rtg 5	rtg 6	rtg 7	rtg 8	oen
12	MSU retain distant general contractor as a liable (for total cost) prime project manager	25	BA	1	b	2	2	2	6	5	5	2	1	4
13	MSU retain B & V design staff as a liable (for total cost) prime project manager	25	BA	2	a	1	1	3	3	3	2	7	5	5
14	MSU appoint jka as in house staff member prime project manager	23	C	3		1	1	1	5	3	1	8	3	11
15	MSU retain distant general contractor as a non liable (for total cost) prime project manager	20	BB	1	b	2	2	2	3	3	1	5	2	23
16	MSU retain distant general contractor as a liable gc	20	F	2		1	5	2	1	2	2	5	2	21
17	MSU retain rwe as a non liable (for total cost) prime project manager	18	BB	3	a	1	1	1	1	1	6	2	5	26
18	MSU retain B & V design staff as a non liable (for total cost) prime project manager	17	BB	2	a	1	1	1	3	1	3	2	5	24
19	Appoint site & foundation prime contractor as a liable (for total cost) prime project manager	14	D	1		3	1	1	3	2	1	2	1	12
20	Appoint arch & enclosure prime contractor as a liable (for total cost) prime proj manager	14	D	3		3	1	1	4	2	1	1	1	14
21	Appoint boiler prime contractor as a liable (for total cost) prime project manager	11	E	3		1	2	3	1	1	1	1	1	17
22	Mech contractor liable (for total cost) prime proj manager on 10/11/91 & is not capable	8	A	1	b	1	1	1	1	1	1	1	1	2

in descending rating order (8 people-jka, rwe, jsi, rdo, rne, kpo, bva, pdi)

	description	rtg total	1st branch	2nd branch	3rd branch	rtg 1	rtg 2	rtg 3	rtg 4	rtg 5	rtg 6	rtg 7	rtg 8	oen
23	Appoint structural steel prime contractor as a liable (for total cost) prime project manager	8	D	2		1	1	1	1	1	1	1	1	13
24	Appoint dist control system prime contractor as a liable (for total cost) prime proj manager	8	E	1		1	1	1	1	1	1	1	1	15
25	Appoint turbine generator prime contractor as a liable (for total cost) prime proj manager	8	E	2		1	1	1	1	1	1	1	1	16
26	Appoint cooling tower prime contractor as a liable (for total cost) prime project manager	8	E	4		1	1	1	1	1	1	1	1	18
27	Appoint fabric filter prime contractor as a liable (for total cost) prime project manager	8	E	5		1	1	1	1	1	1	1	1	19

in descending rating order (8 people-jka, rwe, jsl, rdo, rme, kpo, bva, pdi)

(C)

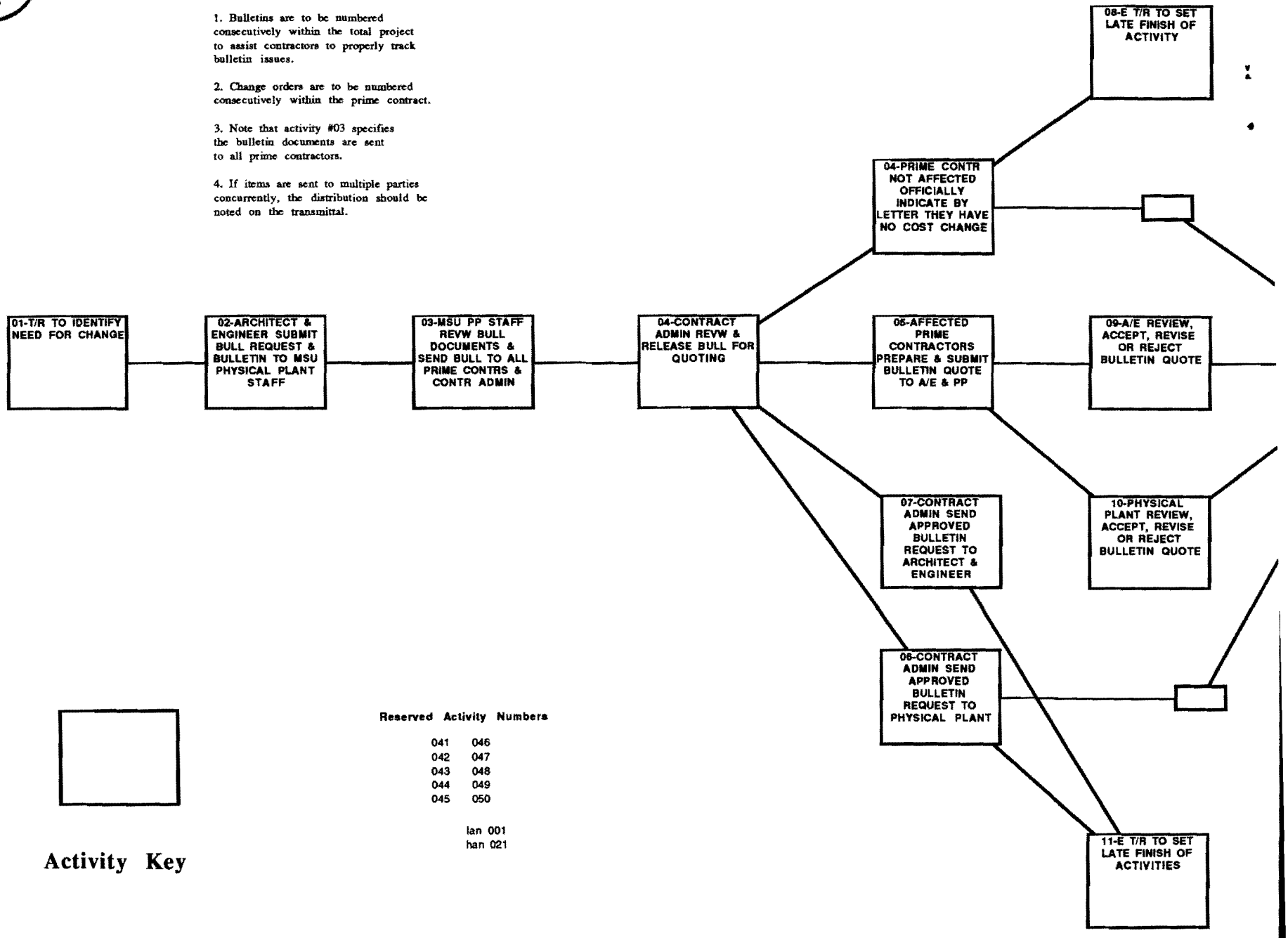
Notes:

1. Bulletins are to be numbered consecutively within the total project to assist contractors to properly track bulletin issues.

2. Change orders are to be numbered consecutively within the prime contract.

3. Note that activity #03 specifies the bulletin documents are sent to all prime contractors.

4. If items are sent to multiple parties concurrently, the distribution should be noted on the transmittal.



Activity Key

Reserved Activity Numbers

041	046
042	047
043	048
044	049
045	050

lan 001
han 021

Network Model for T. B. Simon Power Plant Unit 4 Michigan State University East Lansing, Michigan

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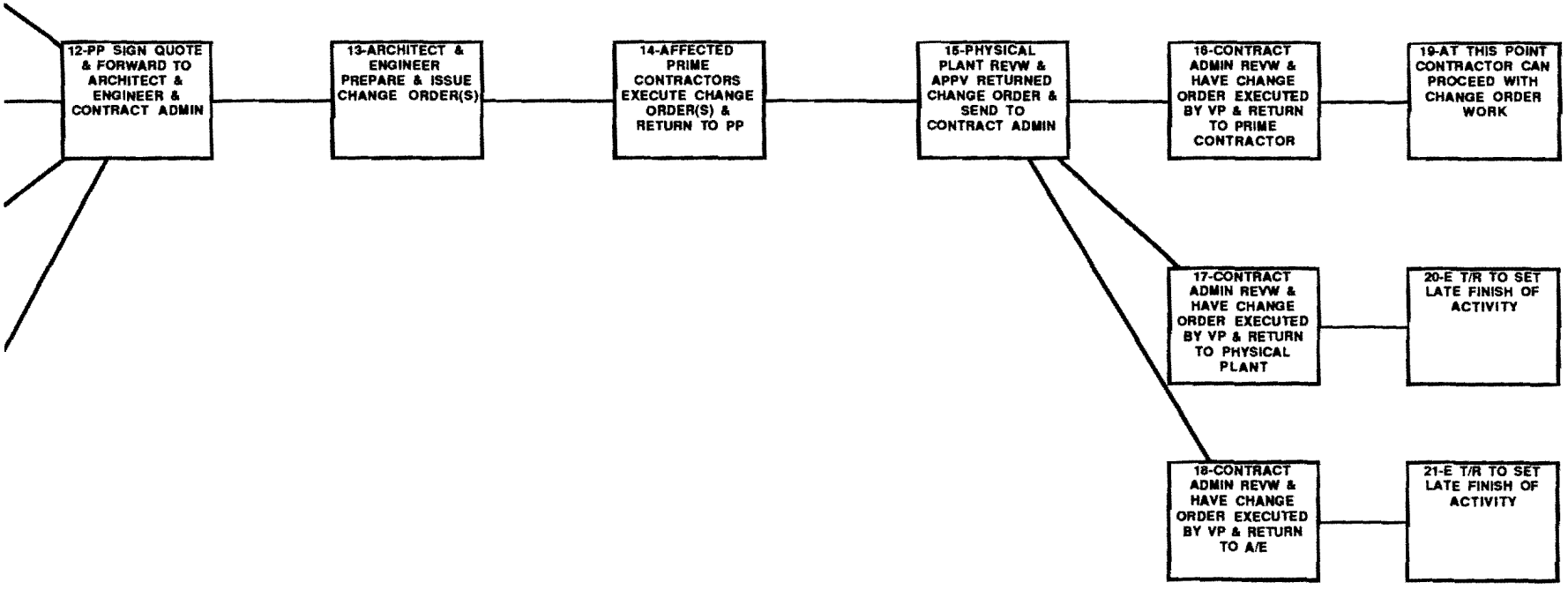

Issue #1 - April 23, 1991
Issue #2 - May 6, 1991
Issue #3 - May 8, 1991
46%
I3 bull/chg order tmplt-lsr

Sheet #cor1

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
June 1, 1991

Subject: Monitoring Report #4

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Joseph Kavanagh - Project manager
Richard Wever - Construction superintendent
Jim Simons - Project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disk #: 253

Date of monitoring: Thursday, May 23, 1991 (wd 357)

Meeting location: MSU Physical Plant - East Lansing, Michigan

Monitored from:

• Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356) - these networks were combined into a single drawing for issue.

Key dates:

• June 7, 1991 (wd 367) - MSU Board to approve award of site work & foundation work
• June 20, 1991 (wd 376) - Site & foundation contractor mobilize & move on site for start of contract package 71.0402 work.
• January, 1994 - Completion date of total project - to be confirmed

MSU Board of Trustees meeting dates:

Friday, February 1, 1991 (wd 278)
Friday, April 5, 1991 (wd 323)
Friday, June 7, 1991 (wd 367)
Friday, July 26, 1991 (wd 401)
Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Those attending: some in meeting part time only

• Richard Wever - MSU construction superintendent
• James Simons - MSU project representative
• Peter Skornia - MSU student employee
• Phil Crockett - Design & Build - president
• Ralph J. Stephenson - consultant

Actions taken:

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
June 1, 1991

- Reviewed issue #2 networks for PP4 contract awards with Mr. Simon and Mr. Wever.
- Reviewed successive translation process from the network logic plan, to the data base format, to the bar chart.
- Provided Mr. Simons copies of issue #2 PP4 contract award network models, activity runs in various sequences, and bar charts.
- Began preparation of a PP4 standard glossary of terms.
- Discussed conform specifications and their relation to other prime contract specifications.
- Monitored current status of structural steel contract award.
- Continued preparing site and foundation laundry list.
- Prepared issue #1 site and foundation work network model with Mr. Crockett, Mr. Simons, Mr. Wever and Mr. Skornia

Current Project Status:

- **Site work and foundations - package 71.0402**

Review and approval of the award of site and foundation work is still expected at the MSU Board of Trustees meeting on June 7, 1991 (wd 367). It is the intent of the apparent successful contractor to mobilize and move on the site the am of June 10, 1991 (wd 368).

- **Structural steel - package 61.4001** - monitored from Sheet #ssca1, issue #2, dated May 22, 1991 (wd 356)

Contract documents for proposals have not yet been issued but it is planned to provide them by Friday, May 24, 1991 (wd 358). This is later than had been anticipated and continuous attention will have to be given receipt of proposals, and recommendations for award in order to have the award approval included on the July 26, 1991 (wd 401) Board agenda.

- **Distributed control system - package 64.0212** - no network yet prepared for this work

No review made at this meeting.

- **Architectural and building enclosure - package 71.0403** - monitored from Sheet #abca1, issue #2, dated May 22, 1991 (wd 356)

A contract award network model was prepared working back from the target Board approval date of October 11, 1991 (wd 455) and using a similar logic and duration format for work subsequent to the issue as was used for the structural steel package.

The resultant late finish date for contract document issue was the pm of August 13, 1991 (wd 414). An early target completion date for the document issue was selected as the pm of August 1, 1991 (wd 406).

This date frame allows a preparation time for the architectural and building enclosure package of 50 working days from May 22, 1991 (wd 356). Since the time frame is very tight and the package is extremely crucial for future management and construction of the project, I suggest close and continuous attention be given its preparation. Unresolved matters must be promptly addressed.

No word was available currently on the status of the package.

- **Mechanical construction - package 72.0200** - monitored from Sheet #mca1, issue #2, dated

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Consulting Engineer
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ph 517 772 2537
June 1, 1991

May 22, 1991 (wd 356)

The approach to setting the date for issuing the mechanical construction package was the same as used for the architectural and building enclosure package issue.

It is currently the intent to present the mechanical construction package at the October 11, 1991 (wd 455) Board meeting. To do this within the constraints discussed above the document package should be issued by the pm of August 1, 1991 (wd 406). The late finish for issue of the package is the pm of August 13, 1991 (wd 414)

Apparently some of the drawings to be included in the package have been sent to MSU for preliminary review and information. This package must also be given top attention due to its tight issue schedule and its importance to the total project management.

• **Electrical construction - package 73.0200** - monitored from Sheet #elca1, issue #2, dated May 22, 1991 (wd 356)

The electrical construction contract award is presently scheduled to be approved at the December 6, 1991 (wd 494) Board meeting. Working back from this date indicates that the construction documents must be issued for bidding no later than the pm of October 8, 1991 (wd 453). In the monitoring network we have shown an early finish of the documents by the pm of September 25, 1991 (wd 444). This provides a total of 88 working days from May 22, 1991 (wd 356) to issue the package.

There was no current word on the status of the package.

• **Electrical configuration package** - no number assigned as yet - monitored from Sheet #ecca1, issue #2, dated May 22, 1991 (wd 356)

This package follows the same logic for issue and processing as the electrical construction package. The date for approval of the contract by the Board is set for December 6, 1991 (wd 494).

There was no current word on the status of the package.

• **Electrical equipment - package 63.0000** - no monitoring network prepared as yet.

Not discussed at this session.

General Summary

As part of our work at this meeting we began preparing the network model for construction work in the site and foundation package. Mr. Phil Crockett, President of Design and Build, the apparent successful prime contractor, worked with us in preparing this preliminary plan of work.

The network model is shown on Sheet #1, issue #1, dated May 22, 1991 (wd 356) for contract 71.0402. Copies of the work plan were issued to those at the meeting for further study and comments.

The network contains models for construction of the following elements of the project

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June 1, 1991

- Temporary power center - summary only
- Grubbing and stripping site
- Cooling tower foundations
- Removal of existing west wall of PP4
- Construction of temporary west wall at PP4
- Caisson installation at PP4 and fabric filter
- Turbine generator foundations and platform
- Retention system at ash pit
- Ash pit

Other elements of the work will be identified as the job planning proceeds.

Of considerable importance will be the procurement of materials and equipment in a timely manner. At our next session we will address this matter in detail and show the procurement as part of our network model.

Mr. Simons, Mr. Crockett and I reviewed submittal turnaround times discussed by Mr. Simons with the architect/engineer. For this early work we are assuming all can turn around submittals within the following time structure.

	Normal	Expedited	Super Expedited
• Prime contractor receives, logs in & checks	3	2	1 1/2
• Prime contractor transmits to B & V	3	1	1
• B & V logs in & checks	16	11	5 1/2
• B & V transmits to prime contractor	3	1	1
• Prime contractor logs in & reviews	3	2	1
• Prime contractor transmits to sub contractor	3	1	1
Total	31	18	11

We shall continue planning of the project on a regular basis as the foundation and site work contract work gets under way. In addition we will outline laundry list items for all future contract work which can be identified without having a contractor on hand to provide specific input.

I highly recommend we also begin a methodical and regular series of planning sessions for the fabrication, delivery and installation of major equipment on the job. Many of these contracts are already let and an authentic plan of work should be possible to prepare.

Mr. Simons is presently reviewing the specifications for each contract already awarded and is abstracting the contract dates for key material and equipment submittals. This information should be tied into our network models for the fabrication, delivery and installation of the contract items. We will review this process in a near future meeting.

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Consulting Engineer
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June 1, 1991

During our meeting several points were raised that should be resolved or answered prior to our next session. Included were:

1.) What is the nature of the fill under the cooling tower basin slab?
2.) What is the depth of the sump at the ash pit.?
3.) What dampproofing, if any, is needed at the ash pit walls?
4.) What dampproofing, if any, is needed at the PP4 foundation walls?
5.) What are the details of the footings supporting exterior foundation walls?

General

I will be in touch shortly with Mr. Simons to set the next planning and monitoring session, and to discuss and prepare an agenda for the meeting. One of the agenda items should be to complete as much more as possible of the network model for the site work and foundation package. Additional work includes procurement, mechanical, electrical and miscellaneous site work operations.

This report is being sent to Mr. Joe Kavanagh, Mr. Dick Wever and Mr. Jim Simons. Further distribution will be by them as desired.

Ralph J. Stephenson PE

Ralph J. Stephenson PE PC
Consulting Engineer
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ph 517 772 2537
July 17, 1991

Subject: Monitoring Report #5

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Joseph Kavanagh - Project manager
Richard Wever - Construction superintendent
Jim Simons - Project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disk #: 253 & 265

Dates of monitoring: Friday, June 7, 1991 (wd 367)
Friday, July 12, 1991 (wd 328)

Meeting location: Job site at Power Plant #4, East Lansing, Michigan

Monitored from:

- Sheets #sscal, abcal, mcal, elcal and eccal, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #1, dated May 23, 1991 (wd 357) - at June 7, 1991 meeting.
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #2, dated June 7, 1991 (wd 367) - at July 12, 1991 meeting

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- July 26, 1991 (wd 401) - MSU Board to approve award of structural steel contract award - package 61.4001
- November 15, 1991 pm (wd 481) - Site grading complete
- December 31, 1991 pm (wd 511) - Power plant foundations complete
- December 31, 1991 pm (wd 511) - Site service complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation complete
- January, 1994 - Total project complete - to be confirmed

MSU Board of Trustees meeting dates:

Friday, July 26, 1991 (wd 401)
Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Those attending: some in meeting part time only

June 7, 1991 meeting

- Richard Wever - MSU construction superintendent

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Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
July 17, 1991

- James Simons - MSU project representative
- David Erickson - MSU student employee
- Phil Dimitri - B & V - Project manager (in sessions very briefly)
- Phil Crockett - Design & Build - President
- Ralph J. Stephenson - consultant

July 12, 1991 meeting

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Phil Crockett - Design & Build - President
- Ralph J. Stephenson - consultant

Actions taken:

June 7, 1991 (wd 112)

- Reviewed current status of all projects to extent of information available
- Reviewed format of Expedition tracking system - being used on site by MSU to track documents on the project
- Updated network model for contract 71.0402, site and foundation work, sheet #1, issue #1 to issue #2, with MSU and Design & Build staff.

July 12, 1991 (wd 391)

- Inspected project foundation and site work in progress
- Made brief inspection of existing power plant
- Monitored job against issue #2, sheet #1, dated June 7, 1991 (wd 367)
- Updated issue #2, sheet #1 to issue #3, dated July 12, 1991 (wd 391)
- Printed out bar chart translations of issue #3, sheet #1 dated July 12, 1991 (wd 391) and left at job office.

Project Status as of July 12, 1991 (wd 391)

Site work & foundations - package 71.0402

This package was reviewed and approved for contract award at the MSU Board of Trustees meeting on June 7, 1991 (wd 367). The contractor moved on the job about June 10, 1991 and field work has proceeded fairly well to date. Fencing has been installed, and the construction parking areas have been graded and are usable although no aggregate base is installed at the west area or at the aggregate drives.

Field work on the power center has not yet started, due to the need for submittals and approvals on equipment. However the contractor does not feel the facility is critical for work under his site work and foundation contract. The transformer is currently expected on the job in early November, 1991 and the structure will be erected just before the equipment arrives.

The temporary wall at the west elevation of the existing building is in work and structural steel and girts are being erected at the inside of the existing building. The contractor expects to be able to start removing existing masonry and sash wall on July 19, 1991 (wd 396). It is presently the intent to have the temporary wall complete and weather tight by the pm of August 9, 1991 (wd 412).

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July 17, 1991

On about June 26, 1991 poor soil was encountered at the power plant excavation. This required some overexcavation and replacement of removed poor soil with engineered fill. The additional work was covered under Field Order #2, dated June 20, 1991 (wd 376). As of July 12, 1991 (wd 391) filling is about 45% complete.

The issue #2 plan start date for caissons was July 16, 1991 (wd 393). The current planned start date is July 26, 1991 (wd 401). Caissons will be installed starting at column line K and moving to G, then to D, and then to A. After the A column line caissons are installed the contractor will move to fabric and filter building caisson construction.

Cooling tower work has proceeded well and is currently slightly ahead of planned dates. The site has been cleared, mass excavation is complete and the base slab has been poured out. Presently cooling tower basin walls are being formed & reinforcement set. Anchor bolts at the cooling tower are to be drilled in later.

Site work mechanical and electrical has not yet started in a production mode. Pipe deliveries are very critical due to the need to mesh the installation with road closings once school is back in session.

At present pipe shop drawings are to be submitted July 16, 1991 (wd 393). The contractor has stressed the need for quick turnaround on their review and approval since delivery of pipe is about 64 working days after approval. This brings pipe to the project in mid October, 1991. The window for installation is very small due to the need to minimize disruptions to campus traffic flow.

After inspecting the project and reviewing the current status, it was decided to update the issue #2 network site work and foundation work model. This was done in conjunction with Mr. Crockett, and with Mr. Wever and Mr. Simons participating. The updated network model is shown on sheet #1, issue #3, dated July 12, 1991 (wd 391).

The revised network was translated to a day bar chart which was left at the field office. The issue #3 network model was delivered to the MSU Physical Plant Building on July 13, 1991 to be picked up by the MSU project staff.

I would like to request that the MSU staff make further distribution to the contractor as felt appropriate.

• **Structural steel - package 61.4001** - monitored from Sheet #ssca1, issue #2, dated May 22, 1991 (wd 356)

Proposals have been received and the Board is expected to approve the contract award on July 26, 1991 (wd 401).

• **Distributed control system - package 64.0212** - no network yet prepared for this work

No review made at this meeting.

• **Architectural and building enclosure - package 71.0403** - monitored from Sheet #abca1, issue #2, dated May 22, 1991 (wd 356)

It is expected that contract documents for this package will be issued in early August, 1991. The intent is still to have construction proposals submitted for approval by the MSU Board at

their meeting on October 11, 1991 (wd 455).

This is a very critical package, since the basic management system for the entire project will be coupled to this award.

• **Mechanical construction - package 72.0200** - monitored from Sheet #mca1, issue #2, dated May 22, 1991 (wd 356)

This package will be issued concurrently with the architectural and building enclosure package. It is expected to be considered for construction contract approval at the MSU Board meeting on October 11, 1991 (wd 455).

It is still the intent to issue this package in early August, 1991, although no specific information was available to us at this monitoring.

• **Electrical construction - package 73.0200** - monitored from Sheet #elca1, issue #2, dated May 22, 1991 (wd 356)

No current information was available on the status of this package.

• **Electrical configuration package** - no number assigned as yet - monitored from Sheet #ecca1, issue #2, dated May 22, 1991 (wd 356)

This package follows the same logic for issue and processing as the electrical construction package. The date for approval of the contract by the Board is set for December 6, 1991 (wd 494).

No current information was available on the status of this package.

• **Electrical equipment - package 63.0000** - no monitoring network prepared as yet.

Not discussed at this session.

General Summary

Meeting notes were prepared from our conference on June 7, 1991 (wd 367). I have made minor editing changes to these and a copy is attached to this monitoring report.

It is of continuing importance that contract document production and construction operations be closely meshed, over the next few months. It appears that the MSU staff and the architect/engineer are presently maintaining the needed communication to help assure this.

At our next meeting I suggest we continue monitoring field progress on site work and foundations, and set methods of effectively monitoring the design, furnish and install contract project progress. These include the following:

62.3401 - Steam generator package
62.1001 - Turbine generator package
62.0601 - Cooling tower package
62.0203 - Fabric filter package
62.0212 - Distributed control package

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July 17, 1991

We should also begin preparation of a master summary project network of the entire program of work. I shall be in contact with Mr. Simons soon to set a mutually satisfactory date and agenda for the coming session.

At present, monitoring reports are being sent to Mr. Joe Kavanagh, Mr. Dick Wever and Mr. Jim Simons. It might be advisable to consider methods by which monitoring reports on specific contract work could be conveyed to the prime contractors involved. I shall discuss this with Mr. Simons in the near future.

Ralph J. Stephenson PE

9:13:59 AM - Friday, June 7, 1991 (367)

1. *Friday, June 7, 1991*
2. *T. B. Simon Power Plant Unit 4 Addition*
3. *Location - MSU Power Plant field office*
4. *Those attending*
   - 4.1. *Dick Wever - MSU construction superintendent - in meeting part time*
   - 4.2. *Jim Simons - MSU project representative*
   - 4.3. *David Erickson - MSU student employee*
   - 4.4. *Phil Dimitri - Project manager - B & V (in meeting briefly)*
   - 4.5. *Phil Crockett - Design & Build - President*
   - 4.6. *Ralph J. Stephenson - consultant*
5. *Agenda*
   - 5.1. *Monitor current project status*
     - 5.1.1. *Current projects not yet let*

       71.0402 - Site & foundation work
       61.4001 - Structural steel
       71.0403 - Architectural & building enclosure
       72.0200 - Mechanical construction
       73.0200 - Electrical construction
       63.0000 - Electrical equipment
       ? - Electrical configuration
     - 5.1.2. *Design, furnish & install contracts*

       62.3401 - Steam generator
       62.1001 - Turbine generator
       62.0601 - Cooling tower
       62.0203 - Fabric filter
       64.0212 - Distributed control package
   - 5.2. *Get current status of each component from B &V or from Doug MacDonald at Power Plant*
   - 5.3. *Review format of Expedition tracking program*
   - 5.4. *Do some bar chart tracking of submittals*
   - 5.5. *Complete prepare site and foundation network model with owner & contractor*
     - 5.5.1. *Show details for construction of temporary wall*
     - 5.5.2. *Show as much procurement as possible*
   - 5.6. *Review tracking techniques against conform spec dates*
   - 5.7. *Tour existing power plant*
   - 5.8. *Continue preparing glossary of terms*
     - 5.8.1. *Redefine certified drawings*
     - 5.8.2. *Only B & V apparently know their needs*
6. *Current project status*
   - 6.1. *Design, furnish & install projects that have been awarded*
     - 6.1.1. *62.0203 - Fabric filter - Environmental Elements Corporation*

No current status information available
From B & V schedule data sheet dated 06/03/91 (363)
Exchange engineering info
To begin am 02/04/91 (279)
To be completed pm 08/27/91 (494)
Manufacture & deliver fabric filter
To begin am 10/31/91 (469)
To be completed pm 06/01/92 (618)
Contractor mobilize
To begin am 05/18/92 (608)
To be completed pm 05/29/92 (617)
Erect fabric filter
To begin am 06/02/92 (618)
To be completed pm 04/30/93 (852)

6.1.2. 62.0601 - Cooling tower - Thermal Dynamics

No current status information available
From B & V schedule data sheet dated 06/03/91 (363)
Exchange engineering info
To begin am 02/01/91 (278)
To be completed pm 01/02/92 (512)
Manufacture & deliver cooling tower
To begin am 01/03/92 (512)
To be completed pm 04/30/92 (574)
Contractor mobilize
To begin am 05/01/92 (597)
To be completed pm 05/07/92 (602)
Erect cooling tower
To begin am 05/08/92 (602)
To be completed pm 09/10/92 (689)

6.1.3. 62.1001 - Turbine generator - General Electric

No current status information available
From B & V schedule data sheet dated 06/03/91 (363)
Exchange engineering info
To begin am 11/30/90 (235)
To be completed pm 10/23/91 (464)
Manufacture & deliver steam turbine generator
To begin am 01/25/91 (273)
To be completed pm 06/04/92 (621)
Contractor mobilize
To begin am 05/22/92 (612)
To be completed pm 06/04/92 (621)
Erect steam turbine generator

To begin am 06/05/92 (621)
To be completed pm 12/07/92 (749)

6.1.4. 62.3401 - Steam generator - Tampella Power Corporation

Have set document control procedure in letter of 05/14/91 (350)
All drawings & correspondence are to be sent to

Tampella Power Corporation
P. O. Box 3308
2600 Reach Road
Williamsport, PA 17701
Attn: Document Control Administrator

Schedule submitted by TPC with letter of 05/14/91 (350) from Dean Ely
Date of schedule - 05/13/91 (349)
Content of schedule & required status as of 06/07/91 (367)
Engineering
Total engineering - should be about 25% complete
To be completed pm 08/07/92 (666)
Engineering to support A/E - should be about 60% complete
To be completed pm 10/16/91 (459)
Engineering to support shipments - should be about 17% complete
To be completed pm 08/07/92 (666)
Manufacturing
Total manufacturing
To begin on am 12/17/91 (501)
To be completed pm 10/21/92 (718)
Drum -1 - manufacturing
To begin on am 12/17/91 (501)
To be completed pm 04/27/92 (594)
Headers -1 - manufacturing
To begin on am 02/13/92 (541)
To be completed pm 10/21/92 (718)
Membrane wall & tubes -1 - manufacturing
To begin on am 12/31/91 (510)
To be completed pm 09/02/92 (684)
Miscellaneous steel -1 - manufacturing
To begin on am 12/17/91 (501)
To be completed pm 09/28/92 (701)
Purchase items - 1
To begin on am 06/17/91 (373)
To be completed pm 01/22/93 (782)

Erection
To begin on am 02/25/92 (549)
To be completed pm 06/07/93 (877)
Start up
Total start up
To begin on am 05/03/93 (852)
To be completed pm 09/07/93 (941)
First firing - steam generator
To begin on am 05/03/93 (852)
To be completed pm 05/03/93 (853)
Steam line blow out
To begin on am 06/01/93 (872)
To be completed pm 06/01/93 (873)
Initial operation
To begin on am 08/02/93 (915)
To be completed pm 08/02/93 (916)
Commercial operation
To begin on am 09/07/93 (940)
To be completed pm 09/07/93 (941)

6.1.5. 64.0212 - Distributed control package - Bailey Control Company

Schedule submitted by B & V in meeting minutes of Bailey kick off session on 05/13/91 (349)
Date of schedule - 05/01/91 (341)
Content of schedule & required status as of 06/07/91 (367)
Phase 1
Bailey /ETSI graphic spec - should be about 98% complete
To be completed on pm 06/10/91 (369)
Submit P&ID's to Bailey - should be 100% complete
To be completed pm 05/27/91 (359)
Bailey review prelim P&ID's - should be 100% complete
To be completed pm 06/03/91 (364)
Develop prelim architecture - should be about 90% complete
To be completed pm 06/10/91 (369)
Review architectural & graphics
To begin on am 06/12/91 (370)
To be completed pm 06/21/91 (378)
Estimate remaining I/O
To begin on am 06/21/91 (377)
To be completed pm 07/02/91 (385)
Final architecture
To begin on am 06/21/91 (377)

To be completed pm 07/02/91 (385)
Vendor meetings
To begin on am 06/21/91 (377)
To be completed pm 07/02/91 (385)
Bailey cabinet arrangement
To begin on am 07/29/91 (402)
To be completed pm 09/30/91 (447)
Bailey externals
To begin on am 07/29/91 (402)
To be completed pm 09/30/91 (447)
Determine missing systems
To begin on am 08/05/91 (407)
To be completed pm 09/03/91 (428)
Review
To begin on am 10/01/91 (447)
To be completed pm 10/18/91 (461)
Finalize cabinet arrangement
To begin on am 10/18/91 (460)
To be completed pm 11/04/91 (472)
Phase 2
Hardware cutoff
To begin on am 11/04/91 (471)
To be completed pm 11/04/91 (472)
Bailey configurations
To begin on am 11/04/91 (471)
To be completed pm 02/28/92 (553)
Adjust estimate: issue subsystem SO's
To begin on am 12/23/91 (505)
To be completed pm 01/20/92 (524)

6.2. Projects awarded and in work

6.2.1. 71.0402 - Site & foundation work

Contract award approved by MSU Board on June 7, 1991 (367)
Contractor to move on job site on June 10, 1991 (368)

6.3. Projects not yet awarded

6.3.1. 61.4001 - Structural steel

Being estimated by contractors
Contract award to be approved at July 26, 1991 Board meeting

6.3.2. 72.0200 - Will now be the architectural, building enclosure & mechanical package

71.0403 - Architectural & building enclosure
Will probably be combined with mechanical construction - 72.0200
Due to be issued for bidding between July 19, 1991 & July 26, 1991

Contract award to be approved at October 11, 1991 Board meeting

72.0200 - Mechanical construction

Will probably be combined with architectural & building enclosure

Due to be issued for bidding between July 19, 1991 & July 26, 1991

Contract award to be approved at October 11, 1991 Board meeting

6.3.3. 73.0200 - Electrical construction

To be issue for bidding on December 2, 1991 (490) - from Phil Dimitry of B & V

Contract award to be approved at February 7, 1992 (537) Board meeting

6.3.4. 63.3600 - Electrical equipment

To be issued for bidding on pm August 9, 1991 (412) - from Phil Dimitry of B & V

Contract award to be approved at October 11, 1991 (455) Board meeting

6.3.5. ? - Electrical configuration

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Consulting Engineer
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ph 517 772 2537
August 7, 1991

Subject: Monitoring Report #6
Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Joseph Kavanagh - Project manager
Richard Wever - Construction superintendent
Jim Simons - Project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disk #: 253 & 265

Dates of monitoring: Friday, August 2, 1991 (wd 406)

Meeting location: Job site at Power Plant #4, East Lansing, Michigan

Monitored from:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #3, dated July 12, 1991 (wd 391)

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- July 26, 1991 (wd 401) - MSU Board approved award of structural steel contract award - package 61.4001 to Almet
- November 15, 1991 pm (wd 481) - Site grading to be complete
- December 31, 1991 pm (wd 511) - Power plant foundations to be complete
- December 31, 1991 pm (wd 511) - Site service to be complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation to be complete
- January, 1994 - Total project complete - to be confirmed

MSU Board of Trustees meeting dates:

Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Those attending:
(Some in meeting part time only)

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - Consultant

Actions taken:

- Inspected project

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Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
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August 7, 1991

- Inspected project
- Reviewed photo record format & methods of photo documentation
- Discussed potential conflict points on total project
- Reviewed status of contract document packages
- Discussed levels of documentation appropriate for project

Project Status

Mr. Simons and I did not conduct a formal monitoring of the project with the contractors at this session. This will be done at our next meeting on Monday, August 12, 1991 (wd 412) in conjunction with the contractor. At this time the network will be updated if it appears desirable.

We did make a brief inspection of work in progress however and it appears the project key activities including demolition of the west wall and installation of caissons for foundation work is from 6 to 10 working days behind the current network model, sheet #1, issue #3 dated July 12, 1991 (wd 391).

Job Photos:

Since official third party photos are not currently being taken of the project, I recommended to Mr. Simons that he continue taking site photos and that they be marked with the date, an identification number, the subject, a key plan and any supplemental remarks of interest. Ultimately the photo file should be recorded in a data base format if the need for photo reference becomes important enough. This is part of the documentation process.

Potential Conflict Points:

I was asked to consider what might be potential conflict points on this project projecting from my past experience. Prior to the meeting I prepared a list of what the conflict points might be and identified some steps to take to help minimize such conflicts and problems. In addition I drew from my project management material and prepared a reference document to help explain some of the more complex points of conflict management.

This material was given to Mr. Wever and Mr. Simons at our conference and was thoroughly reviewed. It is the intent of Mr. Wever to provide the list to others on the project team for a general discussion of job management in the near future.

It should be emphasized that nearly all projects have the potential for problems and certainly for conflict. Anticipation of such conflict and its nature so as to avoid or minimize it as it becomes disruptive and destructive, is the obligation of those involved in the project at various management levels.

Status of contract document packages:

- **Structural steel - package 61.4001** - monitored from Sheet #ssca1, issue #2, dated May 22, 1991 (wd 356)

The structural steel contract has been awarded to Almet by approval of the Board on July 26, 1991 (wd 401). Almet's schedule accompanying its proposal was reviewed at our monitoring session. Under this proposed schedule Almet plans to begin structural steel erection late in December, 1991 and complete in late March, 1992.

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August 7, 1991

We will prepare a network model of the structural steel erection and related other work in a near future meeting.

• **Distributed control system - package 64.0212** - no network yet prepared for this work

No review made at this meeting.

• **Architectural and building enclosure - package 71.0403** - monitored from Sheet #abca1, issue #2, dated May 22, 1991 (wd 356)

Currently it is expected that this package is to be issued for proposals on August 9, 1991 (wd 411). Proposals are to be received on September 24, 1991 (wd 442). The award of the contract is to be approved at the Board meeting on October 11, 1991 (wd 455). Thus the window for selection of a contractor and making the recommendation to the Board in sufficient time to be put on the October 11, 1991 agenda is very small.

This is a very complex package and must be given careful consideration in the selection of the successful bidder since the basic management system for the entire project will be set by this award.

• **Mechanical construction - package 72.0200** - monitored from Sheet #mca1, issue #2, dated May 22, 1991 (wd 356)

The timing on this package, its issue and its award are similar to that for the architectural and building enclosure package 71.0403.

• **Electrical construction - package 73.0200** - monitored from Sheet #elca1, issue #2, dated May 22, 1991 (wd 356)

No current information was available on the status of this package.

• **Electrical configuration package** - no number assigned as yet - monitored from Sheet #ecca1, issue #2, dated May 22, 1991 (wd 356)

This package follows the same logic for issue and processing as the electrical construction package. The date for approval of the contract by the Board is set for December 6, 1991 (wd 494).

No current information was available on the status of this package.

• **Electrical equipment - package 63.0000** - no monitoring network prepared as yet.

Not discussed at this session.

General Summary

Meeting notes were prepared at our conference on August 2, 1991 (wd 406). I have made minor editing changes to these and a copy is attached to this monitoring report.

At our next monitoring on Monday, August 12, 1991 (wd 412) I suggest we work on the following items:

6. & other interested parties

C. Material reviewed shown in discussion outline and in gray book handout material

1. Left one extra copy of discussion outline
2. Left 7 additional copies of gray book - reference material for background

IX. Current status of project

A. 71.0402 - Site & foundation work - not formally monitored

1. Demolition of existing west elevation in work
   Some temporary wall up - about 20% complete
   Masonry being removed - about 40% complete
   Some metal siding up
2. Caissons being installed
   Started at col line DD instead of at north to minimize interference with existing west walk demolition
   9 of 64 total caissions installed
   Caisson at col line DD14 mislocated to col line DD 13.9
   Column carrying 304 kip
   b&v thinking of adjusting structural steel to accomodate mislocated caisson
   On 08/02/91 (406) hit chimney lighting cable in drilling caisson at col line DD
3. Parking areas being gravelled
4. Cooling tower basin in work
   Baffle in work
5. Procurement
   Shop drawings for site piping submitted and approved - in fabrication
   No transformer shop drawings received from contractor as yet

B. 61.4001 - Structural steel

1. Contract approved on 07/26/91 (401)
2. Letter of intent issued to Almet on 07/26/91 (401)
3. Contracts being drawn currently
4. Major time frames from proposed schedule by Almet, dated June 25, 1991 (379)
   Detailing, submittals & approval - 08/01/91 (405) to 11/29/91 (490)
   Fabrication - 10/01/91 (447) to 01/31/92 (533)
   Erection - 12/26/91 (507) to 03/31/92 (575)

C. Electrical & chemical building (ecb)

1. Bulletin to be issued to Design & Build for electrical & chemical bldg foundation work
   To be issued 08/16/91 (416) for pricing by Design & Build, site & foundation contractor
   Price for ecb to be submitted by 08/30/91 (427)
   Change order to be released by 09/13/91 (435)

D. 71.0403 - Architectural & building enclosure

1. Owner review with B & V made on 07/26/91 (401)
2. To be issued for proposals on 08/09/91 (411)
3. Proposals due 09/24/91 (442)
4. Owner to take 5 wd to review & recommend by 10/01/91 (447)
5. Need 3 weeks or 15 wd to put on Board agenda
6. Want to be on 10/11/91 (455) Board agenda
7. **Will miss this by 7 working days or 1 2/5 weeks if current submission requirements are held**

E. 71.0200 - Mechanical construction

1. Owner review with B & V made on 07/26/91 (401)
2. To be issued for proposals on 08/09/91 (411)

3. Proposals due 09/24/91 (442)
4. Owner to take 5 wd to review & recommend by 10/01/91 (447)
5. Need 3 weeks or 15 wd to put on Board agenda
6. Want to be on 10/11/91 (455) Board agenda
7. **Will miss this by 7 working days or 1 2/5 weeks if current submission requirements are held**

X. Documentation process

A. Discussed level of documentation that might be appropriate at this time.

B. Used material on pages 29 to 35 and 36 to 40 in gray ho book as basis for review

1. Consider project is currently at a level 5 & 6 requirement
2. Review at next meeting

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August 15, 1991

Subject:	Monitoring Report #7
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - Project manager Richard Wever - Construction superintendent Jim Simons - Project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disk #:	253 & 265
Date of monitoring:	Monday, August 12, 1991 (wd 412)
Meeting location:	Job site at Power Plant #4, East Lansing, Michigan

Monitored from:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #3, dated July 12, 1991 (wd 391)

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- June 10, 1991 (wd 368) - Site work and foundation contractor moved on job
- July 26, 1991 (wd 401) - MSU Board approved award of structural steel contract award - package 61.4001 to Almet
- August 9, 1991 (wd 412) - Package 72.0200, General Architectural and Mechanical Construction issued for construction proposals
- October 11, 1991 (wd 456) - Contract 72.0200, General Architectural and Mechanical Construction construction contract to be awarded
- November 15, 1991 pm (wd 481) - Site grading to be complete
- December 31, 1991 pm (wd 511) - Power plant foundations to be complete
- December 31, 1991 pm (wd 511) - Site service to be complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation to be complete
- January, 1994 - Total project complete - to be confirmed

MSU Board of Trustees meeting dates:

Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Those attending: (Some in meeting part time only)

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August 15, 1991

Early am meeting
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Late am meeting
- Ron Flinn - MSU assistant vice president & director of physical plant
- Robert Nestle - MSU engineer
- Joe Kavanagh - MSU project manager
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Early pm meeting
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Phil Crockett - Design & Build - president
- Ralph J. Stephenson - consultant

Late pm meeting
- Joe Kavanagh - MSU project manager
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Actions taken:

- Inspected project with Jim Simons
- Reviewed potential conflict points with MSU physical plant staff
- Monitored project and updated network model to sheet #1, issue #4, dated August 12, 1991 (wd 412)
- Began formulating plan of collecting and assimilating information on design, furnish and install (dfi) contracts

Project Status:

Mr. Simons and I inspected the project and compared its status as of August 12, 1991 (wd 412) to the network model, sheet #1, issue #3, dated July 12, 1991 (wd 391).

The project currently lags the issue #3 network model key target dates from 2 to 8 working days . One of the lags is in removal of the west wall and installation of metal siding to close in the existing power plant. This work was to have been completed by August 9, 1991 (wd 412). It currently appears the work will be completed on August 21, 1991 (wd 420).

Caisson installation is proceeding fairly well although the pace of temporary wall installation made it necessary to begin the work sequence at the fabric filter building and then jump to the north end of the building. The issue #3 completion date for caissons was August 30, 1991 (wd 427). The updated issue #4 completion date is September 4, 1991 (wd 429).

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The date for starting the turbine generator base slab in issue #3 was August 15, 1991 (wd 415). The new projected starting date is August 27, 1991 (wd 423).

An item of importance is installation of site utility piping across the service road. It is desired to dovetail this work with traffic demands of the football season. Delivery of pipe is critical. At present the original vendor for the 30" pipe is on strike according to Mr. Crockett. There is no word on how this will affect delivery of the pipe. Mr. Crockett says however that he will resolve this matter by August 16, 1991 (wd 417). We will continue to hold a target delivery date of October 18, 1991 (wd 460).

Looking at current projected end dates for site and foundation work shows that the slab on grade at the power plant is complete by the pm of November 27, 1991 (wd 489). Concrete aprons and aggregate drives are projected for a completion of the pm of November 22, 1991 (wd 486). These dates are getting quite far into the cold weather season and I suggest that if time is to be recaptured, the current lagging elements be given careful and continuous attention now while construction weather is good.

Sheet #1, issue #3, dated July 12, 1991 (wd 391) was updated at this meeting in conjunction with Mr. Phil Crockett of Design & Build. The rough updated network was left with Mr. Simons to use for his construction meetings the remainder of the week.

Enclosed with this report is an updated copy of the network along with various translations that might prove of use in managing the project. I shall prepare a day increment bar chart for use by the contractor and mail it or deliver it for reproduction and distribution.

Potential Conflict Points:

The late morning meeting was devoted to a comprehensive discussion of potential conflict points. The intent is to early identify those elements of the project that could increase the potential for later difficulties as increasing numbers of contractors move on the site.

Tracking design, furnish and install (dfi) contract status

The tracking method for managing and monitoring progress of design, furnish and install (dfi) contracts will be an important part of the management information system to be put into work on the project as the general project manager is selected. Therefore we spent considerable time at the late morning session discussing methods by which this process might best be carried out. There are presently five design, furnish and install contracts awarded. These are:

62.3401 - Steam generator - Tampella Power Corporation -TPC
62.1001 - Turbine generator - General Electric
62.0601 - Cooling tower - Thermal Dynamics
62.0203 - Fabric filter building - Environmental Elements Corporation
62.0212 - Distributed control work - Bailey Controls Company

Questions asked during the sessions and a portion of the answers discussed included the following:

1. *What are the needs of MSU and the program and construction staff in respect to the plans and schedules of the dfi contractors?*

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August 15, 1991

- Authentic and accurate design plan and schedule activities and data.
- Authentic and accurate fabrication plan and schedule activities and data.
- Authentic and accurate delivery plan and schedule activities and data.
- Authentic and accurate installation plan and schedule activities and data.
- Reliable and effective methods of tracking the dfi contractor's work.
- Clear definition of contract milestone dates and their intent.

2. *What will be the needs of the general project manager in respect to the plans and schedules of the dfi contractors?*

- Authentic and accurate design plan and schedule activities and data.
- Authentic and accurate fabrication plan and schedule activities and data.
- Authentic and accurate delivery plan and schedule activities and data.
- Authentic and accurate installation plan and schedule activities and data.
- Reliable and effective methods of tracking the dfi contractor's work.
- Adequate leverage to permit effective management of the dfi contractor's work.
- Complete document files on all assigned dfi contractors.
- Complete list of contract requirements for all assigned dfi contractors.
  - Scope
  - Contract dates
  - Key personnel
- Clear definition of contract milestone dates and their intent.
- Accurate definition of contracts to be assigned.

3. *How does the MSU staff obtain the planning and scheduling documents of the dfi contractors on a regular and effective basis?*

It was decided that for the period between now and when the overall general project manager contract is awarded in early October, 1991 that Mr. Simons and Mr. Wever will work closely with Mr. Kavanagh to obtain the needed information and integrate it into an overall construction work plan. I shall be involved in the integration process and from the data prepare a set of baseline networks from which the ultimate management plan can be determined by the general project manager, taking into account the needs and desires of MSU and the design team.

4. *How and when will the MSU construction staff become directly involved with the dfi contractors?*

As plans and schedules for the design, furnish and install contract work are determined and validated the responsibility for tracking, expediting and managing the work will shift to the MSU construction staff and from there to the general project manager.

Many questions arose from our discussions and it was decided that over the next few weeks, Mr. Kavanagh, Mr. Wever, Mr. Simons and I would analyze the various planning and scheduling documents from Black and Veatch and the design, furnish and install contractors with the intent to complete a valid summary management diagram within which the project can reasonably expect to be constructed.

This plan of work will then be made available to the general project manager as a guidelines to the work that has been completed, is in work and is projected. It is to be expected that the general project manager will use these guidelines to develop his desired plan of management action while allowing the owner's

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August 15, 1991

summary plan to be used by the owner and by those affected by the owner's actions, to accurately measure job progress against a valid standard of performance.

Status of contract document packages:

• **Structural steel - package 61.4001** - monitored from Sheet #ssca1, issue #2, dated May 22, 1991 (wd 356)

The structural steel contract has been awarded to Almet by approval of the Board on July 26, 1991 (wd 401). Almet is presently preparing a detailed plan of work for review and incorporation into the MSU summary network model.

This contract is to be assigned to the general project manager (gpm).

• **Distributed control system - package 64.0212** - no network yet prepared for this work

No detailed review made at this meeting.

Installation of distributed control system components is to be by the electrical construction contractor, package 73.0200.

• **Architectural and building enclosure (gpm contractor) - package 71.0403** - monitored from Sheet #abca1, issue #2, dated May 22, 1991 (wd 356)

The architectural and building enclosure package was issued on August 9, 1991 (wd 411) for preparation and submittal of proposals.

Proposals are to be received on September 24, 1991 (wd 442). The award of the contract is to be approved at the Board meeting on October 11, 1991 (wd 455). Apparently this time table has been accepted by the MSU staff.

It should be confirmed that the time between receipt of proposals and the Board meeting is adequate.

• **Mechanical construction - package 72.0200** - monitored from Sheet #mca1, issue #2, dated May 22, 1991 (wd 356)

Merged with the architectural and building enclosure package #71.0403.

• **Electrical construction - package 73.0200** - monitored from Sheet #elca1, issue #2, dated May 22, 1991 (wd 356)

No current information was available on the status of this package.

This contract is to be assigned to the general project manager (gpm).

• **Electrical configuration package** - no number assigned as yet - monitored from Sheet #ecca1, issue #2, dated May 22, 1991 (wd 356)

This package follows the same logic for issue and processing as the electrical construction package. The date

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for approval of the contract by the Board is set for December 6, 1991 (wd 494).

No current information was available on the status of this package.

This package will not be assigned to the general project manager.

- **Electrical equipment - package 63.0000** - no monitoring network prepared as yet.

Not discussed in detail at this session.

This contract will be assigned to the electrical construction contractor, package 73.0200.

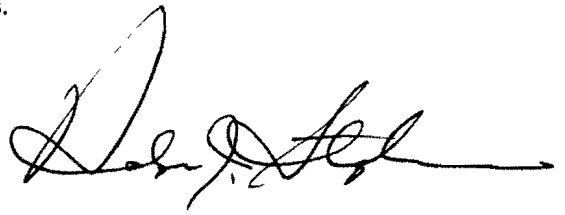
General Summary:

I should like to stress the importance of a clear cut assignment of the various contract packages to the general project manager. A good transition from design to approval to construction requires accurate definition of the scope of work, assignment of authority and placement of responsibility.

Meeting notes were prepared at our conference on August 12, 1991 (wd 412). I have made minor editing changes to these and a copy is attached to this monitoring report.

I shall be touch with Mr. Simons and Mr. Kavanagh soon to set the date for our next meeting. I suggest we put the following items on the meeting agenda.

- Monitor project with owner and contractors.
- Set methods of accurately tracking progress on design, furnish and install contracts within the framework described in the questions and answers outlined above.
- Work on total project summary network model.
- Discuss project documentation procedures as time permits.
- Establish graphic methods of tracking project revisions.



Ralph J. Stephenson PE

8:48:39 AM - Monday, August 12, 1991 (412)

I. *T. B. Simon Power Plant Unit 4 Addition notes*
II. *By Ralph J. Stephenson*
III. *Monday, August 12, 1991*
IV. *Location - MSU Power Plant field office*
V. *Those attending*
   A. *Early am meeting*
      1. Dick Wever - construction superintendent
      2. Jim Simons - MSU project representative
      3. Ralph J. Stephenson - consultant
   B. *Late am meeting*
      1. Ron Flinn (rfl) - assistant vice president & director of physical plant
      2. Robert Nestle (rne) - engineer
      3. Joe Kavanagh (jka) - project manager
      4. Dick Wever (rwe) - construction superintendent
      5. Jim Simons (jsi) - project representative
      6. Ralph J. Stephenson (rjs) - consultant
   C. *Early pm meeting*
      1. Dick Wever (rwe) - construction superintendent
      2. Jim Simons (jsi) - project representative
      3. Phil Crockett (pcr) - president - Design & Build
      4. Ralph J. Stephenson (rjs) - consultant
   D. *Late pm meeting*
      1. Joe Kavanagh (jka) - project manager
      2. Dick Wever (rwe) - construction superintendent
      3. Jim Simons (jsi) - project representative
      4. Ralph J. Stephenson (rjs) - consultant
VI. *Agenda - checked items completed at meeting*
   A. *Review documentation procedures*
   B. *Outline recommended documentation procedures for project*
   C. *Plan structural steel erection*
   D. *Continue prepare summary network model for entire project*
   E. *Discuss distribution of monitoring reports*
   F. *√Review potential conflict points*
   G. *√Discuss and decide on method of tracking progress on design, furnish & install contracts*
      1. 62.3401 - Steam generator - Tampella Power
      2. 62.1001 - Turbine generator - General Electric
      3. 62.0601 - Cooling tower - Thermal Dynamics
      4. 62.0203 - Fabric filter building - Environmental Elements Corporation
      5. 62.0212 - Distributed control work - Bailey Controls Company
   H. *√Monitor project and update network*
VII. *Tracking progress on design, furnish and install contracts*

8:48:39 AM - Monday, August 12, 1991 (412)

A. *Questions*

1. Where does MSU construction get the planning and scheduling documents of the contractors?
   - 62.3401 - Steam generator - Tampella Power
   - 62.1001 - Turbine generator - General Electric
   - 62.0601 - Cooling tower - Thermal Dynamics
   - 62.0203 - Fabric filter building - Environmental Elements Corporation
   - 62.0212 - Distributed control work - Bailey Controls Company
2. At what point will the MSU construction group be involved directly with the contractors
   - 62.3401 - Steam generator - Tampella Power
   - 62.1001 - Turbine generator - General Electric
   - 62.0601 - Cooling tower - Thermal Dynamics
   - 62.0203 - Fabric filter building - Environmental Elements Corporation
   - 62.0212 - Distributed control work - Bailey Controls Company

B. ***Needs of the MSU project team in respect to these contractors***

1. Authentic & accurate design plan and schedule activities & data
2. Authentic & accurate fabrication plan and schedule activities & data
3. Authentic & accurate delivery plan and schedule activities & data
4. Authentic & accurate installation plan and schedule activities & data
5. Method of tracking all phases of the contractors work

C. ***Needs of the MSU general project manager in respect to these contractors***

This firm will be on the project as of October 11, 1991 (455). They should have all the needed contractor information to properly manage the project.

1. Authentic & accurate design plan and schedule activities & data
2. Authentic & accurate fabrication plan and schedule activities & data
3. Authentic & accurate delivery plan and schedule activities & data
4. Authentic & accurate installation plan and schedule activities & data
5. Method of tracking all phases of the contractors work
6. Managerial leverage to permit proper direction of the work
7. Complete document files on all assigned contractors
8. Complete list of contract requirements for the contractors
   - Scope
   - Contract dates
   - Key personnel

D. ***Possible answers & techniques***

1. Work through Black & Veatch directly to obtain plan and schedule information
2. Work through jka directly to obtain plan and schedule information

3. Continue on present course of action until gpm comes on job in October, 1991
   Then have him gather all material he needs
4. Prepare summary or detailed plans of action now and turn over to gpm in October, 1991
   Should not make the networks part of the contract documents
   Can make key target dates part of the gpm's work.

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September 13, 1991

Subject:	Monitoring Report #8
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disk #:	253 & 265
Dates of monitoring:	Tuesday, September 3, 1991 (wd 427) & Thursday, September 5, 1991 (wd 429)
Meeting locations	Job site at Power Plant #4, East Lansing, Michigan

Monitored from:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #4, dated August 12, 1991 (wd 412)

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- June 10, 1991 (wd 368) - Site work and foundation contractor moved on job
- July 26, 1991 (wd 401) - MSU Board approved award of structural steel contract award - package 61.4001 to Almet
- August 9, 1991 (wd 412) - Package 72.0200, General Architectural and Mechanical Construction issued for construction proposals
- October 11, 1991 (wd 456) - Contract 72.0200, General Architectural and Mechanical Construction construction contract to be awarded
- November 15, 1991 pm (wd 481) - Site grading to be complete
- December 31, 1991 pm (wd 511) - Power plant foundations to be complete
- December 31, 1991 pm (wd 511) - Site service to be complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation to be complete
- January, 1994 - Total project complete - to be confirmed

MSU Board of Trustees meeting dates:

Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Those attending: (Some in meeting part time only)

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September 13, 1991

Tuesday, September 3, 1991 (wd 427)
- Robert Nestle - MSU engineer
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Phil Crockett - Design & Build - president
- Ralph J. Stephenson - consultant

Thursday, September 5, 1991 (wd 429)
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Actions taken:

Tuesday, September 3, 1991 (wd 427)
- Inspected project with Jim Simons
- Monitored current status of project
- Updated network model sheet #1 to issue #5, dated September 3, 1991 (wd 427)
- Reviewed possible addendum revisions to general project manager documents

Thursday, September 5, 1991 (wd 429)

- Reviewed suggested wording of addenda to architectural/mechanical contract documents
- Prepared master summary network model with Mr. Simons

Project Status:

On Tuesday, September 3, 1991 (wd 427), Mr. Simon & I inspected the project and monitored job status against the network model shown on Sheet #1, issue 4, dated August 12, 1991 (wd 412). In general, the current project lag over the issue 4 plan of work ranges from four working days at the turbine generator base, to about fifteen working days in erecting the temporary wall at the west elevation of the existing building.

There is a lag at the cooling tower foundation of about five working days in construction of the isolated footings and the baffle roof slab.

Work at the utility line road crossing was begun early so as to reduce the time of installation during football season traffic. However the large pipe delivery has shifted from October 18, 1991 (wd 460) to November 8, 1991 (wd 475). It apparently was necessary for the prime site and foundation contractor to change suppliers due to a plant strike. This may have been part of the delivery delay.

Turbine generator base work is expected to begin on September 9, 1991 (wd 431). It was due to begin on August 27, 1991 (wd 423) and thus has a projected lag of eight working days. Ash pit work is to begin on September 9, 1991 (wd 431) also. It had a projected start dated of September 5, 1991 (wd 429) and shows a lag of two working days.

Base slab work on the urea containment foundation has been completed and the contractor is starting up with the side walls. These were due to have begun on August 22, 1991 (wd 420), and are now about

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September 13, 1991

seven working days behind desired dates.

Caisson work has proceeded well over the past few days and it is expected that all caissons will be installed by the pm of September 5, 1991 (wd 430).

In total the above slippages are not overly serious except that they represent a continued loss of time in construction of site and foundation work. Also, completion dates of critical concrete work has now in some cases been pushed into late November and early December, 1991. This is very late to be installing exposed concrete work that may be difficult to protect against rain, low temperatures and snow.

As a result of our inspection we met with Mr. Phil Crockett of Design and Build and updated Sheet #1, issue #4, dated August 12, 1991 (wd 412). The resulting network model, Sheet #1, issue #5 dated September 3, 1991 (wd 427) has been sent to Mr. Simons who distributed it to Mr. Wever, Mr. Kavanagh and Mr. Crockett.

Contract work assignments :

At our meeting on September 3, 1991 (wd 427), Mr. Nestle, Mr. Wever, Mr. Simons and I discussed the assignment of contracts as proposed to be described in a pre bid addenda to the architectural / mechanical (a/m) contract proposal documents. The intent of the addenda is to stress that the installation portion only of the design, furnish and install contracts (dfi) is to be assigned to the a/m contractor. This matter was discussed further at our meeting on Thursday, September 5, 1991 (wd 429). A final decision on the scope of the assigned work will be made by the architect/engineer and the owner in the near future.

Summary Project Network Model:

On September 5, 1991 (wd 429), Mr. Simons and I met to prepare a full project summary network model. To do this we drew on several data sources including the following:

a. Almet's structural steel erection schedule, dated June 25, 1991 (wd 379)

b. TPC's circulating fluid bed boiler schedule dated 08/09/91 (wd 411)

c. B & V's project plan & schedule dated July 16, 1991 (wd 393)

d. G. E. letter to B & V dated June 4, 1991 (wd 364)

e. Contract date data tabulated from dfi conform specs by Mr. Simons and I, and shown in the data file dated August 15, 1991 (wd 415)

The network model produced during this meeting was labeled Sheet #sm2, issue #5, dated September 3, 1991 (wd 427). Copies were made at our meeting on September 5, 1991, 1991 (wd 429) and Mr. Simons will distribute these as required. I shall add the needed notes and activity numbers as well as check over the diagram for accuracy. It will then be printed and sent to Mr. Simon for further distribution as desired.

There are presently five design, furnish and install contracts awarded. These are:

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ph 517 772 2537
September 13, 1991

62.3401 - Steam generator - Tampella Power Corporation -TPC
62.1001 - Turbine generator - General Electric
62.0601 - Cooling tower - Thermal Dynamics
62.0203 - Fabric filter building - Environmental Elements Corporation
62.0212 - Distributed control work - Bailey Controls Company

It will be important to address the information transfer needs of MSU, the design/furnish/install contractors, and the architectural / mechanical / general project manager so that a smooth transition from the current project delivery system to the dfi installation assignment can be made. These were outlined in Monitoring Report #7, dated August 15, 1991 (wd 415), and listed on pages 3 and 4.

Mr. Simons and I are meeting with TPC, the steam generator contractor, on September 19, 1991 (wd 339) to prepare a network model of the steam generator installation. At this meeting Mr. Simons and I will also discuss as many of the matters outlined above as possible. After this meeting we should have a better idea than at present, about the current and future information needs of the project team.

Status of contract document packages:

• Structural steel - package 61.4001 - monitored from Sheet #ssca1, issue #2, dated May 22, 1991 (wd 356)

Contract awarded. Erection is to be assigned to the general project manager (gpm).

• Distributed control system - package 64.0212 - no network yet prepared for this work

No detailed review made at this meeting. Installation of distributed control system components is to be by the electrical construction contractor, package 73.0200.

• Architectural / mechanical (gpm) - package 71.0200 - monitored from Sheet #abca1, issue #2, dated May 22, 1991 (wd 356)

The architectural and mechanical package was issued on August 9, 1991 (wd 411) for preparation and submittal of proposals.

Proposals are to be received on September 24 1991 (wd 442). The award of the contract is to be approved at the Board meeting on October 11, 1991 (wd 455).

• Electrical construction - package 73.0200 - monitored from Sheet #elca1, issue #2, dated May 22, 1991 (wd 356)

No current information was available on the status of this package.

• Electrical configuration package - no number assigned as yet - monitored from Sheet #ecca1, issue #2, dated May 22, 1991 (wd 356)

This package follows the same logic for issue and processing as the electrical construction package. The date for approval of the contract by the Board is set for December 6, 1991 (wd 494). No current information was available on the status of this package. This package will not be assigned to the general project manager.

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September 13, 1991

• Electrical equipment - package 63.0000 - no monitoring network prepared as yet.

Not discussed in detail at this session. This contract will be assigned to the electrical construction contractor, package 73.0200.

General:

Brief meeting notes were prepared of our conferences on September 3 and 5, 1991 (wd 427 and 429). These are attached to this report.

Ralph J. Stephenson PE

9:47:16 AM - Tuesday, September 3, 1991 (427)

I. *T. B. Simon Power Plant Unit 4 Addition notes*
II. *By Ralph J. Stephenson*
III. *Tuesday, September 3, 1991*
IV. *Location - MSU Power Plant field office*
V. *Those attending - some in meeting part time only*
   A. *Robert Nestle - MSU engineer*
   B. *Dick Wever - MSU construction superintendent*
   C. *Jim Simons - MSU project representative*
   D. *Phil Crockett - President - Design Build - foundation and site work*
   E. *Ralph J. Stephenson - consultant*
VI. *Agenda*
   A. *Inspect project*
   B. *Monitor project*
   C. *Review suggested revisions to general project manager specs*
   D. *Discuss those proposing on architectural/mechanical package*
   E. *Discuss project documentation degree & procedures*
VII. *Status of site & foundation work - package 71.0402*
   A. *Temporary wall erection*
      1. All existing wall removed
      2. Metal siding about 70% complete
   B. *Caissons*
      1. Complete from K to D & at fabric filter building
      2. About 9 more caissons to install
   C. *Turbine generator base*
      1. Not started
   D. *Urea containment area*
      1. Base slab poured
   E. *Services from PP #4 to cooling tower*
      1. Installing lines and constructing structures
   F. *Cooling tower foundation*
      1. Constructing isolated footings
      2. Constructing baffle roof deck

Thursday - September 5, 1991 (429)

I. *T. B. Simon Power Plant Unit 4 Addition notes*
II. *By Ralph J. Stephenson*
III. *Meeting date Thursday, September 5, 1991 (429)*
    A. *Note that these observations were written on September 13, 1991 (435)*
IV. *Location - MSU Power Plant field office*
V. *Those attending - some in meeting part time only*
    A. *Dick Wever - MSU construction superintendent*
    B. *Jim Simons - MSU project representative*
    C. *Ralph J. Stephenson - consultant*
VI. *Agenda*
    A. *Prepare summary network model of total project*
    B. *Review wording of proposal addenda to Architectural & Mechanical (a/m) contract 71.0200*
VII. *General notes*
    A. *Assignment of contracts*
        1. MSU considering assignment of erection only to a/m contractor (71.0200)
        2. Reviewed advantages and disadvantages of erection only with rwe & jsi
        3. Whatever course of action is followed it will require clarification in a pre bid addenda
        4. May require some method be used to revise the conditions of the dfi contracts already let
    B. *Interim dates*
        1. Agreed among those attending that the intermediate dates given should not be considered contract dates
        2. Language of documents to be reviewed
    C. *Summary network model*
        1. Prepared summary network model
        2. Incorporated dates and action items from various sources
        3. Matters to be resolved
            How is the boiler steam drum erected through the roof?
                Structural steel contractor to leave out designated steel members
                These are identified on the structural contract documents
                Must decide how return trips to the job by structural steel contractor are incorporated into contract requirements
            How are discrepancies between contract milestone dates and TPC schedule to be resolved?
            How is the cooling tower maintained from its completion to operation?
            What grating is to be installed and what is to be left out for equipment setting?
            Completion date discrepancies between structural steel schedule, contract documents & TPC schedule
        4. Completed summary network model sheet #sm1, issue #5 dated September 5, 1991 (429)
        5. Printed network and left copy with Jim Simons; he will distribute as needed

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September 26, 1991

Subject: Monitoring Report #9
Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Joseph Kavanagh - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253 & 265

Date of monitoring: Thursday, September 19, 1991 (wd 439)

Meeting locations: Power Plant office conference room

Monitored from:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)

- Sheet #1, contract 71.0402 - Site work & foundation work, issue #5, dated September 3, 1991 (wd 427)

- Miscellaneous prime contractor networks including

  Milestone dates from prime contract agreements
  Almet's proposed steel erection schedule of 06/25/91 (wd 379)
  Tampella's steam generator erection schedule of 08/09/91 (wd 411)
  Tampella's steam generator erection master schedule of 09/17/91 wd 437)
  MSU & rjs summary network model of project dated 09/13/91 (wd 435)

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- June 10, 1991 (wd 368) - Site work and foundation contractor moved on job
- July 26, 1991 (wd 401) - MSU Board approved award of structural steel contract award - package 61.4001 to Almet
- August 9, 1991 (wd 412) - Package 72.0200, General Architectural and Mechanical Construction issued for construction proposals
- October 11, 1991 (wd 456) - Contract 72.0200, General Architectural and Mechanical Construction construction contract to be awarded
- November 15, 1991 pm (wd 481) - Site grading to be complete
- December 31, 1991 pm (wd 511) - Power plant foundations to be complete
- December 31, 1991 pm (wd 511) - Site service to be complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation to be complete

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• January, 1994 - Total project complete - to be confirmed

MSU Board of Trustees meeting dates:

Friday, October 11, 1991 (wd 455)
Friday, December 6, 1991 (wd 494)

Those attending: (Some in meeting part time only)

• Robert Dowding - MSU contracts and grants
• Joe Kavanagh - MSU project manager
• Robert Ellerhorst - MSU director of utilities
• Richard Wever - MSU construction superintendent
• James Simons - MSU project representative
• Doug MacDonald - MSU design coordinator
• Bruce Van Heest - B&V project engineer - structural and civil
• Gerald Hersh - Tampella director of projects
• Dean Ely - Tampella project manager
• Harry J. Markwick - Tampella project engineer
• James Kramer - Tampella project superintendent
• Ralph J. Stephenson - consultant

Actions taken:

• Discussed assignment of contract provisions
• Discussed interaction of other contractors with Tampella
• Reviewed selection of general project manager, architectural and mechanical contractors.
• Briefly inspected project with those attending meeting
• Prepared summary network model of steam generator installation - sheet #BL1, issue #1, dated September 19, 1991 (wd 439)

General summary:

The main purpose of this meeting was to review the current status of various prime contracts, and to begin preparing an authentic summary network model. This model is basically to be used as a planning guideline by MSU and the General Project Manager as detailed planning and scheduling work proceeds on the project.

We first reviewed the overall nature of the project and the current status of the contract awards. There were several questions about the function of the General Project Manager and his relation to the various prime contractors.

The location and size of the lay down areas was also discussed in relation to the needs of Tampella Power, and the areas available. This lead into a discussion of the sequence of erection to be used and the relation of this sequencing to the various current milestone dates. The general erection sequence of the steam generator requires close cooperation between the steel erector, Tampella, and the architectural contractor to allow the elements of the steam generator to be set in place properly. Then as the steam generator is erected, the interaction with other prime contract work will become of

increasing importance.

At a convenient point in the erection discussion the entire group took a break and made an inspection tour of the project and the adjoining site areas.

Upon returning to the planning conference, we began detailed network modeling of the steam generator installation. The network model took the planning from hanging the steam drum on through ground fabrication and erection of various elements to completion of the refractory and installation of the combustion insulation and lagging in early 1993. The current network model being used is shown on sheet #BL1, issue #1, dated September 19, 1991 (wd 439)

Most of the information for the work sequencing came from Mr. Kramer and Mr. Ely of Tampella. At the completion of diagraming the network model was printed and distributed to those requesting copies. Tampella's copy was sent to them by fax that afternoon.

Those involved have been asked by MSU staff to review the preliminary network and note revisions, additions, those sequences to be expanded, the interaction points with other contractors, and to provide whatever other comments they might have relative to the installation. Tampella Power, Michigan State University and Black and Veatch staff are the primary parties involved in this review and comment effort.

The next planning and monitoring session is set for Wednesday, October 9, 1991 (wd 453). It is intended at this meeting to complete the summary network model of the steam generator installation to a point where the other prime contractor's work can be incorporated with confidence into a full summary network model.

The additional work encompasses four other design, furnish and install contracts. These are:

62.1001 - Turbine generator - General Electric
62.0601 - Cooling tower - Thermal Dynamics
62.0203 - Fabric filter building - Environmental Elements Corporation
62.0212 - Distributed control work - Bailey Controls Company

In addition it will be necessary to plan the meshing of architectural, mechanical, and electrical construction contract work with that of the prime design, furnish and install (dfi) contractors.

Status of contract document packages:

- Structural steel - package 61.4001

Contract awarded. Erection is to be assigned to the general project manager (gpm). The plan and schedule for this work is currently being prepared by Almet the structural steel contractor. Their field plan of action is very important and will be needed in order to complete work on the steam generator summary plan and schedule. Mr. Simons is following this with Almet and plans to have additional schedule data available for our meeting on October 9, 1991 (wd 453).

- Distributed control system - package 64.0212

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September 26, 1991

Installation of distributed control system components is to be by the electrical construction contractor, package 73.0200.

- Architectural / mechanical (gpm) - package 71.0200

Proposals were received on September 25, 1991 (wd 443). Award of contract is to be approved at the Board meeting on October 11, 1991 (wd 455).

- Electrical construction - package 73.0200

No current information available on the status of this package work. Electrical construction work will be bid in January,1992 and will go to the MSU Board of Trustees for award in February, 1992.

- Electrical configuration package - no number assigned as yet.

This work will be awarded by purchase order by the project staff and a portion of the work is to be completed over the 1991 Christmas holiday recess.

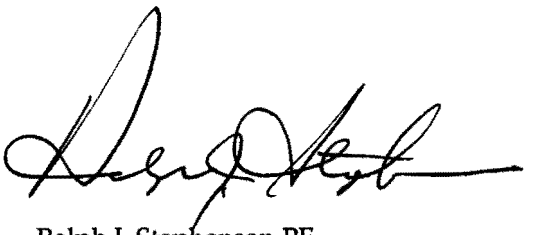
- Electrical equipment - package 63.0000 - no monitoring network prepared as yet.

Not discussed in detail at this session. This contract will be assigned to the electrical construction contractor, package 73.0200.

General:

Brief meeting notes were prepared of our conference on September 19, 1991. These are attached.

As noted above, the next planning and monitoring session is set for October 9, 1991 (wd 453). I shall be in touch with Mr. Simons shortly to set an agenda for the meeting.



Ralph J. Stephenson PE

Thursday, September 19, 1991 (439)

I. *Date of meeting - Thursday, September 19, 1991 (439)*
   A. Note: these observations were written on September 26, 1991 (444)
II. *T. B. Simon Power Plant Unit 4 Addition notes*
III. *By Ralph J. Stephenson P. E.*
IV. *Location - MSU Power Plant conference room*
V. *Those attending - some in meeting part time only*
   A. Robert Dowding (rdo) - MSU contracts & grants
   B. Joe Kavanagh (jka) - MSU project manager
   C. Bob Ellerhorst (rel) - MSU director of utilities
   D. Dick Wever - MSU construction superintendent
   E. Jim Simons - MSU project representative
   F. Doug MacDonald (dma) - MSU design coordinator
   G. Bruce Van Heest (bvh) - Black & Veatch project engineer - civil & structural
   H. Gerald Hersh (ghe) - Tampella director of projects
   I. Dean Ely (del) - Tampella project manager
   J. Harry J. Markwick P. E. (hma) - Tampella project engineer
   K. James Kramer (jka) - Tampella project superintendent
   L. Ralph J. Stephenson - consultant
VI. *Agenda*
   A. Review current field work status of project
   B. Inspect project with Tampella Power staff
   C. Discuss assignment of contract conditions with Tampella Power
   D. Discuss interaction of other contractors with Tampell Power
   E. Prepare summary network model of steam generator erection
   F. Review B & V milestone dates
   G. Review lay down requirements for Tampella Power
   H. Review selection of general project manager, architectural and mechanical contractors
VII. *Supplemental documents used in preparing summary network of total project*
   A. Almet - Proposed bar chart for structural steel erection - 06/25/91 (338)
   B. B&V - Project summary bar chart - 07/01/91 (383)
   C. B&V - Project schedule printout - 07/29/91 (402)
   D. Tampella - Erection schedule for steam generator - 08/09/91 (411)
   E. Contract date lists abstracted from contracts by jsi & rjs - 08/15/91 (415)
   F. Tampella - MSU Erection master schedule - 09/17/91 (437)
VIII. *General observations re steam generator erection*
   A. In general Tampella desires erection time of the steam generator be about 10 months from start of steam drum to hydor test
      1. Start steam drum work - late March, 1992
      2. Complete hydo test - early January, 1993
   B. May not be able to totally meet this desired 10 month date framework
   C. Careful planning is needed to understand how each element fits the total plan best
   D. Considerable ground fabrication needed by Tampella. Might include:
      1. Cyclones
      2. Side wall panels
      3. Front wall panels
      4. Rear wall panels
      5. Sand bin
      6. Division walls
      7. Cyclone outlet manifold
      8. Air heater hoppers

9. Secondary air duct
10. Primary air duct
11. Economizer inlet and outlet breeching
12. Superheater enclosure walls

IX. Network modeling

A. Completed preparing network model sheet #BL1, issue #1, dated September 19, 1991 (439)
B. Those receiving copies of sheet #BL1, issue #1
   1. MSU staff
   2. Black & Veatch
   3. Sent to Tampella by fax
C. MSU, Tampella and Black & Veatch will review network for meeting of October 9, 1991 (453)
D. Networks will be knit together to product master summary and detailed network models

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October 26, 1991

Subject:	Monitoring Report #10
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265 & 281
Dates of monitoring:	Thursday, October 9, 1991 (wd 453) Monday, October 21, 1991 (wd 461)
Meeting locations:	Job site at Power Plant #4 & Physical Plant conference room, East Lansing, Michigan

Monitored from:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #5, dated September 3, 1991 (wd 427)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #6, dated October 9, 1991 (wd 453)
- Milestone date matrix
- Almet's proposed steel erection schedule of 06/25/91 (wd 379).
- MSU & rjs summary network model of project dated 09/13/91 (wd 435)

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- June 10, 1991 (wd 368) - Site work and foundation contractor moved on job
- July 26, 1991 (wd 401) - MSU Board approved award of structural steel contract to Almet - package 61.4001
- August 9, 1991 (wd 412) - Package 72.0200, General Architectural and Mechanical Construction issued for construction proposals
- October 11, 1991 (wd 456) - Contract 72.0200, MSU Board approved award of General Architectural and Mechanical Construction to joint venture of Alberici/Clark
- November 15, 1991 pm (wd 481) - Site grading to be complete
- December 31, 1991 pm (wd 511) - Power plant foundations to be complete

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October 26, 1991

- December 31, 1991 pm (wd 511) - Site service to be complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation to be complete
- January, 1994 - Total project complete - to be confirmed

MSU Board of Trustees meeting dates:

- Friday, December 6, 1991 (wd 494)

Those attending: (Some in meeting part time only)

Thursday, October 9, 1991 (wd 453) am

- Robert Nestle - MSU engineer
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Thursday, October 9, 1991 (wd 453) pm

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Phil Crockett - president, Design & Build - foundation and site work contractor
- Ralph J. Stephenson - consultant

Monday, October 21, 1991 (wd 461) am

- Robert Nestle - MSU engineer
- Robert Dowding - MSU contracts and grants
- Joe Kavanagh - MSU project manager
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Monday, October 21, 1991 (wd 461) pm

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Actions taken:

Wednesday, October 9, 1991 (wd 453)

- Reviewed milestone date information
- Continued general project manager work scope discussions
- Inspected and monitored site and foundation work
- Updated site and foundation work network model to Sheet #1, issue #6, dated October 9, 1991 (wd 453)

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October 26, 1991

• Updated steam generator installation network model to Sheet #BL1, issue #2, dated October 9, 1991 (wd 453)

Monday, October 21, 1991 (wd 461)

• Discussed assignment of contracts
• Discussed interim milestone date structure
• Reviewed lay down area designations
• Set basic format for MSU Power Plant #4 addition briefing manual
• Prepared rough draft of MSU Power Plant #4 addition briefing manual
• Briefly inspected work progress under site and foundation contract

General summary:

Thursday, October 9, 1991 (wd 453)

The main thrust of the morning meeting was to again review the interim or milestone date structure as specified in the various prime contracts, and to discuss the significance of these to the prime contractors, the University and the general project manager. The basic tabulation used in the review was the data listing of August 15, 1991 (wd 415), in which the milestone dates from the various contracts had been tabulated by contract package and date. It was noted that some changes had been made to the information as later contract packages were issued and contractors selected.

Mr. Simon and I also inspected the project and the construction work in progress under the Site and Foundation Contract 71.0402. In general it was noted that the project lagged early starts and finishes in the issue #5 network model, dated September 3, 1991 (wd 427) by from 2 to 13 working days. The major lag of concern is at the turbine foundation. Here the entire turbine base was due to have been completed by October 14, 1991 (wd 456). The early completion was primarily to keep concrete work from extending too far into potentially inclement weather. As such the lags are not so critical to meeting contract obligations as they are to permitting effective field operations.

There is a lag of about 10 to 13 working days at the ash pit. This work has some direct impacts on certain slabs on grade and should be expedited. Building wall footings and foundation walls lag from 7 to 13 working days. This lag is relatively serious since construction of perimeter foundations directly impacts upon construction of the slab on grade.

As a result of the project inspection it was felt that the site and foundation network should be updated to issue #6, dated October 9, 1991 (wd 453). This was done in conjunction with Mr. Crockett. The resulting network model was distributed by Mr. Simons to those concerned.

Mr. Simons had received Tampella's comments on the preliminary network model for boiler erection, prepared in conjunction with Tampella at our meeting on September 19, 1991 (wd 439). We updated the issue #1 network, Sheet BL1, dated September 19, 1991 (wd 439) to issue #2, dated October 9, 1991 (wd 453). Mr. Simons distributed this network model to those involved.

Monday, October 21, 1991 (wd 461)

The prime purpose of this meeting was to discuss contract assignment, interim date structures and lay

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October 26, 1991

62.0212 - Distributed control work - Bailey Controls Company

Status of contract document packages:

• Structural steel - package 61.4001

Contract awarded. Need additional data on erection of structural steel and grating to better integrate with steam generator package work

• Distributed control system - package 64.0212

Not awarded as yet.

Installation of distributed control system components is to be by the electrical construction contractor, package 73.0200.

• Architectural / mechanical (gpm) - package 71.0200

Award of contract to Alberici/Clark approved at Board meeting on October 11, 1991 (wd 455).

• Electrical construction - package 73.0200

No current information available on the status of this package work. Electrical construction work will be bid in January, 1992 and will go to the MSU Board of Trustees for award in February, 1992.

• Electrical configuration package - no number assigned as yet.

This work will be awarded by purchase order by the project staff and a portion of the work is to be completed over the 1991 Christmas holiday recess.

• Electrical equipment - package 63.0000 - no monitoring network prepared as yet.

Not discussed in detail at this session. This contract will be assigned to the electrical construction contractor, package 73.0200.

General:

I shall be in touch with Mr. Simons shortly to set a date and an agenda for our next meeting.

	package #	package name	item	date	wkg day	remarks	oen
1	61.4001	Structural steel	Complete steel erection - boiler room to support boiler erection (pm)	3/23/92	569		32
2	61.4001	Structural steel	Complete all work - structural steel (pm)	7/1/92	640		33
3	62.0203	Fabric filter	Start delivery of equipment (am)	6/1/92	617		21
4	62.0203	Fabric filter	Clear gas paths (pm)	5/3/93	853		22
5	62.0203	Fabric filter	Complete start up (pm)	7/23/93	910		23
6	62.0203	Fabric filter	Initial operation (am)	8/2/93	916		24
7	62.0203	Fabric filter	Commercial operation (am)	9/7/93	940		25
8	62.0601	Cooling tower	Complete setting cooling tower on foundations (pm)	8/14/92	671		26
9	62.0601	Cooling tower	Complete fan alignments (pm)	8/21/92	676		27
10	62.0601	Cooling tower	Complete operational/functional verification (pm)	8/28/92	681		28
11	62.0601	Cooling tower	Initial operation of cooling tower (am)	3/1/93	807		29
12	62.0601	Cooling tower	Commercial operation (am)	9/7/93	940		30
13	62.1001	Turbine generator	Complete setting of turbine generator foundations (pm)	10/30/92	725		14
14	62.1001	Turbine generator	Complete lube oil & control oil system flushes (pm)	1/29/93	787		15
15	62.1001	Turbine generator	Complete turbine generator alignments (pm)	3/5/93	812		16
16	62.1001	Turbine generator	Complete controls interface verification (pm)	4/30/93	852		17
17	62.1001	Turbine generator	Complete balancing & controls system operational/functional verification (pm)	7/23/93	910		18
18	62.1001	Turbine generator	Initial operation of unit (am)	8/2/93	916		19
19	62.1001	Turbine generator	Commercial operation of unit (am)	9/7/93	940		20
20	62.3401	Circulating Fluidized Bed System Generator	Complete steam drum lift (pm)	3/30/92	574		1
21	62.3401	Circulating Fluidized Bed System Generator	Complete support steel (pm)	5/4/92	599		2
22	62.3401	Circulating Fluidized Bed System Generator	Complete steam outlet headers (pm)	11/30/92	745		3
23	62.3401	Circulating Fluidized Bed System Generator	Complete air heater erection (pm)	1/4/93	768		4
24	62.3401	Circulating Fluidized Bed System Generator	Release economizer area (am)	1/4/93	768		5
25	62.3401	Circulating Fluidized Bed System Generator	Release bottom ash area (am)	3/1/93	807		6
26	62.3401	Circulating Fluidized Bed System Generator	Complete furnace & convection pass hydrostatic testing (pm)	3/22/93	823		7
27	62.3401	Circulating Fluidized Bed System Generator	Complete air test (pm)	4/5/93	833		8

	package #	package name	item	date	wkg day	remarks	oen
28	62.3401	Circulating Fluidized Bed System Generator	Complete chemical cleaning (pm)	4/5/93	833		9
29	62.3401	Circulating Fluidized Bed System Generator	First firing of steam generator (am)	5/3/93	852		10
30	62.3401	Circulating Fluidized Bed System Generator	Operation of steam generator for steam line blowout (pm)	6/1/93	873		11
31	62.3401	Circulating Fluidized Bed System Generator	Initial operation of unit (pm)	8/2/93	916		12
32	62.3401	Circulating Fluidized Bed System Generator	Commercial operation of unit (am)	9/7/93	940		13
33	71.0402	Site & foundation	Latest mobilization date (am)	6/20/91	376		34
34	71.0402	Site & foundation	Site grading complete (pm)	11/15/91	481		35
35	71.0402	Site & foundation	Power house & associated foundations complete (pm)	12/31/91	511		36
36	71.0402	Site & foundation	Turbine foundation complete (pm)	12/31/91	511		37
37	71.0402	Site & foundation	Site service complete (pm)	12/31/91	511		38
38	71.0402	Site & foundation	Cooling tower foundation complete (pm)	4/3/92	578		39
39	72.0200	General architectural / mechanical construction	Installation of Owner - furnished steam and feedwater tie-in valves			date as determined by Owner	46
40	72.0200	General architectural / mechanical construction	Completion of condensate, steam, and other tie-ins to existing plant			date as determined by Owner	47
41	72.0200	General architectural / mechanical construction	Award of contract	10/11/91	455		40
42	72.0200	General architectural / mechanical construction	Latest mobilization date	12/18/91	502		42
43	72.0200	General architectural / mechanical construction	Delivery of both deareator heaters and tanks	3/30/92	554		43
44	72.0200	General architectural / mechanical construction	Delivery of ash system separtor/filter	3/30/92	554		44
45	72.0200	General architectural / mechanical construction	Delivery of CCCW head tank	3/30/92	554		45
46	72.0200	General architectural / mechanical construction	Completion of deareators lift and set	4/20/92	589		48
47	72.0200	General architectural / mechanical construction	Finish setting CCCW head tank	4/20/92	589		49
48	72.0200	General architectural / mechanical construction	Completion of ash separator lift and set	4/24/92	592		50
49	72.0200	General architectural / mechanical construction	Completion of Owner - furnished steam tempering coils lift and set	4/24/92	592		51
50	72.0200	General architectural / mechanical construction	Coal handling mod - to be installed between am 5/1/92 (597) & pm 9/30/92 (703) - start	5/1/92	597		69
51	72.0200	General architectural / mechanical construction	Install new fire protection in coal conveyor gallery - between 5/1/92 & 9/30/92 - start	5/1/92	597	can be installed between 5/1/93 (852) & 9/30/93 (958)	71
52	72.0200	General architectural / mechanical construction	Delivery of cooling tower acid storage tank	6/1/92	617		52
53	72.0200	General architectural / mechanical construction	Delivery of condenser	6/15/92	627		53
54	72.0200	General architectural / mechanical construction	Finish setting of acid storage tank	6/15/92	628		54

	package #	package name	item	date	wkg day	remarks	oen
55	72.0200	General architectural / mechanical construction	Finish setting condenser	6/29/92	638		55
56	72.0200	General architectural / mechanical construction	Finish setting station air compressors	6/30/92	639		56
57	72.0200	General architectural / mechanical construction	Complete construction of Circulating Water Chemical / Electrical Building	9/14/92	691		57
58	72.0200	General architectural / mechanical construction	Coal handling mod - to be installed between am 5/1/92 (597) & pm 9/30/92 (703) - comp	9/30/92	703		70
59	72.0200	General architectural / mechanical construction	Install new fire protection in coal conveyor gallery - between 5/1/92 & 9/30/92 - comp	9/30/92	703	can be installed between 5/1/93 (852) & 9/30/93 (958)	71
60	72.0200	General architectural / mechanical construction	Substantially complete building envelop (pm)	12/31/92	767		68
61	72.0200	General architectural / mechanical construction	Complete air supply systems start-up	3/1/93	808		60
62	72.0200	General architectural / mechanical construction	Complete CCCW systems start up	3/1/93	808		61
63	72.0200	General architectural / mechanical construction	Complete fire protection system commissioning	3/1/93	808		62
64	72.0200	General architectural / mechanical construction	Preboiler systems chemical cleaning	4/5/93	832		63
65	72.0200	General architectural / mechanical construction	Install new fire protection in coal conveyor gallery - between 5/1/93 & 9/30/93 - start	5/1/93	852	can be installed between 5/1/92 (597) & 9/30/92 (703)	72
66	72.0200	General architectural / mechanical construction	Steam blow	6/1/93	872		64
67	72.0200	General architectural / mechanical construction	Initial operation of unit	8/2/93	915		65
68	72.0200	General architectural / mechanical construction	Complete final site grading	9/7/93	941		58
69	72.0200	General architectural / mechanical construction	Complete site paving	9/7/93	941		59
70	72.0200	General architectural / mechanical construction	Commercial operation of unit	9/7/93	940		66
71	72.0200	General architectural / mechanical construction	Install new fire protection in coal conveyor gallery - between 5/1/93 & 9/30/93 - comp	9/30/93	958	can be installed between 5/1/92 (597) & 9/30/92 (703)	73
72	72.0200	General architectural / mechanical construction	Capability and performance testing	11/2/93	981		67

8:56:40 AM - Wednesday, October 9, 1991

I. *T. B. Simon Power Plant Unit 4 Addition notes*
II. *By Ralph J. Stephenson*
III. *Meeting date - Wednesday, October 9, 1991*
IV. *Location - MSU Power Plant field office*
V. *Those attending - some in meeting part time only*
   A. *Jim Simons - MSU project representative*
   B. *Dick Wever - MSU construction superintendent*
   C. *Ralph J. Stephenson - consultant*
VI. *Agenda*
   A. *Update steam generator summary network*
   B. *Prepare steel erection network model & integrate with TPC plan of work*
   C. *Continue preparing total project summary network*
   D. *Inspect & monitor project*
   E. *Update foundation and site network as required*
   F. *Prepare outline of work to be done with general project manager*
   G. *Review general approach to measurement of project against milestone dates*
   H. *Review documentation process and begin implementing documentation system*
   I. *Discuss distribution of monitoring reports*
VII. *General*
   A. *Organizational discussion of decision making*
      1. Board of Trustees
         President
            VP of administration
            VP of business
               VP physical plant
                  Director of maintenance
                  Director of construction
                  Director of design
                  Manager power plant operations
            Other VP's

1:40:36 PM - Monday, October 21, 1991

I. T. B. Simon Power Plant Unit 4 Addition notes
II. By Ralph J. Stephenson
III. Meeting date - Monday, October 21, 1991
IV. Location - MSU Physical Plant office & MSU Power Plant field office
V. Those attending
A. AM meetings
1. Robert Nestle - University engineer
2. Robert Dowding - MSU contracts officer
3. Joe Kavanagh - MSU project manager
4. Jim Simons - MSU project representative
5. Dick Wever - MSU construction superintendent
6. Ralph J. Stephenson - consultant
B. PM meetings
1. Dick Wever - MSU construction superintendent
2. Jim Simons - MSU project representative
3. Ralph J. Stephenson - consultant
VI. Agenda
A. AM
1. Discuss assignment of contracts
2. Discuss interim date structure
3. Review lay down area designations
4. Decide on how to convey contract data to General Project Manager (gpm)
B. PM
1. Prepare briefing manual for General Project Manager
VII. MSU Power Plant #4 addition briefing manual
A. Table of contents - checks indicate item put in briefing manuals
1. √Milestone dates
2. √Design data and schedules
3. √Covered in the 17 point discussion below under assignment of the various contracts indicated
a) √Planning and scheduling project work
Design
Fabrication
Installation and erection
b) √Contracts awarded to date
c) √Contracts to be awarded
d) √Management scope of work included in contracts
e) √Fabrication data and schedules
f) √Tracking project work
Design
Fabrication
Installation & erection
g) √Processing payments
h) √Processing submittals
i) √Processing revisions
4. √Installation & erection data and schedules
B. Briefing Manual
1. Contracts awarded to date
a) 62.3401 - Steam generator - furnish & erect
Awarded to Tampella Keeler - March 11, 1991 (wd 304)

b) 62.1001 - Turbine generator - furnish & erect
Awarded to General Electric - March 1, 1991 (wd 298)
c) 62.0601 - Cooling tower - furnish & erect
Awarded to Thermal Dynamic Towers, Inc. - April 10, 1991 (wd 326)
d) 62.0203 - Fabric filter
Awarded to Environmental Elements Corporation - March 19, 1991 (wd 310)
e) 64.0212 - Distributed controls
Awarded to Bailey Controls Company - March 14, 1991 (wd 307)
f) 71.0402 - Site work & concrete foundations
Approved for award to Design & Build of Lansing, Inc. - June 7, 1991 (wd 368)
g) 61.4001 - Structural steel
Approved for award to Almet, Inc. - July 26, 1991 (wd 401)
h) 72.0200 - General Project Management
Approvd for award to joint venture of Alberici/Clark on October 11, 1991 (wd 456)
Includes
Architectural and building enclosure - formerly 71.0403
Mechanical construction - formerly 72.0200

2. *Contracts to be awarded*
a) 73.0200 - Electrical construction - to be bid in January, 1992 & approved at the February, 1992 Board meeting
To be assigned to General Project Manager (72.2000)
b) 63.0000 - Electrical equipment - bids received October 7, 1991 (wd 451)
Apparent low bidder - ?
Installation of electrical equipment to be assigned to electrical construction contractor (73.0200)

3. *Scope of General Project Manager's (gpm) work included in contracts*
From page 1A-4 & 5 - General Construction - 72.0200 - original specifications

Project Management Requirements.- The Contractor and his subcontractors shall actively participate in and adhere to the Owner's project management requirements, job rules and conduct, fire protection and safety procedures, and all other procedures initiated by the Owner for the purpose of maintaining jobsite administrative control. The Contractor and his subcontractors shall attend project management meetings or other meetings as deemed necessary by the Owner.

The Contractor shall have six other Owner contracts assigned as subcontracts for the purpose of project management, site coordination, and administration as specified herein.

The Contractor shall coordinate all subcontract work, monitor all activities, process all Bulletins, Change Orders, process all Applications for Payment, and interface all assigned subcontractors with the Owner. (sic).

For purposes of clarification, Project Management on this job shall include, but not necessarily be limited to the following minimum activities / responsibilities.

a. Acceptance of assignment of the various contracts for this project as determined by the Owner.

b. Coordination & assignment of all laydown and storage space.

c. Coordination & scheduling all project related site activities.

d. Coordination, planning, & assisting the Owner's planning consultant with CPM scheduling of all project related construction activities.

e. Arbitration & resolution between Contractor, Subcontractors and all assignees of all site & construction disputes.

f. Timely and accurate processing of all bulletins, change orders, field orders, and payment requests for Contractor, Subcontractors, and all assignees.

g. Attendance at and coordination of all weekly or special project progress meetings with the Owner.

h. Monthly updates of all Owner CPM schedules using input from all parties.

i. Coordination of all site services.

j. Assist Owner's Project Representative in inspection of the Work to guard against defects and deficiencies.

<u>As clarified in addendum #1 - page 8</u>

- Accept assignment of the various contracts indicated.

- Monitor work of subcontractors and coordinate the work with activities and responsibilities of the Owner and the A & E.

- Coordinate, plan, and schedule all construction activities, and exercise control of the construction site.

- Assist Owner's CPM network planning consultant to develop and maintain project schedule.

- Assist Owner's Project Representative in inspection of the work to guard against defects and deficiencies.

- Arbitrate and resolve all site and construction disputes.

- Field inventory and inspection of all material received from suppliers and notify the Owner and subcontractors of any deficiencies.

- Implement timely and accurate program for processing shop drawings, bulletins, change orders, field orders, and payment requests.

4. Assignment of the various contracts indicated

The acceptance of assignment of design, furnish & install (dfi) contracts means that the General Project Manager will accept the Owner's instructions as to the gmp's scope of work for erection of the designed and furnished materials and equipment.

It is assumed by the Owner that all site fabrication is part of the installation and erection process, and as such is under the management of the General Project Manager, in conjunction with each dfi installation and erection supervisor.

The General Project Manager will be responsible for directing the dfi contractor's forces in the following activities from the time the dfi contractor moves on the project site or when dfi materials and equipment arrive on the project site, whichever is earlier.

01.) Plan all laydown and storage space.

02.) Make all space assignments to the dfi contractors

03.) Prepare an inventory of all dfi material and equipment as it arrives at the job site

04.) Insure that proper protection and insurance coverage is provided for all dfi materials and equipment by dfi contractor.

05.) Regularly inform Ower's representative of the current inventory location, amount, expected draw down from stock, protection status and insurance status of all dfi site stored materials & equipment.

06.) Participate in and mutually agree with the Owner, the dfi contractor, and the Owner's planning consultant on a clearly defined procedure for preparing and issuing network models and schedules for all dfi installation and erection activities.

07.) Plan and schedule all dfi project related installation and erection activities in conjuction with the dfi contractor and the Owner's planning consultant.

08.) Participate in and mutually agree with the Owner, the dfi contractor and the Owner's planning consultant on a clearly defined measuring and monitoring procedure for evaluating current project status on a regular basis.

09.) In conjunction with the Owner, the dfi contractor and the Owner's planning consultant, monitor project status and measure against the current network model and schedule on a regular basis.

10.) Participate in and mutually agree with the Owner, the dfi contractor and the Owner's planning consultant on a clearly defined network model and schedule updating procedures to be accomplished with all affected parties.

11.) Identify, arbitrate, and resolve installation and erection disputes between

all dfi contractors, dfi subcontractors, and General Project Manager subcontractors.

12.) Act as the Owner's limited agent in effectively processing all erection and installation bulletins, change orders, field orders, and payment requests from dfi contractors. The procedures and limitations for processing are to be established in conjunction with the Owner's Representative to the mutual satisfaction of the General Project Manager and the Owner's Representative.

13.) Attend, conduct and prepare the official minutes of all weekly and special project progress meetings with the dfi contractors, the Owner, and the Architect and Engineer.

14.) Provide all services required to maintain the construction site so as to be fully accessible and usable by the Owner and all contractors. Details of this requirement are to be mutually agreed upon between the Owner and the General Project Manager.

15.) Develop a project construction quality control program to effectively protect the Owner from defects and deficiencies in the work. Such program shall be subject to the Owner's review and approval.

16.) Act as the Owner's limited agent in effectively processing all submittals including shop drawings, samples and mock ups among others. The procedures and limitations for processing are to be established in conjunction with the Owner's Representative to the mutual satisfaction of the General Project Manager and the Owner's Representative.

5. ***Milestone dates***
   a) Provide the gpm with MSU power plant addition #4 contract dates data matrix
   b) Jim Simons to verify final matrix data with contract dates
   c) To be attached to briefing manual
6. ***Design data & schedules***
   a) Included in Black & Veatch design and engineering schedules
   b) To be attached to briefing manual
7. ***List of network models & translations issued on project as of 10/21/91 (wd 461)***
   a) Summary network models
      Current networks
         Sheet #sm2 - Issue #5, dated 09/05/91 (429)
   b) Bulletin - change order processing network
      Current networks
         Sheet #cor 1 - Issue #3, dated 05/08/91 (346)
      Superseded networks
         Sheet #cor 1 - Issue #1, dated 04/23/91 (335)
            Superseded by issue #2
         Sheet #cor 1 - Issue #2, dated 05/06/91 (344)
            Superseded by issue #3
   c) Contract award networks
      Template
         Sheet #P1F - Issue #1, dated 03/12/91 (305)

Superseded by issue #2
Sheet #P1F - Issue #2, dated 03/15/91 (308)
Superseded by individual award networks
Multiple contract award networks
Current networks
Sheets #sscal 1, abcal 1, mcal1, elcal 1, eccal 1 - Issue # 2, dated May 22, 1991 (356)
Translations issued
Data tabulations
In es, ef sequence
By package in es, ef sequence
In ls, lf sequence
In lf, ls sequence
Bar chart by weekly increments

d) Contract 71.0402 - Site & foundation work networks
Current networks
Sheet #1 - Issue #5, dated 09/3/91 (415)
Superseded networks
Sheet #Asm1 - Issue #1, dated 04/02/91 (320) - scenario A
Superseded by sheet #1, issue #1 & by multiple contract award networks
Sheet #Bsm1 - Issue #1, dated 04/02/91 (320) - scenario B
Superseded by sheet #1, issue #1 & by multiple contract award networks
Sheet #Csm1 - Issue #1, dated 04/02/91 (320) - scenario C
Superseded by sheet #1, issue #1 & by multiple contract award networks
Sheet #1 - Issue #1, dated 05/23/91 (357)
Superseded by Issue #2
Sheet #1 - Issue #2, dated 06/07/92 (367)
Superseded by Issue #3
Sheet #1 - Issue #3, dated 07/12/91 (391)
Translations issued
Data tabulation in es, ef sequence
Bar chart by weekly increments
Superseded by Issue #4
Sheet #1 - Issue #4, dated 08/12/91 (412)
Translations issued
Day time scale bar chart

e) Contract 61.4001 - Structural steel network
Current networks
Included in multiple contract award networks listed above
Superseded networks
Sheet #sscal - Issue #1 dated 04/23/91 (325)
Superseded by multiple network sheet sscal 1, abcal 1, mdal 1, elcal 1 & eccal

f) Contract 62.3401 - Steam Generator network
Current networks
Sheet BL1 - issue #2 dated October 9, 1991 (wd 453)
Superseded network

1:40:36 PM - Monday, October 21, 1991

Sheet BL1 - issue #1 dated September 19, 1991 (wd 439)

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
November 18, 1991

Subject:	Monitoring Report #11
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265 & 281
Dates of monitoring:	Wednesday, November 6, 1991 (wd 473) Wednesday, November 11, 1991 (wd 476)
Meeting locations:	Job site office at Power Plant #4

Monitored from:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #6, dated October 9, 1991 (wd 453)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #7, dated November 6, 1991 (wd 473)
- Milestone date matrix
- MSU & rjs summary network model of project dated 09/13/91 (wd 435)

Key dates:

- June 7, 1991 (wd 367) - MSU Board approved award of site work & foundation work
- November 15, 1991 pm (wd 481) - Site grading to be complete
- December 31, 1991 pm (wd 511) - Power plant foundations to be complete
- December 31, 1991 pm (wd 511) - Site service to be complete
- April 3, 1992 pm (wd 578) - Cooling tower foundation to be complete
- January, 1994 - Total project complete - to be confirmed

Note: For other key dates prior to November 15, 1991 (wd 481) see previous reports.

MSU Board of Trustees meeting dates:

- Friday, December 6, 1991 (wd 494)

Ralph J. Stephenson PE PC
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ph 517 772 2537
November 18, 1991

Those attending: (Some in meetings part time only)

Wednesday, November 6, 1991 (wd 473) am

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Phil Crockett - Design & Build Construction - owner
- Ralph J. Stephenson - consultant

Wednesday, November 6, 1991 (wd 473) pm

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- John Wieland - Principal in charge - Alberici/Clark
- Jim Cornillie - Project director - Alberici/Clark
- John Hacul - Project manager - Alberici/Clark
- Dave Sadler - Project director - Alberici/Clark
- Dave Monroe - Project superintendent - Alberici/Clark
- Steve Hughes - Project manager - IMC Mechanical
- Ralph J. Stephenson - consultant

Monday, November 11, 1991 (wd 476)

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Rick Johnson - Electrical engineer - MSU Power Plant
- Peter Skornia - Student employee - MSU
- Dave Sanger - Student employee - MSU field office
- Ralph J. Stephenson - consultant

Actions taken:

Wednesday, November 6, 1991 (wd 473)

- Monitored foundation and site work
- Updated foundation and site work network model
- Met with Alberici/Clark to review project work - items discussed included
  - Briefing manual
  - Planning and scheduling procedures
  - Construction site planning
  - Meetings with primes to plan and schedule project work
- Reviewed issue date of electrical construction package (73.0200)
- Reviewed proposed documentation system

Monday, November 11, 1991 (wd 476)

- Reviewed documentation concepts with MSU project team

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
November 18, 1991

• Prepared document control system sample

General summary:

A. M. - Wednesday, November 6, 1991 (wd 473)

Mr. Simon and I reviewed the current status of the site and foundation project with Mr. Crockett of Design & Build. We prepared a monitored network showing the status as of November 6, 1991 (wd 473). As of that date the project lagged at the urea containment area, the turbine foundation, and the perimeter foundation walls of the power plant addition. However at each of these areas it was felt that the work could be completed by the contract date for 71.0402 of December 31, 1991 (wd 511).

To confirm this we updated the sheet #1 network model for site and foundation work to issue #7, dated November 6, 1991 (wd 473). This plan of work shows the latest item to be completed is the power plant slab on grade work by the pm of December 24, 1991 (wd 507).

It is still the intent to deliver the HRC 30" and the 12" WWC site piping materials to the project on November 12, 1991 (wd 477). These are critical delivery dates since they affect work on the power plant slab on grade.

The updated network model was printed and given to Mr. Simons for distribution to the contractor.

P. M. - Wednesday, November 6, 1991 (wd 473)

The MSU project staff met with the project representatives of Alberici/Clark (A/C) to discuss the project briefing manual. We reviewed this manual in detail and covered each of the points relative to assignment conditions to the General Project Manager.

Alberici/Clark intends to make use of the Primavera planning and scheduling program and will have a computer terminal on the site to help expedite their work. They feel they can convert the current network models and others to be prepared in the future to a satisfactory format. This format will be discussed in greater detail as they assume their project duties.

The network modeling approach desired by the General Project Manager is to work from a large scale (macro) milestone network down into the detailed actions to be taken within each milestone (micro).

Details of the methods of planning, monitoring and updating will be discussed and established at subsequent meetings.

We reviewed the site planning for storage, fabrication and layout use. Alberici/ Clark will determine the site needs of all prime contractors and prepare a plan for the review of the MSU project staff. As part of this review MSU mentioned that to be considered for payment, stored materials must be on MSU property and properly stored and protected.

Several administrative matters were also discussed at the session including provision of to-be-assigned prime contract copies to Alberici/Clark, insurance coverage, submittal approval procedures, and the positions and duties of the MSU and Alberici/Clark project staff members.

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
November 18, 1991

A brief discussion was held of the need to issue the electrical construction package so it could be approved for construction award at the February, 1992 MSU Board of Trustees meeting.

Monday, November 11, 1991 (wd 476)

This meeting was basically to establish a firm documentation direction for MSU in the recording and use of day to day job documentation. Mr. Rick Johnson, Mr. Peter Skornia, and Mr. David Sanger will be responsible for setting and maintaining the documentation system.

Current activities will concentrate on assigning a document number to each document as it is received or sent, to or from, the MSU field office. This number will allow a roughly chronological file to be built. The individual documents will then be identified by several fields. The information will then be entered in a data base program for ease of reference and location. The level of documentation will initially be kept relatively simple. However as the need for additional detail arises, it can be added to the basic data configuration.

We actually prepared a sample system of a portion of one month's collection of documents. This material is to be entered in a data base program to be selected by the project field team.

I shall plan to review the document system regularly with Mr. Simons and the others as it is built and put into use in the field.

Status of contract document packages:

- Structural steel - package 61.4001

Contract awarded. Still require additional erection data on structural steel and grating to better integrate with steam generator package work. MSU staff and Alberici/Clark to meet to discuss this with Tampella Power in near future.

- Distributed control system - package 64.0212

Not discussed at these meetings. Installation of distributed control system components is to be by the electrical construction contractor, package 73.0200.

- Electrical construction - package 73.0200

Electrical construction work will be bid in January, 1992 and will go to the MSU Board of Trustees for award in February, 1992.

- Electrical configuration package - no number assigned as yet.

This work will be awarded by purchase order by the project staff and a portion of the work is to be completed over the 1991 Christmas holiday recess.

- Electrical equipment - package 63.0000

Not discussed in detail at this session. This contract will be assigned to the electrical construction

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Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
November 18, 1991

contractor, package 73.0200.

General:

Meeting notes prepared for each of the sessions are attached to this report for reference. I shall be in touch with Mr. Simons shortly to set a date and an agenda for our next meeting.

Ralph J. Stephenson P. E.

10:49:07 AM - Wednesday, November 6, 1991 (473)

I. T. B. Simon Power Plant Unit 4 Addition notes
II. By Ralph J. Stephenson
III. Meeting date - Wednesday, November 6, 1991 (473)
A. Notes edited and added to 11/18/91 (481)
IV. Location - MSU Power Plant field office
V. Those attending
A. AM meetings - some in meeting part time
1. Jim Simons - MSU project representative
2. Dick Wever - MSU construction superintendent
3. Phil Crockett - Design & Build - president
4. Ralph J. Stephenson - consultant
B. PM meetings - some in meeting part time
1. Dick Wever - MSU construction superintendent
2. Jim Simons - MSU project representative
3. John Wieland - Principal in charge - Alberici/Clark
4. Jim Cornillie - Project director - A/C
5. John Hucul - Project manager - A/C
6. Dave Sadler - Project director - A/C
7. Dave Monroe - Project superintendent - A/C
8. Steve Hughes - Project manager - IMC Mechanical
9. Ralph J. Stephenson - Consultant
VI. Agenda (check means item discussed in meeting)
A. √Monitor foundation and site work plan of work
B. √Update foundation and site work plan of work to issue #7
C. √Review briefing manual contents
D. √Review and begin laying ground work for documentation system
E. √Review late issue of electrical construction package
F. √Identify impact of the late issue of the electrical construction package
G. √Discuss planning & scheduling with Alberici/Clark
1. Networks issued to date
2. Methodology of planning
3. Methodology of scheduling
4. Process of issuing plans & schedules
5. Preparation of a construction site plan
6. Set dates for planning & scheduling meetings
a) Steam generator - Tampella Keeler
b) Turbine generator - General Electrical
c) Cooling tower - Thermal Dynamic Towers, Inc
d) Fabric filter - Environmental Elements
e) Distributed controls - Bailey Controls Company
f) Structural steel - Almet, Inc.
g) Electrical construction - to be awarded on ?
h) Electrical equipment - to be awarded on ? - to be assigned to electrical construction
Who administers this contract in the period between its award & award of the electrical construction contract
Friday, 11/08/91 (475) is deadline for award to meet equipment delivery dates
VII. Discussion notes
A. AM - monitoring and updating
1. Reviewed current status of project with Jim Simons of MSU
2. Reviewed current status of project with Phil Crockett of D&B

3. *Current status*
   a) Site piping
      30" and fire protection piping delivery to be held at 11/12/91 (477)
   b) Turbine foundation
      Upper platform poured out - now curing
   c) Ash pit
      Walls poured, stripped, waterproofed and backfilled
   d) PP#4 - perimeter foundation beams
      Some have been poured, considerable work yet to be done
   e) Urea contaninment area
      Containment area walls have been poured
   f) Current lag = ± 11 to 15 working days
4. ***Updated network model sheet #1 to issue #7, dated 11/06/91 (473)***
   a) Completion date of latest task - sog at PP4 at 30" line is pm 12/24/91 (507)

B. PM - discussions with A/C general project manager

1. *Specific agenda with A/C*
   a) Networks issued to date
   b) Methodology of planning
   c) Methodology of scheduling
   d) Process of issuing plans & schedules
   e) Preparation of a construction site plan
   f) Set dates for planning & scheduling meetings with assigned contractors
      Steam generator - Tampella Power
      Turbine generator - General Electric
      Cooling tower - Thermal Dynamic Towers, Inc
      Fabric filter - Environmental Elements
      Distributed controls - Bailey Controls Company
      Structural steel - Almet, Inc.
      Electrical construction - to be awarded on ?
      Electrical equipment - to be awarded on ? - to be assigned to electrical construction
         Who administers this contract in the period between its award & award of the electrical construction contract
         Friday, 11/08/91 (475) is deadline for award to meet equipment delivery dates
   g) Briefing manual
2. *Summary of meeting*
   a) Briefing manual
      Reviewed contracts awarded to date & contracts to be awarded
      Discussed each point covered in the assignment portion
         A/C generally agreed with the material - good discussion
   b) Planning and scheduling
      A/C to use Primavera system with modem on site
      A/C can convert MacProject networks to Primavera as required
      A/C would like to use a milestone system (macro/micro)
         Identify major project milestones and prepare summary network model
         Prepare detailed network models and schedules within major milestone definitions
      Provided John Hacul copies of selected network models for units #2 and 3
         To be returned to rjs

c) Construction site planning
    Discussed site layout for construction operations
        IMC said will have 3 operations to locate to service site
        A/C to review site requirements with all other contractors and prepare site layout
    Reviewed storage of material and equipment
        Discussed bondable storage
        MSU said material must be on MSU property and properly stored to receive material payment under contract
d) Contract administration and management
    A/C requested copies of all contracts which are to be under their managment
    Briefly discussed control strength of A/C in relation to other prime contractors
    Briefly reviewed insurance coverage and who carries
    Discussed procedures for shop drawing reviews and approvals
    Reviewed positions and duties of various MSU personnel on project
e) Electrical construction contract package (73.0200)
    To be presented for award approval to February, 1992 MSU Board of Trustees meeting

Monday, November 11, 1991 (476)

I. *T. B. Simon Power Plant Unit 4 Addition notes*
   A. *Prepared November 18, 1991 (481)*
II. *By Ralph J. Stephenson*
III. *Meeting date - Monday November 11, 1991 (476)*
   A. *Notes prepared Monday, 11/18/91 (476)*
IV. *Location - MSU Power Plant field office*
V. *Those attending*
   A. *Dick Wever - MSU construction superintendent*
   B. *Jim Simons - MSU project representative*
   C. *Rick Johnson - Electrical engineer - MSU power plant*
   D. *David Sanger - MSU student employee - field office - in meeting part time*
   E. *Ralph J. Stephenson - Consultant*
VI. *Agenda*
   A. *Review documentation concepts*
   B. *Walk through one month of documentation*
VII. *Meeting notes*
   A. *Discussed concepts of documentation*
      1. *Used Documentation Degree (305) and Procedures for Preparing Project Documentation (299) as discussion base*
      2. *Project currently at a DD level of about 5 to 6 or slightly higher*
      3. *Should take steps 1, 2, 3, 4 and part of 5 now*
   B. *Reviewed case study #3 of Sierra/Hirtwell with those present*
      1. *Showed how to assign document numbers*
      2. *Discussed format for meeting notes*
      3. *Began preparing abbreviation list*
      4. *Selected document coding fields*
   C. *Worked on documentation sample of one month*

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February 28, 1992

Subject:	Monitoring Report #12
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265, 281, 301 & 302
Dates of monitoring:	Friday, January 24, 1992 (wd 527) Friday, January 31, 1992 (wd 532) Friday, February 7, 1992 (wd 537) Monday, February 10, 1992 (wd 539) Thursday, February 20, 1992 (wd 546) Thursday, February 27, 1992 (wd 551)
Meeting locations:	Physical plant offices and job site office at Power Plant #4

Documents used in monitoring:

- Sheets #ssca1, abca1, mca1, elca1 and ecca1, issue #2, dated May 22, 1991 (wd 356)
- Sheet #1, contract 71.0402 - Site work & foundation work, issue #7, dated November 6, 1991 (wd 473)
- Milestone date matrix
- MSU & rjs summary network model of project dated 09/13/91 (wd 435)
- Alberici/Clark (A/C) Prima Vera computer run #23, dated January 27, 1992 (wd 528), with data date of November 4, 1991 (wd 471). Note that this computer run is designated Issue #1, dated January 27, 1992 (wd 528) of the A/C planning documents.
- Alberici/Clark (A/C) Prima Vera computer run #29, dated February 22, 1992 (wd 548), with data date of November 4, 1991 (wd 471). This computer run has been designated Issue #2, dated February 22, 1992 (wd 548) of the A/C planning documents.

Key dates:

- December 31, 1991 pm (wd 511) - Complete power plant foundations
- December 31, 1991 pm (wd 511) - Complete site services

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February 28, 1992

- March 23, 1992 pm (wd 569) - Complete steel erection to support boiler erection
- March 30, 1992 pm (wd 574) - Complete steam drum lift
- April 3, 1992 pm (wd 578) - Complete cooling tower foundation
- June 1, 1992 am (wd 617) - Start delivery of fabric filter equipment
- July 1, 1992 pm (wd 640) - Complete structural steel work
- December 31, 1992 pm (wd 767) - Substantially complete building envelope
- September 7, 1993 am (940) - Complete Power Plant #4 for commercial operation
- January, 1994 - Complete total project - to be confirmed

Note: For other key dates prior to December 31, 1991 (wd 511) see previous monitoring reports.

Those attending: (Major participants only. Some in meetings part time only)

Friday, January 24, 1992 (wd 527) and Friday, January 31, 1992 (wd 532) - no attendance roster prepared

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Friday, February 7, 1992 (wd 537) - no attendance roster prepared

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Monday, February 10, 1992 (wd 538) - no attendance roster prepared

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Thursday, February 20, 1992 (wd 546)

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- John Wieland - Principal in charge - Alberici/Clark
- John Clark - Principal - Alberici/Clark
- Jim Cornillie - Project director - Alberici/Clark
- John Hacul - Project manager - Alberici/Clark
- Dave Sadler - Project director - Alberici/Clark
- Ralph J. Stephenson - consultant

Thursday, February 27, 1992 (wd 551)

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

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February 28, 1992

Actions taken:

Friday, January 24, 1992 (wd 527) and Friday, January 31, 1992 (wd 532)

- Reviewed planning and scheduling work by Alberici/Clark to date
- Discussed procedures to be used to translate A/C planning and scheduling information into monitoring and analysis material for MSU use.
- Began preparing network models from A/C predecessor/successor runs - issue #1, run #23, dated January 27, 1992 (wd 528), data date of November 4, 1991 (wd 471).

Friday, February 7, 1992 (wd 537) and Monday, February 10, 1992 (wd 539)

- Prepared network models from A/C predecessor/successor runs
- Made detailed analysis with Mr. Simons of network models derived from A/C computer runs

Thursday, February 20, 1992 (wd 546)

- Prepared network models from A/C predecessor/successor runs
- Met with MSU and A/C staff to review planning and scheduling of the work

Thursday, February 27, 1992 (wd 551)

- Reviewed updated boiler erection erection plan from A/C with Mr. Simons
- Began updating issue #1 network models to issue #2 with updated boiler erection information
- Monitored current job status with Mr. Simons

General Summary:

Friday, January 24, 1992 (wd 527) and Friday, January 31, 1992 (wd 532)

These meetings were to begin deriving a set of tracking and monitoring network models from the computer planning runs made by A/C for the total project under their contract. It was decided that Mr. Simons and I would work from the predecessor/successor (p/s) runs prepared by A/C. This material would be translated into a network model from which the project could be evaluated and progress noted on a graphic depiction of the job.

A/C provided the initial p/s computer run to Mr. Simons for our work. This run was identified as run number 23, report date January 27, 1992 (wd 528), with a data date of November 4, 1991 (wd 471). For the purpose of relating it to the MSU network model, it was termed Issue #1.

Friday, February 7, 1992 (wd 537) and Monday, February 10, 1992 (wd 539)

In this series of meetings Mr. Simons and I continued reviewing and preparing the Issue #1 network models for structural steel and the boiler erection from the A/C run #23 dated January 27, 1992 (wd 528). We also conferred briefly with some of the A/C staff about the runs.

At points where adequate material had been diagramed we made selective analyses regarding the

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February 28, 1992

content of the material in relation to contract requirements. Most of our attention was focussed on the boiler erection since this is the early design, fabrication and installation (dfi) operation.

Thursday, February 20, 1992 (wd 546)

The early part of the day was spent with Mr. Wever and Mr. Simons discussing procedures to be used in planning and scheduling the work. They generally feel that I should continue to review the planning and scheduling work being done on the job by the various contractors including A/C and the dfi contractors.

I will also monitor project progress from plans and schedules produced by various parties to the project. This will include all preconstruction, construction and turn over operations.

Later in the morning a meeting was held at which representatives of MSU and A/C were present. All agreed that the procedures outlined by MSU from our morning session were satisfactory.

A/C is responsible for all project planning and scheduling. My work is to be done from project plans and schedules prepared by A/C and others and submitted to Mr. Simons. If required, and if acceptable to A/C, I might also participate in the planning process in whatever way MSU, A/C, or both feel will be helpful.

Thursday, February 27, 1992 (wd 551)

The purpose of this meeting was begin active network modeling work from the updated predecessor/successor computer run made by A/C from Tampella's boiler erection information. The p/s data was labeled by A/C as run number 29, dated February 22, 1992 (wd 548), with a data date of November 4, 1991 (wd 471). (**Note**: this data date should be checked).

This a/s run was designated as Issue #2, dated February 22, 1992 (wd 548) and the network models derived from it will be designated as Issue #2.

Mr. Simons and I began updating the Issue #1 models for the boiler installation from the updated a/s run. This model will be reviewed with Mr. Simons as it is prepared. Copies of the model will be provided by Mr. Simons to others as appropriate after his review.

We also evaluated current job progress. Work presently is concentrated on erecting structural steel. We monitored it against the Issue #1 network model, derived from the A/C run #23, dated January 27, 1992 (wd 528). A copy of this structural steel sequence is attached for reference.

Structural steel erection is shown as beginning on January 6, 1992 (wd 513) with sequence #1. Erection actually began on Monday, January 27, 1992 (wd 528). Sequences 1 through 5 have been erected and as of February 27, 1992 (wd 551) a portion of sequence #6 is erected. Some work has also begun in sequence #7.

Sequence #6 was due to have been completed by the pm of February 19, 1992 (wd 546). The current lag in steel therefore is about 5 working days. Current lags are measured by the status of the work as of the monitoring date. Thus sequence 6 is measured against the February 27, 1992 (wd 551) monitoring date relative to the completion target shown in the current schedule.

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February 28, 1992

Status of contract document packages:

Not reviewed at our meetings.

General:

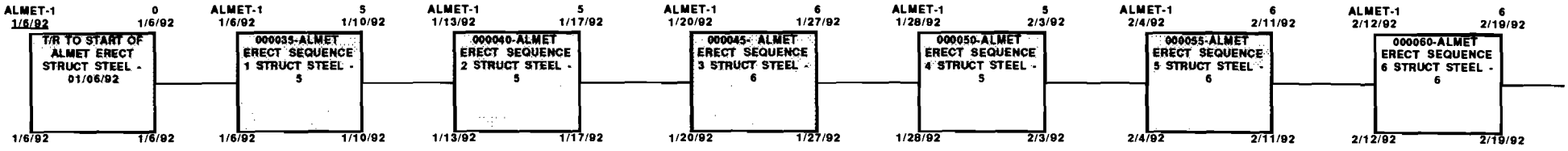
The project currently lags the A/C Issue #1 a/s run dated January 27, 1992 (wd 528) by about 6 working days. The lag is primarily in structural steel.

Our present planning and scheduling efforts are being focussed on obtaining an accurate set of data for the boiler installation. This work is presently being measured against the A/C Issue 2 p/s updated computer run. Mr. Simons and I are now deriving an updated network model from this run. It will be given to Mr. Simons as the model is assembled.

I shall be in touch with Mr. Simons soon to set the next planning and monitoring session.

Ralph J. Stephenson P. E.

A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1/6/92
0
1/6/92
T/R TO START OF ALMET ERECT STRUCT STEEL - 01/06/92
1/6/92
1/6/92
ALMET-1
1/6/92
5
1/10/92
000035-ALMET ERECT SEQUENCE 1 STRUCT STEEL - 5
1/6/92
1/10/92
ALMET-1
1/13/92
5
1/17/92
000040-ALMET ERECT SEQUENCE 2 STRUCT STEEL - 5
1/13/92
1/17/92
ALMET-1
1/20/92
6
1/27/92
000045-ALMET ERECT SEQUENCE 3 STRUCT STEEL - 6
1/20/92
1/27/92
ALMET-1
1/28/92
5
2/3/92
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1/28/92
2/3/92
ALMET-1
2/4/92
6
2/11/92
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2/4/92
2/11/92
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2/12/92
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2/19/92
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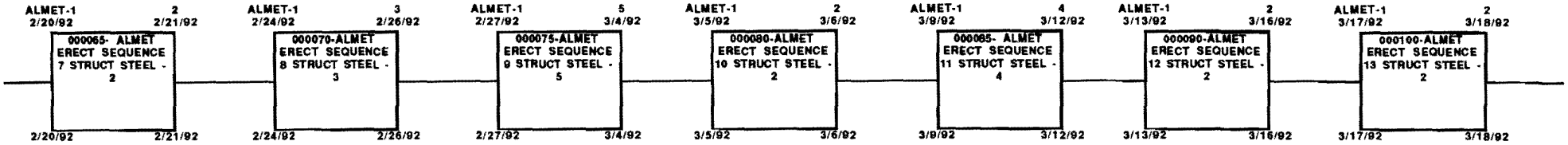
2/12/92
2/19/92

B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2
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ERECT SEQUENCE
7 STRUCT STEEL -
2
2/20/92
2/21/92
ALMET-1
2/24/92
3
2/26/92
000070-ALMET
ERECT SEQUENCE
8 STRUCT STEEL -
3
2/24/92
2/26/92
ALMET-1
2/27/92
5
3/4/92
000075-ALMET
ERECT SEQUENCE
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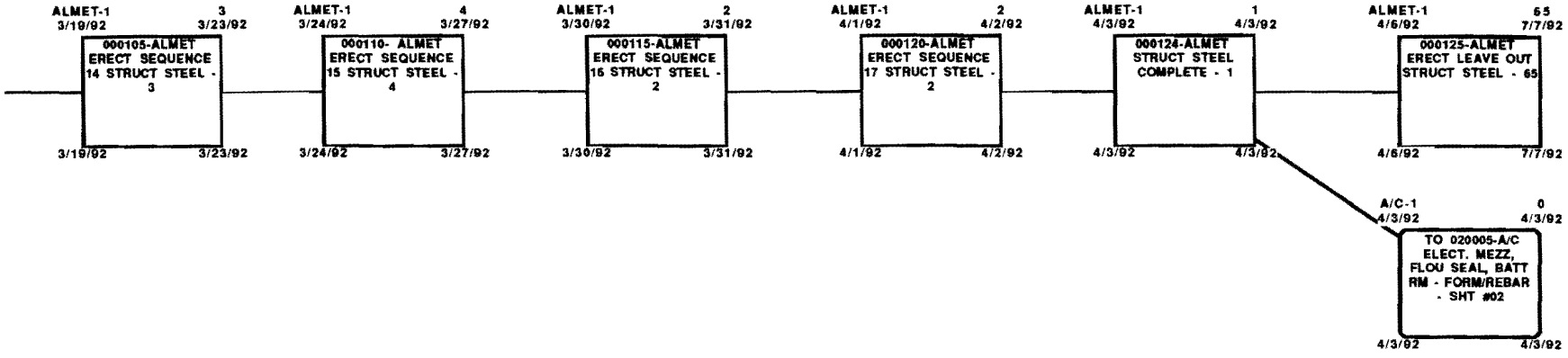
3/17/92
3/18/92

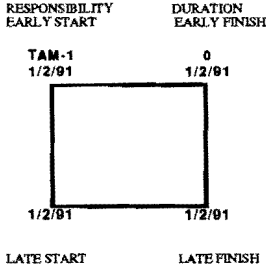
C



Structural Steel Erection

THIS NETWORK MODEL IS A LOGIC PLAN RECONSTRUCTION OF THE A/C PV RUN, ISSUE #1, MSU-1, DATED 01/22/92, DATA DATE OF 11/04/91.

Network Model for T. B. Simon Power Plant Unit 4 Michigan State University East Lansing, Michigan



Activity Key

Issue #1e - January 31, 1992
Issue #1b - February 7 1992
Issue #1c - February 10, 1992
Issue #1d - February 12, 1992
Issue #1e - February 18, 1992
a/c pv ilesht#ss1 msupp4

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Sheet #ss1

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March 25, 1992

Subject:	Monitoring Report #13
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265, 281, 301 & 303 (302)
Date of monitoring:	Tuesday, March 24, 1992 (wd 569)
Meeting locations:	Job site office at Power Plant #4

Documents used in monitoring:

• Alberici/Clark (A/C) Prima Vera computer runs #29 & 30, dated February 22 and 27, 1992 (wds 548 and 551), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated Issue #2, dated February 27, 1992 (wd 551) of the A/C planning documents.

• Network model translations of the A/C network Issue #2. These include sheets #1 and 2, issue 2a. Sheet #1 is dated February 27, 1992 (wd 551) and sheet #2 is dated March 5, 1992 (wd 556).

• Data run translations of the A/C network issue #2. These include an early start sequence and an activity number listing of the activities.

Key target dates:

• December 31, 1991 pm (wd 511) - Complete power plant foundations
• December 31, 1991 pm (wd 511) - Complete site services
• March 23, 1992 pm (wd 569) - Complete steel erection to support boiler erection
• March 30, 1992 pm (wd 574) - Complete steam drum lift
• April 3, 1992 pm (wd 578) - Complete cooling tower foundation
• June 1, 1992 am (wd 617) - Start delivery of fabric filter equipment
• July 1, 1992 pm (wd 640) - Complete structural steel work
• December 31, 1992 pm (wd 767) - Substantially complete building envelope
• September 7, 1993 am (940) - Complete Power Plant #4 for commercial operation
• January, 1994 - Complete total project - to be confirmed

Note: For key dates prior to December 31, 1991 (wd 511) see earlier monitoring reports.

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April 11, 1992

Subject:	Monitoring Report #14
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265, 281, 301, 303, 305 & 308
Date of monitoring:	Tuesday, April 7, 1992 (wd 579)
Meeting locations:	Job site office at Power Plant #4

Documents used in monitoring:

• Alberici/Clark (A/C) Prima Vera computer run #23, dated January 27, 1992 (wd 528) with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #1, dated January 27, 1992 (wd 528) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #29 & 30, dated February 22 and 27, 1992 (wds 548 and 551), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 tam, dated February 27, 1992 (wd 551) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #36, dated April 7, 1992 (wd 579), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 qua, dated April 7, 1992 (wd 579) of the A/C planning documents.

• rjs network model translations of the A/C network issues # 1 and 2. These include the following

Sheet #1, issue 2a dated February 27, 1992 (wd 551)
Sheet #2, issue 2a dated March 5, 1992 (wd 556)
Sheet #3, issue 2a dated April 3, 1992 (wd 577)
Sheet #4, issue 2a dated March 26, 1992 (wd 571)
Sheet #5, issue 2a dated April 4, 1992 (wd 578))

• rjs data run translations of the A/C network issue #2a for sheets #1, 2, 3, 4 & 5. These include an early start sequence and an activity number listing of the tasks in the network.

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April 11, 1992

Key target dates:

- March 23, 1992 pm (wd 569) - Complete steel erection to support boiler erection
- March 30, 1992 pm (wd 574) - Complete steam drum lift
- April 3, 1992 pm (wd 578) - Complete cooling tower foundation
- June 1, 1992 am (wd 617) - Start delivery of fabric filter equipment
- July 1, 1992 pm (wd 640) - Complete structural steel work
- December 31, 1992 pm (wd 767) - Substantially complete building envelope
- September 7, 1993 am (940) - Complete Power Plant #4 for commercial operation
- January, 1994 - Complete total project - to be confirmed

Note: For key dates prior to March 23, 1992 (wd 569) see earlier monitoring reports.

Those attending: (some in meeting part time only)

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- David Sanger - MSU
- Sean McCardel - MSU
- John Hucul - A/C project manager - for brief discussion only
- Ralph J. Stephenson - consultant

Actions taken:

- Issued sheets #3 and #5, issue 2a to Mr. Simons
- Issued data run translations of network issue #2a for sheets #1, 2, 3, 4 & 5.
- Inspected project with Mr. Sanger
- Reviewed materials and equipment on site with Mr. Sanger
- Began preparing network translation of electrical work from A/C issue #02 qua successor, predecessor list, run #36, report date 04/07/92 (wd 579), data date 11/04/91 (wd 471)
- Prepared example of data tabulation for bulletin, change order tracking
- Reviewed current status of project with Mr. Simons
- Discussed network models briefly with Mr. Hacul, A/C project manager

General Summary:

The following monitoring measures the project against the A/C computer runs as noted in the ***documents used in monitoring*** section above.

According to Mr. Simons structural steel erection is complete for sequences 1 through 15. Sequence 16 was due to begin at an early start of March 30, 1992 (wd 573). If it has not yet started the current lag over early starts is about 6 working days. This is about the same lag quantity as in the previous monitoring of March 24, 1992 (wd 569).

Considerable work has been accomplished in assembling hoisting equipment and collecting material and equipment on the site ready for setting. Mr. Sanger and I inspected the job site and made a rough evaluation of the status of the project inventory. However a detailed review of the inventory was not done at this session. I recommend that at our next monitoring we carefully evaluate the status of on-job

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procurement.

It appears that deliveries could currently lag early dates by as much as 20 to 26 working days. A more detailed evaluation of the project measured by late starts and finishes is best made when the logic restraints are further identified by A/C and their contractors.

It should be noted that the estimated lag in deliveries of materials and equipment as of the previous monitoring was from 12 to 17 working days. The apparent increase in this lag is a source of concern, and a detailed evaluation of the inventory status is highly recommended.

Tampella equipment setting work on the project was to have begun about March 23, 1992 (wd 568). It does not appear that such work has yet started. If this is the case installation lags early starts by about 11 working days.

The lower mezzanine supported deck was poured out on April 7, 1992 (wd 579). This deck was due to have been placed on April 7, 1992 (wd 579) and did meet its early finish date.

Some metal grating has been installed in the building. I suggest that careful attention be give to recording installation and grating condition by report, and photos or sketches. Heavy construction traffic on and around grating surfaces will be considerable and it is important to resolve disputes about damaged materials quickly and accurately to avoid job delays.

The steam drum, an important milestone delivery and installation item, arrived on the job on April 4, 1992 (wd 577). It was due on the site on March 26, 1992 (wd 571). Steam drum erection is due for an early start of April 15, 1992 (wd 585). There was no word on the currently planned erection date.

A tabulation of the rjs issue 2a data for power plant work showing the approximate status of activity items as of April 7, 1992 (wd 576) is enclosed with this report as attachment A. Tasks are listed by expected early starts and finishes through April 27, 1992 (wd 594). No other distribution will be made of the list than to the recipients of this monitoring report. Further distribution is to be by them as they desire.

At this meeting I issued the remainder of the network translations for boiler work as described in the A/C successor, predecessor runs, issues #1 & 2. These are diagramed on sheets 1 through 5, issue 2a, carrying various dates. This completes the current available logic translations until A/C issues an updating of the boiler and other work.

Mr. Simon did receive an electrical successor, predecessor computer run from A/C on April 7, 1992 (wd 579). Mr. McCardel and I began to produce the logic plan from this run and I shall complete and issue this network in the near future. The work does not appear to indicate tie ins to other trade work. These tie ins are necessary to gain a true plan model from which project status can be accurately measured.

Mr. Sanger and I prepared a preliminary revision tracking document to measure in tabular form, and to show in time scaled form the current status of bulletin requests, bulletins and change orders. We set the format and began inputting data from the job records. A copy of the document material to date accompanies this report. We shall complete our graphic work on the tracking document soon and provide to Mr. Simons for comments and revisions.

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April 11, 1992

Brief meeting notes were prepared and distributed at our session. I have attached an edited copy of the notes to each monitoring report.

General:

The project currently lags current monitoring plans and networks by 6 to 26 working days. These lags are measured against early starts and early finishes.

The lags should be examined carefully to determine their true impact on the project. However in order for this late start, late finish evaluation to be accurate the interrelations between trades and major contractors on the project must be further defined. This definition is currently being developed and should be given careful and continuous attention.

I shall be in touch with Mr. Simons soon to set the next planning and monitoring session.

Ralph J. Stephenson P. E.

	activity	sub title	earliest start	earliest finish	days	status as of 04/07/92	comp
1	000010-T/R TO AWARD CONTRACT TO ALBERICI/CLARK - 11/04/91 *	A/C-1	11/4/91	11/4/91	0	complete	x
2	000015-A/C MOBILIZATION - 5	A/C-1	11/4/91	11/8/91	5	complete	x
3	T/R TO START OF ALMET ERECT STRUCT STEEL - 01/06/92	ALMET-1	1/6/92	1/6/92	0	complete	x
4	000035-ALMET ERECT SEQUENCE 1 STRUCT STEEL - 5	ALMET-1	1/6/92	1/10/92	5	complete	x
5	000040-ALMET ERECT SEQUENCE 2 STRUCT STEEL - 5	ALMET-1	1/13/92	1/17/92	5	complete	x
6	000045- ALMET ERECT SEQUENCE 3 STRUCT STEEL - 6	ALMET-1	1/20/92	1/27/92	6	complete	x
7	000050-ALMET ERECT SEQUENCE 4 STRUCT STEEL - 5	ALMET-1	1/28/92	2/3/92	5	complete	x
8	000055-ALMET ERECT SEQUENCE 5 STRUCT STEEL - 6	ALMET-1	2/4/92	2/11/92	6	complete	x
9	000060-ALMET ERECT SEQUENCE 6 STRUCT STEEL - 6	ALMET-1	2/12/92	2/19/92	6	complete	x
10	140430-TAM DELIVER - CYCLONES - 02/14/92 PM - TO 140006	TAM-3	2/17/92	2/17/92	0	complete	x
11	000065- ALMET ERECT SEQUENCE 7 STRUCT STEEL - 2	ALMET-1	2/20/92	2/21/92	2	complete	x
12	000070-ALMET ERECT SEQUENCE 8 STRUCT STEEL - 3	ALMET-1	2/24/92	2/26/92	3	complete	x
13	000075-ALMET ERECT SEQUENCE 9 STRUCT STEEL - 5	ALMET-1	2/27/92	3/4/92	5	complete	x
14	140432-TAM DELIVER - AIR HEATER TO PLENUM DUCT - 02/28/92 PM - TO 140010	TAM-1	3/2/92	3/2/92	0	no info	
15	T/R TO TAMPELLA START MOBILIZATION - AM 03/02/92	TAM-1	3/2/92	3/2/92	0	complete	x
16	140000- TAMPELLA MOBILIZATION - 15	TAM-1	3/2/92	3/20/92	15	subst complete	x
17	140434-TAM DELIVER - FLUOSEAL - 03/02/92 PM - TO 140026	TAM-1	3/3/92	3/3/92	0	complete	x
18	140436-TAM DELIVER - FURNACE LOWER HEADERS - 03/04/92 PM - TO 140018	TAM-1	3/5/92	3/5/92	0	complete?	
19	000080-ALMET ERECT SEQUENCE 10 STRUCT STEEL - 2	ALMET-1	3/5/92	3/6/92	2	complete	x
20	140438-TAM DELIVER - FURNACE FLOOR TUBES - 03/05/92 PM - TO 140020	TAM-1	3/6/92	3/6/92	0	complete?	
21	140440-TAM DELIVER - FURNACE BUCKSTAYS - 03/06/92 PM - TO 140024	TAM-1	3/9/92	3/9/92	0	complete	x
22	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM - TO 140022, 038, 046, 084, 104, 164	TAM-1	3/9/92	3/9/92	0	some on job	
23	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM - TO 140022, 038, 046, 084, 104, 164	TAM-1	3/9/92	3/9/92	0	some on job	
24	140442-TAM DELIVER - FRAMING STEEL - PM 03/06/92	TAM-2	3/9/92	3/9/92	0	some on job	
25	000085- ALMET ERECT SEQUENCE 11 STRUCT STEEL - 4	ALMET-1	3/9/92	3/12/92	4	complete	x
26	140444-TAM DELIVER - ASH CLASSIFIER - 03/09/92 - TO 140180	TAM-2	3/10/92	3/10/92	0	no info	
27	140446-TAM DELIVER - COAL FEEDERS - 03/12/92 PM - TO 140028	TAM-1	3/13/92	3/13/92	0	no info	
28	000090-ALMET ERECT SEQUENCE 12 STRUCT STEEL - 2	ALMET-1	3/13/92	3/16/92	2	complete?	
29	140448-TAM DELIVER - BURNERS & RACKS - 03/16/92 PM - TO 140036	TAM-1	3/17/92	3/17/92	0	no info	

[redacted]

	activity	sub title	earliest start	earliest finish	days	status as of 04/07/92	comp
30	140450-TAM DELIVER - BURNER INJECTOR & RACKS - 03/16/92 PM - TO 140036	TAM-1	3/17/92	3/17/92	0	no info	
31	140452-TAM DELIVER - SUPPORTS & HANGERS - 03/16/92 PM - TO 140052	TAM-1	3/17/92	3/17/92	0	some on job	
32	140452-TAM DELIVER SUPPORTS & HANGERS - PM 03/16/92	TAM-2	3/17/92	3/17/92	0	some on job	
33	000100-ALMET ERECT SEQUENCE 13 STRUCT STEEL - 2	ALMET-1	3/17/92	3/18/92	2	in work or complete	
34	000105-ALMET ERECT SEQUENCE 14 STRUCT STEEL - 3	ALMET-1	3/19/92	3/23/92	3	in work or complete	
35	140002-TAM INSTALL LIMESTONE SILO - 1	TAM-2	3/23/92	3/23/92	1		
36	140004-TAM - LIMESTONE FOUNDATION STRUCTURE - 1	TAM-2	3/23/92	3/23/92	1		
37	140014-TAM ROUGH SET - FURN DW LOWER HDR - 1	TAM-1	3/23/92	3/23/92	1		
38	140010-TAM ROUGH SET DUCT - AIR HEATER TO PLENUM - 2	TAM-1	3/23/92	3/24/92	2		
39	140012-TAM SET SAND BIN - 2	TAM-1	3/23/92	3/24/92	2		
40	140180-TAM ROUGH SET - ASH CLASSIFIER - 2	TAM-2	3/23/92	3/24/92	2		
41	140008-TAM GROUND ASSEMBLE DUCT - ECON TO AH - 7	TAM-2	3/23/92	3/31/92	7		
42	140006-TAM GROUND ASSEMBLE - CYCLONE - 40	TAM-3	3/23/92	5/15/92	40	in work	
43	140018-TAM ROUGH SET - FURN SW LOWER HDR - 1	TAM-1	3/24/92	3/24/92	1		
44	000110- ALMET ERECT SEQUENCE 15 STRUCT STEEL - 4	ALMET-1	3/24/92	3/27/92	4		
45	140020-TAM ROUGH SET - FLOOR/PLENUM - 1	TAM-1	3/25/92	3/25/92	1		
46	140016-TAM ROUGH SET DOWNCOMBERS - 2	TAM-1	3/25/92	3/26/92	2		
47	140022-TAM INSTALL FLUOSEAL SUPPORT STEEL - 3	TAM-1	3/25/92	3/27/92	3		
48	140186-TAM ERECT - ASH CLASSIFIER - 6	TAM-2	3/25/92	4/1/92	6		
49	140188-TAM ROUGH SET - ASH DUCT - 7	TAM-2	3/25/92	4/2/92	7		
50	140454-TAM DELIVER STEAM DRUM - AM 03/26/92	TAM-1	3/26/92	3/26/92	0	on site - delivered 04/01/92	x
51	140024-TAM ROUGH SET - BUCKSTAYS - 4	TAM-1	3/26/92	3/31/92	4		
52	140456-TAM DELIVER - AIR HEATER HOPPER - PM 03/27/92	TAM-2	3/30/92	3/30/92	0		
53	000115-ALMET ERECT SEQUENCE 16 STRUCT STEEL - 2	ALMET-1	3/30/92	3/31/92	2		
54	140026-TAM ROUGH SET - FLUOSEAL - 2	TAM-1	3/30/92	3/31/92	2		
55	140050-TAM GROUND ASSEMBLE - AIR HEATER HOPPER - 4	TAM-2	3/30/92	4/2/92	4		
56	000120-ALMET ERECT SEQUENCE 17 STRUCT STEEL - 2	ALMET-1	4/1/92	4/2/92	2		
57	140028-TAM ROUGH SET - COAL GRAVIMETRIC FEEDER - 2	TAM-1	4/1/92	4/2/92	2		
58	140032-TAM ROUGH SET - FLUOSEAL DISCHARGE LEG - 2	TAM-1	4/1/92	4/2/92	2		

	activity	sub title	earliest start	earliest finish	days	status as of 04/07/92	comp
59	140030-TAM ERECT - FLUOSEAL/J VALVE - 6	TAM-1	4/1/92	4/8/92	6		
60	000124-ALMET STRUCT STEEL COMPLETE - 1	ALMET-1	4/3/92	4/3/92	1		
61	140036-TAM ROUGH SET - BURNERS & PREPIPE RACK - 1	TAM-1	4/3/92	4/3/92	1		
62	140458-TAM DELIVER LIMESTONE FEEDERS - PM 04/02/92	TAM-3	4/3/92	4/3/92	0		
63	140056-TAM LIMESTONE GRAVIMETRIC FEEDER - 3	TAM-3	4/3/92	4/7/92	3		
64	140034-TAM ERECT - COAL GRAVIMETRIC FEEDER - 8	TAM-1	4/3/92	4/14/92	8		
65	140208-TAM ERECT - ASH DUCT - 10	TAM-2	4/3/92	4/16/92	10		
66	020005-A/C ELECT. MEZZ, FLOU SEAL, BATT RM - FORM/REBAR - 1	A/C-1	4/6/92	4/6/92	1	complete	x
67	FR 140036-TAM ROUGH SET-BURNERS & PREPIPE RK-SHT #01 - PM 04/03/92	TAM-3	4/6/92	4/6/92	0		
68	T/R TO 04/06/92	FAI-5	4/6/92	4/6/92	0		
69	140038-TAM INSTALL COMBUSTION TOP GRID STEEL - 7	TAM-1	4/6/92	4/14/92	7		
70	130005-FAI DELIVER COAL CONVEYOR EQUIPMENT - 15	FAI-5	4/6/92	4/24/92	15		
71	000125-ALMET ERECT LEAVE OUT STRUCT STEEL - 65	ALMET-1	4/6/92	7/7/92	65	most on job?	x
[redacted]							
74	[redacted] FORM/REBAR - 1 *	A/C-1	4/8/92	4/8/92	1		
75	020025-A/C OPERATING FLOOR - POUR - 1	A/C-1	4/8/92	4/9/92	2		
76	020015-A/C ELECT. MEZZ, FLOU SEAL, BATT RM - CURE - 23	A/C-1	4/8/92	5/8/92	23	in work	
77	020050-A/C BATTERY, SECONDARY FAN FLOOR - FORM/REBAR - 1	A/C-1	4/9/92	4/9/92	1		
78	140040-TAM ROUGH SET - CYCLONE INLET EXPANSION JOINT - 1	TAM-1	4/9/92	4/9/92	1		
79	140460-TAM DELIVER DUCT - SEC AIR AH TO BUSTLE - PM 04/08/92	TAM-1	4/9/92	4/9/92	0		
80	140044-TAM INSTALL - FLUIDIZING BLOWER - 6	TAM-1	4/9/92	4/16/92	6		
81	140042-TAM ERECT DUCT - PRI AIR AH TO PLENUM - 30 *	TAM-1	4/9/92	5/20/92	30		
82	020040-A/C AIR HEATER, HEATER ASH LOAD FLOORS - POUR - 1 *	A/C-1	4/10/92	4/10/92	1		
83	020065-A/C PRIMARY FAN FLOOR - FORM/REBAR - 1	A/C-1	4/10/92	4/10/92	1		
84	020051-A/C SECONDARY FAN PEDESTALS - FORM/REBAR - 4	A/C-1	4/10/92	4/15/92	4		
85	020030-A/C OPERATING ROOM - CURE - 20	A/C-1	4/10/92	5/7/92	20		
86	020055-A/C BATTERY, SECONDARY AIR FAN FLOOR - POUR - 1	A/C-1	4/13/92	4/13/92	1		
87	140462-TAM DELIVER DUCT - COAL FD PURGE AIR - PM 04/10/92	TAM-1	4/13/92	4/13/92	0		

	activity	sub title	earliest start	earliest finish	days	status as of 04/07/92	comp
88	020080-A/C ELEVATOR MACHINE ROOM FLOOR - FORM/REBAR - 2	A/C-1	4/13/92	4/14/92	2		
89	020066-A/C PRIMARY AIR FAN PEDESTLES - FORM/REBAR - 4	A/C-1	4/13/92	4/16/92	4		
90	020045-A/C AIR HEATER, HEATER ASH LOAD FLOORS - CURE - 23	A/C-1	4/13/92	5/13/92	23		
91	020070-PRIMARY AIR FAN FLOOR - POUR - 1	A/C-1	4/14/92	4/14/92	1		
92	140464-TAM DELIVER - SAND SCREW FEEDER - PM 04/13/92	TAM-1	4/14/92	4/14/92	0		
93	140062-TAM ROUGH SET - SCREW CONVEYOR SAND - 2	TAM-1	4/14/92	4/15/92	2		
94	020060-A/C BATTERY, SECONDARY AIR FAN FLOOR - CURE - 23	A/C-1	4/14/92	5/14/92	23		
95	020085-A/C ELEVATOR MACHINE ROOM FLOOR - POUR - 1	A/C-1	4/15/92	4/15/92	1		
96	140058-TAM ROUGH SET DUCT - SEC AIR AH TO BUSTLE - 2	TAM-1	4/15/92	4/16/92	2		
97	140048-TAM INSTALL STEAM DRUM - 3	TAM-1	4/15/92	4/17/92	3		
98	140046-TAM INSTALL - CYCLONE SUPPORT STEEL - 5	TAM-1	4/15/92	4/21/92	5		
99	020075-A/C PRIMARY AIR FAN FLOOR - CURE - 23	A/C-1	4/15/92	5/15/92	23		
100	020056-A/C SECONDARY FAN PEDESTALS - POUR - 1	A/C-1	4/16/92	4/16/92	1		
101	140468-TAM DELIVER - SNCR SYSTEM TANK - PM 04/15/92	TAM-2	4/16/92	4/16/92	0		
102	140068-TAM ERECT SAND/FILL - SCREW CONVEYOR - 2	TAM-1	4/16/92	4/17/92	2		
103	140070 - TAM SET - UREA TANK - 2	TAM-2	4/16/92	4/17/92	2		
104	020090-A/C ELEVATOR MACHINE ROOM FLOOR - CURE - 23	A/C-1	4/16/92	5/18/92	23		
105	020071-A/C PRIMARY FAN PEDESTLES - POUR - 1	A/C-1	4/17/92	4/17/92	1		
106	140060-TAM ROUGH SET DUCT - COAL FD PURGE AIR - 2	TAM-1	4/17/92	4/20/92	2		
107	140236-TAM ERECT - ASH DUCT - 4	TAM-2	4/17/92	4/22/92	4		
108	140054-TAM INSTALL - FLUIDIZING DUCT - 15	TAM-1	4/17/92	5/7/92	15		
109	020061-A/C SECONDARY FAN PEDESTALS - CURE - 20	A/C-1	4/17/92	5/14/92	20		
110	140052-TAM INSTALL COMBUSTOR BOILER HANGERS - 10	TAM-1	4/20/92	5/1/92	10		
111	020076-A/C PRIMARY FAN PEDESTLES - CURE - 20	A/C-1	4/20/92	5/15/92	20		
112	140470-TAM DELIVER - TEMPERING / PREHEAT COILS - PM 04/20/92	TAM-2	4/21/92	4/21/92	0		
113	140064-TAM ROUGH SET - OF DUCT BUSTLE TO BURNERS - 2	TAM-1	4/21/92	4/22/92	2		
114	140472-TAM DELIVER - TUBES, FURNACE UPPER SW - PM 04/21/92	TAM-1	4/22/92	4/22/92	0		
115	140476-TAM DELIVER - UPPER RW FURNACE TUBES - PM 04/24/92	TAM-2	4/25/92	4/25/92	0		
116	140474-TAM DELIVER - UPPER FW FURNACE TUBES - PM 04/24/92	TAM-1	4/27/92	4/27/92	0		

	oen	bull request #	date of bull req	bull #	date of bull	date bull iss to contr	bull summary	date of contr bull quote	date contr bull quote rcd	msu revw & appv quote	auth to proceed given	chg ord # for bull wk	chg order iss date	contract #	remarks
1	1			1	5/20/91	5/20/91	Turbine generator revisions	3/28/91				1	5/22/91	62.1001	
2	2	2		2	5/31/91	5/31/91	Circulating fluidized bed steam generator revisions	2/6/91				1	3/11/91	62.3401	no bull request issued in writing
3	3			3	5/31/91	5/31/91	Fabric filter revisions	3/14/91	3/14/91			1	5/31/91	62.0203	
4	4			4	6/17/91	6/17/91	Sitework & foundation revisions	7/29/91	8/13/91	8/20/91		3	8/21/91	71.0402	
5	5			5	8/28/91	8/28/91	Sitework & foundation revisions	10/2/91	10/3/91	10/11/91		5	10/10/91	71.0402	
6	6			6	8/16/91	8/16/91	Structural steel								

listed in ascending bulletin number order

9:42:51 AM - Tuesday, April 7, 1992 (579) - meeting notes

I. T. B. Simon Power Plant Unit 4 Addition notes - disk 281
II. By Ralph J. Stephenson
III. Meeting date - Tuesday, April 7, 1992 (579)
IV. Location - MSU Power Plant field office
V. Items to add to General Notes
A. Plans & schedules issued for contracts & work under A/C as of 04/07/92 (579)

1. *A/C computer listing issues - predecessor, successor (p/s)*

a) **Issue #01**

Report date 01/27/92 (528), run #23, data date 11/04/91 (471)
rjs network translations are labeled from issue #1a to #1e, & issue #2a
A/C issue #01 includes
Activity ID series 000000 - mile, msu, ac, alm,
Activity ID series 010000 - gec
Activity ID series 020000 - a/c
Activity ID series 030000 - sch
Activity ID series 040000 - gjoh
Activity ID series 050000 - zac
Activity ID series 060000 - cei
Activity ID series 070000 - wes
Activity ID series 080000 - van
Activity ID series 090000 - ess
Activity ID series 100000 - abp
Activity ID series 110000 - gmid
Activity ID series 130000 - fai, mor, the,
A/C issue #01 runs not translated into rjs networks
Activity ID series 160000 - duv
Activity ID series 170000 - imc - A/C run not complete
Activity ID series 190000 - qua - not complete
Activity ID series 990000 - star

b) **Issue #02 tam & qua**

tam - Report date 02/27/92 (551), run #30, data date 11/04/91 (471)
rjs network translations are labeled issue #2a - various dates
A/C **issue #02 tam** includes
Activity ID series 140000 - tam
qua - Report date 04/07/92 (579), run #36, data date 11/04/91 (471)
rjs network translations are labeled issue #2a - in work as of 04/07/92 (579)
A/C **issue #02 qua** includes
Activity ID series - 180000 - qua

2. *A/C bar chart translation issues - posted in msu field office*

A/C bar chart translation are bar charts prepared from the A/C predecessor, successor listing noted. It should be noted that predecessor successor run from which the bar chart was prepared is not shown on the bar chart.

a) **Sheets 1a & b through 18a & b**
b) **Data date - 02/14/92 (542)**
c) **Plot date - 02/16/92 (543)**
d) **Bar chart start date - 11/04/92 (471)**
e) **Bar chart completion date - 09/07/93 (940)**

3. *rjs network translations issues*

rjs network translations are graphic, quantified es, ef logic plans prepared from the data shown in the A/C predecessor, successor listings.

a) **Network models currently in use**

Sheet #01, issue #2a dated 02/27/92 (551)
Sheet #02, issue #2a dated 03/05/92 (553)
Sheet #03, issue #2a dated 04/03/92 (577)
Sheet #04, issue #2a dated 03/26/92 (571)
Sheet #05, issue #2a dated 04 04/92 (578)

b) **Network models being prepared as of 04/07/92 (579)**

A/C **issue #02 qua** - Sheet #06, issue #2a dated 04/07/92 (579)

c) **Data listings**

Sheets #01 & 02 - issue #2a (for dates see above)
es sequence run of rjs network translations
Activity sequence run of rjs network translations
Sheet #04 - issue #2a (for date see above)
es sequence of rjs network translations
Activity number sequence run for rjs network translations
Sheets #01 to 05 - issue #2a (for dates see above)
es sequence run of rjs network translations
Sheet number sequence run of rjs network translations

VI. Those attending (some in meeting part time)

A. Dick Wever - MSU construction superintendent
B. Jim Simons - MSU project representative
C. John Hucul - A/C project manager - for brief discussion only
D. David Sanger - MSU
E. Sean McCardel - MSU
F. Ralph J. Stephenson - Consultant

VII. Agenda

A. Inspect project
B. Issue & review sheets #03 & #05, issue #2a networks
C. Issue & review sheets #01 to #05, issue #2a data arrays
D. Monitor project from issue #2a networks & data arrays
E. Review procurement status
F. Update data monitoring lists to reflect 04/07/92 (579) status

1. *Give these lists an official name*
   a) **Data monitoring list**
   b) **Project monitoring report listing**
   c) **Project status listing**
   d) **Other?**

G. Begin diagramming IMC's mechanical work from A/C issue #01

1. *A/C run #23, report date 01/27/92 (528) - data date 11/04/91 (471)*

H. Begin diagramming electrical work from A/C issues available
I. Review A/C plan and schedule issues to date

1. *Discuss method by which msu can identify the various p/s runs and bar chart runs issued by A/C*

VIII. Current job status

A. Structural steel

1. *Sequences 01 through 14 complete & trimmed(?)*
2. *Sequence 15 in work*

a) Planned completion -

3. *Lag over es/ef = approx 6 wd*

B. For others see Status Report as of 04/07/92 (wd 579)

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
April 28, 1992

Subject:	Monitoring Report #15
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265, 281, 301, 303, 305 and 308
Date of monitoring:	Tuesday, April 27, 28 1992 (wd 594)
Meeting locations:	Job site office at Power Plant #4

Documents used in monitoring:

• Alberici/Clark (A/C) Prima Vera computer run #23, dated January 27, 1992 (wd 528) with data date of November 4, 1991 (wd 471). The work shown in this computer run has been designated A/C Issue #01, dated January 27, 1992 (wd 528) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #29 & 30, dated February 22 and 27, 1992 (wds 548 and 551), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 tam, dated February 27, 1992 (wd 551) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #36, dated April 7, 1992 (wd 579), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 qua, dated April 7, 1992 (wd 579) of the A/C planning documents.

• rjs network model translations of the A/C network issues # 1 and 2. These include the following
- Sheet #1, issue 2a dated February 27, 1992 (wd 551) - Translated from A/C Issues #1 and #2
- Sheet #2, issue 2a dated March 5, 1992 (wd 556) - Translated from A/C Issue #2
- Sheet #3, issue 2a dated April 3, 1992 (wd 577) - Translated from A/C Issue #2
- Sheet #4, issue 2a dated March 26, 1992 (wd 571) - Translated from A/C Issue #1
- Sheet #5, issue 2a dated April 4, 1992 (wd 578) - Translated from A/C Issue #1

• rjs data run translations of the A/C network issue #2a for sheets #1, 2, 3, 4 & 5. These include an early start sequence and an activity number listing of the tasks in the network.

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
April 28, 1992

Key planned target dates:

- March 30, 1992 pm (wd 574) - Complete steam drum lift
- April 3, 1992 pm (wd 578) - Complete cooling tower foundation
- June 1, 1992 am (wd 617) - Start delivery of fabric filter equipment
- July 1, 1992 pm (wd 640) - Complete structural steel work
- December 31, 1992 pm (wd 767) - Substantially complete building envelope
- September 7, 1993 am (940) - Complete Power Plant #4 for commercial operation
- January, 1994 - Complete total project - to be confirmed

Note: For key planned dates prior to March 23, 1992 (wd 569) see earlier monitoring reports.

Those attending: (some in meeting part time only)

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Don Vercruysse - MSU field staff
- Sean McCardel - MSU field staff
- Ralph J. Stephenson - consultant

Actions taken:

- Inspected project with Mr. Simons
- Reviewed materials and equipment on site with Mr. Simons
- Continued preparing network translation of electrical work from A/C issue #02 qua successor, predecessor list, run #36, report date 04/07/92 (wd 579), data date 11/04/91 (wd 471)
- Reviewed current status of project with Mr. Simons
- Continued work on revision tracking and documentation

General Summary:

As of April 28, 1992 (wd 594) structural steel erection is complete for sequences 1 through 15. Sequence 16 is about 50% complete. Sequence 16 was due to have been completed at an early finish of the pm of March 31, 1992 (wd 575). As of the current date the lag over early starts and finishes is 19 to 21 working days. This is a considerable increase over the previous monitoring lag noted on April 7, 1992 (wd 579). The lag at that time was estimated at 6 working days. Thus the increase over a 15 working day period is about 13 working days.

We are currently measuring structural steel and other trades progress against the A/C schedule data noted above as issued by A/C. An intermediate short term bar chart schedule was also issued to MSU by A/C that contains data not contained in, or different from, that in the official issues being used. This causes conflicting evaluations and invalid data to be used to gauge job status and progress.

I strongly recommend that the job planning and monitoring document base on the project for A/C, MSU, and the dfi contractors be brought into alignment and made consistent for all parties to the project. This matter should be addressed by MSU and A/C jointly, and agreement reached officially on which A/C planning and scheduling documents are in effect.

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
April 28, 1992

The discussion should also cover how the A/C plans and schedules are identified, and to whom they have been furnished and under what instructions relative to their use. We had discussed some of these matters earlier when we decided how the A/C issues were to be labeled. However I suggest this be redone now.

Other procurement and field action items from the monitoring documents also show considerable lag over planned early start dates. Mr. Simons, Mr. Wever and I discussed several of these from a list of activities that were to have begun and be complete by an early start and early finish of the current monitoring date, April 28, 1992 (wd 594).

It appears there could be as many as 60 or more items that were planned to begin and finish on or before April 28, 1992 (wd 594) that have not yet started. The current lags over early starts and early finishes are best determined by measuring the planned early starts or finishes against the April 28, 1992 (wd 594) date.

Actions not yet started include some that have early starts ranging from as long ago as March 23, 1992 (wd 568). These activities, if the early start is an accurate measure of the activity status, currently lag by the time between April 28, 1992 (wd 594) and March 23, 1992 (wd 568). This lag is 26 working days.

It must be kept in mind that we do not as yet have adequate tie in data to accurately determine the true late finish and late start dates for each activity. It is only with this data that the true significance of a lag can be determined. The MSU project staff has asked for this tie in information several times. The data has apparently not been provided. It is urgently needed along with a full updating of the entire remaining work plan.

The concern at this time is that each successive monitoring has shown an increase in lag over planned early starts and early finishes. Since it is relatively early in the project these increases should be minimized, and the planning brought more closely in line with the expected than is presently the case.

We also reviewed work done in translating the electrical construction computer run by A/C into a logic plan. The computer run used for this translation is entitled Run No. 36, dated April 7, 1992, from a data date of November 4, 1991. In accordance with the procedure currently in effect, this computer run has been assigned an MSU issue #2 designation to parallel the other issue #2 translations made.

It does not appear that the activities in the run are fully connected either internally within the electrical work sequence, nor to outside constraints to and from the electrical activities. Mr. Simons has discussed this matter with A/C. To date there is no word as to how the tie ins are to be shown by A/C. Therefore, no further work is being done on translating this data at present.

The mechanical work computer run for IMC activities is also yet to be completed. This is a critical set of work since it relates closely to Tampella's boiler work. Mr. Simons is discussing this material with A/C currently. I shall defer additional work on the mechanical installation until discussing it more fully with Mr. Simons.

Architectural trades work is due to begin within the next two months. This work is critical to closing the building in against winter weather. We have prepared a close in translation of the A/C computer run for close in. This network model is shown on sheet #04 of the current monitoring set.

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April 28, 1992

With the current lags I strongly recommend that the computer runs being produced by A/C be updated with all current data available to insure accuracy.
The updated plan of work should show valid ties between the various trades work on the project. It should also be clearly identified and issued for use by all concerned with the project work. I shall discuss this with Mr. Simons and Mr. Wever at our next planning and monitoring session.

A tabulation entitled ***msu pp4 project status as of 04/28/92 - wd 594*** showing the approximate status of activity items as of April 28, 1992 (wd 594) is enclosed with this report. Tasks are listed by expected early starts and finishes through an early finish of June 1, 1992 (wd 617). A red line on page 5 of this tabulation shows the benchmark by which all activities as of April 28, 1992 (wd 594) should have started according to an early start, early finish schedule. There is a considerable number that have not yet begun.

Brief meeting notes were prepared at our session. These have been reproduced and are attached to this report.

General:

The project currently lags monitoring plans and networks by 19 to 26 working days. These lags are measured against early starts and early finishes.

For an accurate late start, late finish evaluation the interrelations between trades and major contractors on the project must be further defined. This definition i needed as soon as possible from the general project manager and the dfi contractors.

I shall be in touch with Mr. Simons soon to set the next planning and monitoring session.

Ralph J. Stephenson P. E.

	activity	sub title	earliest start	earliest finish	days	status as of 04/28/92	s#
1	000010-T/R TO AWARD CONTRACT TO ALBERICI/CLARK - 11/04/91 *	A/C-1	11/4/91	11/4/91	0	complete	01
2	000015-A/C MOBILIZATION - 5	A/C-1	11/4/91	11/8/91	5	complete	01
3	T/R TO START OF ALMET ERECT STRUCT STEEL - 01/06/92	ALMET-1	1/6/92	1/6/92	0	complete	01
4	000035-ALMET ERECT SEQUENCE 1 STRUCT STEEL - 5	ALMET-1	1/6/92	1/10/92	5	complete	01
5	000040-ALMET ERECT SEQUENCE 2 STRUCT STEEL - 5	ALMET-1	1/13/92	1/17/92	5	complete	01
6	000045- ALMET ERECT SEQUENCE 3 STRUCT STEEL - 6	ALMET-1	1/20/92	1/27/92	6	complete	01
7	000050-ALMET ERECT SEQUENCE 4 STRUCT STEEL - 5	ALMET-1	1/28/92	2/3/92	5	complete	01
8	000055-ALMET ERECT SEQUENCE 5 STRUCT STEEL - 6	ALMET-1	2/4/92	2/11/92	6	complete	01
9	000060-ALMET ERECT SEQUENCE 6 STRUCT STEEL - 6	ALMET-1	2/12/92	2/19/92	6	complete	01
10	140430-TAM DELIVER - CYCLONES - 02/14/92 PM - TO 140006	TAM-3	2/17/92	2/17/92	0	complete	03
11	000065- ALMET ERECT SEQUENCE 7 STRUCT STEEL - 2	ALMET-1	2/20/92	2/21/92	2	complete	01
12	000070-ALMET ERECT SEQUENCE 8 STRUCT STEEL - 3	ALMET-1	2/24/92	2/26/92	3	complete	01
13	000075-ALMET ERECT SEQUENCE 9 STRUCT STEEL - 5	ALMET-1	2/27/92	3/4/92	5	complete	01
14	140432-TAM DELIVER - AIR HEATER TO PLENUM DUCT - 02/28/92 PM - TO 140010	TAM-1	3/2/92	3/2/92	0	no word	01
15	T/R TO TAMPELLA START MOBILIZATION - AM 03/02/92	TAM-1	3/2/92	3/2/92	0	complete	01
16	140000- TAMPELLA MOBILIZATION - 15	TAM-1	3/2/92	3/20/92	15	complete	01
17	140434-TAM DELIVER - FLUOSEAL - 03/02/92 PM - TO 140026	TAM-1	3/3/92	3/3/92	0	complete	01
18	140436-TAM DELIVER - FURNACE LOWER HEADERS - 03/04/92 PM - TO 140018	TAM-1	3/5/92	3/5/92	0	complete	01
19	000080-ALMET ERECT SEQUENCE 10 STRUCT STEEL - 2	ALMET-1	3/5/92	3/6/92	2	complete	01
20	140438-TAM DELIVER - FURNACE FLOOR TUBES - 03/05/92 PM - TO 140020	TAM-1	3/6/92	3/6/92	0	complete	01
21	140440-TAM DELIVER - FURNACE BUCKSTAYS - 03/06/92 PM - TO 140024	TAM-1	3/9/92	3/9/92	0	complete	01
22	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM - TO 140022, 038, 046, 084, 104, 164	TAM-1	3/9/92	3/9/92	0	complete	01
23	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM - TO 140022, 038, 046, 084, 104, 164	TAM-1	3/9/92	3/9/92	0	complete	01
24	140442-TAM DELIVER - FRAMING STEEL - PM 03/06/92	TAM-2	3/9/92	3/9/92	0	complete	02
25	000085- ALMET ERECT SEQUENCE 11 STRUCT STEEL - 4	ALMET-1	3/9/92	3/12/92	4	complete	01
26	140444-TAM DELIVER - ASH CLASSIFIER - 03/09/92 - TO 140180/	TAM-2	3/10/92	3/10/92	0	no word	02
27	140446-TAM DELIVER - COAL FEEDERS - 03/12/92 PM - TO 140028	TAM-1	3/13/92	3/13/92	0	complete	01

	activity	sub title	earliest start	earliest finish	days	status as of 04/28/92	s#
28	000090-ALMET ERECT SEQUENCE 12 STRUCT STEEL - 2	ALMET-1	3/13/92	3/16/92	2	complete	01
29	140448-TAM DELIVER - BURNERS & RACKS - 03/16/92 PM - TO 140036	TAM-1	3/17/92	3/17/92	0	no word	01
30	140450-TAM DELIVER - BURNER INJECTOR & RACKS - 03/16/92 PM - TO 140036	TAM-1	3/17/92	3/17/92	0	no word	01
31	140452-TAM DELIVER - SUPPORTS & HANGERS - 03/16/92 PM - TO 140052	TAM-1	3/17/92	3/17/92	0	some on site	01
32	140452-TAM DELIVER SUPPORTS & HANGERS - PM 03/16/92	TAM-2	3/17/92	3/17/92	0	some on site	02
33	000100-ALMET ERECT SEQUENCE 13 STRUCT STEEL - 2	ALMET-1	3/17/92	3/18/92	2	complete	01
34	000105-ALMET ERECT SEQUENCE 14 STRUCT STEEL - 3	ALMET-1	3/19/92	3/23/92	3	complete	01
35	140002-TAM INSTALL LIMESTONE SILO - 1	TAM-2	3/23/92	3/23/92	1	complete	02
36	140004-TAM - LIMESTONE FOUNDATION STRUCTURE - 1	TAM-2	3/23/92	3/23/92	1	complete ?	02
37	140014-TAM ROUGH SET - FURN DW LOWER HDR - 1	TAM-1	3/23/92	3/23/92	1	no word	01
38	140010-TAM ROUGH SET DUCT - AIR HEATER TO PLENUM - 2	TAM-1	3/23/92	3/24/92	2	no word	01
39	140012-TAM SET SAND BIN - 2	TAM-1	3/23/92	3/24/92	2	complete	01
40	140180-TAM ROUGH SET - ASH CLASSIFIER - 2	TAM-2	3/23/92	3/24/92	2	no word	02
41	140008-TAM GROUND ASSEMBLE DUCT - ECON TO AH - 7	TAM-2	3/23/92	3/31/92	7	no word	02
42	140006-TAM GROUND ASSEMBLE - CYCLONE - 40	TAM-3	3/23/92	5/15/92	40	in work	03
43	140018-TAM ROUGH SET - FURN SW LOWER HDR - 1	TAM-1	3/24/92	3/24/92	1	no word	01
44	000110- ALMET ERECT SEQUENCE 15 STRUCT STEEL - 4	ALMET-1	3/24/92	3/27/92	4	complete	01
45	140020-TAM ROUGH SET - FLOOR/PLENUM - 1	TAM-1	3/25/92	3/25/92	1	no word	01
46	140016-TAM ROUGH SET DOWNCOMBERS - 2	TAM-1	3/25/92	3/26/92	2	in work	01
47	140022-TAM INSTALL FLUOSEAL SUPPORT STEEL - 3	TAM-1	3/25/92	3/27/92	3	in work	01
48	140186-TAM ERECT - ASH CLASSIFIER - 6	TAM-2	3/25/92	4/1/92	6	no word	02
49	140188-TAM ROUGH SET - ASH DUCT - 7	TAM-2	3/25/92	4/2/92	7	no word	02
50	140454-TAM DELIVER STEAM DRUM - AM 03/26/92	TAM-1	3/26/92	3/26/92	0	delivered 04/01/92	01
51	140024-TAM ROUGH SET - BUCKSTAYS - 4	TAM-1	3/26/92	3/31/92	4	in work	01
52	140456-TAM DELIVER - AIR HEATER HOPPER - PM 03/27/92	TAM-2	3/30/92	3/30/92	0	complete	02
53	000115-ALMET ERECT SEQUENCE 16 STRUCT STEEL - 2	ALMET-1	3/30/92	3/31/92	2	in work	01
54	140026-TAM ROUGH SET - FLUOSEAL - 2	TAM-1	3/30/92	3/31/92	2	in work	01

	activity	sub title	earliest start	earliest finish	days	status as of 04/28/92	s#
55	140050-TAM GROUND ASSEMBLE - AIR HEATER HOPPER - 4	TAM-2	3/30/92	4/2/92	4	complete	02
56	000120-ALMET ERECT SEQUENCE 17 STRUCT STEEL - 2	ALMET-1	4/1/92	4/2/92	2		01
57	140028-TAM ROUGH SET - COAL GRAVIMETRIC FEEDER - 2	TAM-1	4/1/92	4/2/92	2		01
58	140032-TAM ROUGH SET - FLUOSEAL DISCHARGE LEG - 2	TAM-1	4/1/92	4/2/92	2		01
59	140030-TAM ERECT - FLUOSEAL/J VALVE - 6	TAM-1	4/1/92	4/8/92	6		01
60	000124-ALMET STRUCT STEEL COMPLETE - 1	ALMET-1	4/3/92	4/3/92	1		01
61	140036-TAM ROUGH SET - BURNERS & PREPIPE RACK - 1	TAM-1	4/3/92	4/3/92	1		01
62	140458-TAM DELIVER LIMESTONE FEEDERS - PM 04/02/92	TAM-3	4/3/92	4/3/92	0	complete	03
63	140056-TAM LIMESTONE GRAVIMETRIC FEEDER - 3	TAM-3	4/3/92	4/7/92	3		03
64	140034-TAM ERECT - COAL GRAVIMETRIC FEEDER - 8	TAM-1	4/3/92	4/14/92	8		01
65	140208-TAM ERECT - ASH DUCT - 10	TAM-2	4/3/92	4/16/92	10		02
66	020005-A/C ELECT. MEZZ, FLOU SEAL, BATT RM - FORM/REBAR - 1	A/C-1	4/6/92	4/6/92	1	flou fl was poured 04/07/92 - demo'd	01
67	FR 140036-TAM ROUGH SET-BURNERS & PREPIPE RK-SHT #01 - PM 04/03/92	TAM-3	4/6/92	4/6/92	0		03
68	T/R TO 04/06/92	FAI-5	4/6/92	4/6/92	0	complete	05
69	140038-TAM INSTALL COMBUSTION TOP GRID STEEL - 7	TAM-1	4/6/92	4/14/92	7		01
70	130005-FAI DELIVER COAL CONVEYOR EQUIPMENT - 15	FAI-5	4/6/92	4/24/92	15		05
71	000125-ALMET ERECT LEAVE OUT STRUCT STEEL - 65	ALMET-1	4/6/92	7/7/92	65	in work	01
72	020010-A/C ELECT. MEZZ, FLOU SEAL, BATT RM - POUR - 1	A/C-1	4/7/92	4/7/92	1	flou fl was poured 04/07/92 - demo'd	01
73	020020-A/C OPERATING FLOOR - FORM/REBAR - 1	A/C-1	4/7/92	4/7/92	1		01
74	020035-A/C AIR HEATER, HEATER ASH LOAD FLOORS - FORM/REBAR - 1 *	A/C-1	4/8/92	4/8/92	1		01
75	020025-A/C OPERATING FLOOR - POUR - 1	A/C-1	4/8/92	4/9/92	2		01
76	020015-A/C ELECT. MEZZ, FLOU SEAL, BATT RM - CURE - 23	A/C-1	4/8/92	5/8/92	23	flou fl was poured 04/07/92 - demo'd	01
77	020050-A/C BATTERY, SECONDARY FAN FLOOR - FORM/REBAR - 1	A/C-1	4/9/92	4/9/92	1		01
78	140040-TAM ROUGH SET - CYCLONE INLET EXPANSION JOINT - 1	TAM-1	4/9/92	4/9/92	1		01
79	140460-TAM DELIVER DUCT - SEC AIR AH TO BUSTLE - PM 04/08/92	TAM-1	4/9/92	4/9/92	0		01
80	140044-TAM INSTALL - FLUIDIZING BLOWER - 6	TAM-1	4/9/92	4/16/92	6		01
81	140042-TAM ERECT DUCT - PRI AIR AH TO PLENUM - 30 *	TAM-1	4/9/92	5/20/92	30		01

	activity	sub title	earliest start	earliest finish	days	status as of 04/28/92	s#
82	020040-A/C AIR HEATER, HEATER ASH LOAD FLOORS - POUR - 1 *	A/C-1	4/10/92	4/10/92	1		01
83	020065-A/C PRIMARY FAN FLOOR - FORM/REBAR - 1	A/C-1	4/10/92	4/10/92	1		01
84	020051-A/C SECONDARY FAN PEDESTALS - FORM/REBAR - 4	A/C-1	4/10/92	4/15/92	4		01
85	020030-A/C OPERATING ROOM - CURE - 20	A/C-1	4/10/92	5/7/92	20		01
86	020055-A/C BATTERY, SECONDARY AIR FAN FLOOR - POUR - 1	A/C-1	4/13/92	4/13/92	1		01
87	140462-TAM DELIVER DUCT - COAL FD PURGE AIR - PM 04/10/92	TAM-1	4/13/92	4/13/92	0		01
88	020080-A/C ELEVATOR MACHINE ROOM FLOOR - FORM/REBAR - 2	A/C-1	4/13/92	4/14/92	2		01
89	020066-A/C PRIMARY AIR FAN PEDESTLES - FORM/REBAR - 4	A/C-1	4/13/92	4/16/92	4		01
90	020045-A/C AIR HEATER, HEATER ASH LOAD FLOORS - CURE - 23	A/C-1	4/13/92	5/13/92	23		01
91	020070-PRIMARY AIR FAN FLOOR - POUR - 1	A/C-1	4/14/92	4/14/92	1		01
92	140464-TAM DELIVER - SAND SCREW FEEDER - PM 04/13/92	TAM-1	4/14/92	4/14/92	0		01
93	140062-TAM ROUGH SET - SCREW CONVEYOR SAND - 2	TAM-1	4/14/92	4/15/92	2		01
94	020060-A/C BATTERY, SECONDARY AIR FAN FLOOR - CURE - 23	A/C-1	4/14/92	5/14/92	23		01
95	020085-A/C ELEVATOR MACHINE ROOM FLOOR - POUR - 1	A/C-1	4/15/92	4/15/92	1		01
96	140058-TAM ROUGH SET DUCT - SEC AIR AH TO BUSTLE - 2	TAM-1	4/15/92	4/16/92	2		01
97	140048-TAM INSTALL STEAM DRUM - 3	TAM-1	4/15/92	4/17/92	3		01
98	140046-TAM INSTALL - CYCLONE SUPPORT STEEL - 5	TAM-1	4/15/92	4/21/92	5		01
99	020075-A/C PRIMARY AIR FAN FLOOR - CURE - 23	A/C-1	4/15/92	5/15/92	23		01
100	020056-A/C SECONDARY FAN PEDESTALS - POUR - 1	A/C-1	4/16/92	4/16/92	1		01
101	140468-TAM DELIVER - SNCR SYSTEM TANK - PM 04/15/92	TAM-2	4/16/92	4/16/92	0		02
102	140068-TAM ERECT SAND/FILL - SCREW CONVEYOR - 2	TAM-1	4/16/92	4/17/92	2		01
103	140070 - TAM SET - UREA TANK - 2	TAM-2	4/16/92	4/17/92	2		02
104	020090-A/C ELEVATOR MACHINE ROOM FLOOR - CURE - 23	A/C-1	4/16/92	5/18/92	23		01
105	020071-A/C PRIMARY FAN PEDESTLES - POUR - 1	A/C-1	4/17/92	4/17/92	1		01
106	140060-TAM ROUGH SET DUCT - COAL FD PURGE AIR - 2 *	TAM-1	4/17/92	4/20/92	2		01
107	140236-TAM ERECT - ASH DUCT - 4	TAM-2	4/17/92	4/22/92	4		02
108	140054-TAM INSTALL - FLUIDIZING DUCT - 15	TAM-1	4/17/92	5/7/92	15		01

	activity	sub title	earliest start	earliest finish	days	status as of 04/28/92	s#
109	020061-A/C SECONDARY FAN PEDESTALS - CURE - 20	A/C-1	4/17/92	5/14/92	20		01
110	140052-TAM INSTALL COMBUSTOR BOILER HANGERS - 10	TAM-1	4/20/92	5/1/92	10		01
111	020076-A/C PRIMARY FAN PEDESTLES - CURE - 20	A/C-1	4/20/92	5/15/92	20		01
112	140470-TAM DELIVER - TEMPERING / PREHEAT COILS - PM 04/20/92	TAM-2	4/21/92	4/21/92	0		02
113	140064-TAM ROUGH SET - OF DUCT BUSTLE TO BURNERS - 2	TAM-1	4/21/92	4/22/92	2		01
114	140472-TAM DELIVER - TUBES, FURNACE UPPER SW - PM 04/21/92	TAM-1	4/22/92	4/22/92	0		01
115	140476-TAM DELIVER - UPPER RW FURNACE TUBES - PM 04/24/92	TAM-2	4/25/92	4/25/92	0		02
116	140474-TAM DELIVER - UPPER FW FURNACE TUBES - PM 04/24/92	TAM-1	4/27/92	4/27/92	0		01
117	130010-FAI PART REWORK EXIST. 24" FEED CONVEYOR - 0	FAI-5	5/4/92	5/4/92	0		05
118	140478-TAM DELIVER - AIRHEATER - PM 05/01/92	TAM-2	5/4/92	5/4/92	0		02
119	140478-TAM DELIVER AIR HEATER - PM 05/01/92	TAM-2	5/4/92	5/4/92	0		02
120	T/R TO AM 05/04/92	TAM-5	5/4/92	5/4/92	0		05
121	140066-TAM UPPER COMBUSTOR HEADERS - 5	TAM-1	5/4/92	5/8/92	5		01
122	130015-FAI PART DELIVER TRIPPER ROOM ROOF STEEL - 10	FAI-5	5/4/92	5/15/92	10		05
123	130010A-FAI COMP REWORK EXIST. 24" FEED CONVEYOR - 41	FAI-5	5/4/92	6/30/92	41		05
124	140482-TAM DELIVER - FURNACE ROOF TUBES - PM 05/04/92	TAM-3	5/5/92	5/5/92	0		03
125	140072-TAM ROUGH SET - FURN SIDEWALL UPPER - 3	TAM-1	5/11/92	5/13/92	3		01
126	140074-TAM ROUGH SET - FURN FW UPPER - 3	TAM-1	5/14/92	5/18/92	3		01
127	140484-TAM DELIVER ECONOMIZER TO AH - PM 05/14/92	TAM-2	5/15/92	5/15/92	0		02
128	130015-FAI COMP DELIVER TRIPPER ROOM ROOF STEEL - 5	FAI-5	5/18/92	5/22/92	5		05
129	130020-FAI INSTALL TRIPPER ROOM ROOF STEEL - 14	FAI-5	5/18/92	6/5/92	14		05
130	140076-TAM GROUND ASSEMBLE - FURN DW - 20	TAM-3	5/18/92	6/15/92	20		03
131	140078-TAM ROUGH SET - FURN RW UPPER - 2	TAM-2	5/19/92	5/20/92	2		02
132	140080-TAM ROUGH SET - AIR HEATER HOPPER - 2	TAM-2	5/21/92	5/22/92	2		02
133	140082-TAM PART ERECT - UPPER FURN SIDEWALL - 3	TAM-2	5/21/92	5/26/92	3		02
134	140084-TAM AIR HEATER SUPPORT STEEL - 3	TAM-2	5/26/92	5/28/92	3		02
135	140486-TAM DELIVER - SH DUCT TO ECON - PM 05/26/92	TAM-2	5/27/92	5/27/92	0		02

	activity	sub title	earliest start	earliest finish	days	status as of 04/28/92	s#
136	140082A-TAM COMP ERECT - UPPER FURN SIDEWALL - 3	TAM-2	5/27/92	5/29/92	3		02
137	140086-TAM FURN SW WELD UPPER - 9	TAM-2	5/27/92	6/8/92	9		02
138	140126-TAM ROUGH SET - GAS GUN PURGE AIR - 1	TAM-2	5/28/92	5/28/92	1		02
139	140488-TAM DELIVER DUCT - GAS GUN PURGE AIR - PM 05/27/92	TAM-2	5/28/92	5/28/92	0		02
140	140490-TAM DELIVER - SW LOWER FURNACE TUBES - PM 05/27/92	TAM-2	5/28/92	5/28/92	0		02
141	140492-TAM DELIVER - FW FURNACE LOWER TUBES - PM 05/27/92	TAM-2	5/28/92	5/28/92	0		02
142	140494-TAM DELIVER - RW LOWER FURNACE TUBES - PM 05/27/92	TAM-2	5/28/92	5/28/92	0		02
143	140496-TAM DELIVER - RETRACTABLE SOOT BLOWERS - PM 05/28/92	TAM-2	5/29/92	5/29/92	0		02
144	140088-TAM ROUGH SET - STEAM COIL AIR HEATER - 2	TAM-2	5/29/92	6/1/92	2		02
145	140132-TAM ROUGH SET - SAND PIPING TO COAL FEEDER - 2	TAM-2	5/29/92	6/1/92	2		02
146	140364-TAM ERECT DUCT - COAL FD PURGE AIR - 15	TAM-3	5/29/92	6/18/92	15		03

8:40:39 AM - Tuesday, April 28, 1992 (594) - meeting notes

I. *T. B. Simon Power Plant Unit 4 Addition notes - disk 308*
II. *By Ralph J. Stephenson*
III. *Meeting date - Tuesday, April 28, 1992 (594)*
IV. *Location - MSU Power Plant field office*
V. *Those attending*
   A. *Dick Wever - MSU construction superintendent*
   B. *Jim Simons - MSU project representative - in meeting part time*
   C. *Don Vercruysse - MSU field staff*
   D. *Sean McCardel - MSU field staff*
   E. *Ralph J. Stephenson - Consultant*
VI. *Agenda*
   A. *Complete work on bulletin & change order tracking document - see monitoring report #14*
   B. *√Inspect project*
   C. *√Discuss current status of project*
   D. *√Review and comment on current documentation status*
   E. *√Review recent issues of A/C computer listings*
   F. *√Evaluate current status of project*
   G. *√Review translation work to date on sheet #06 - electrical construction*
VII. *Current job status - see project status analysis in monitoring report #15*
VIII. *Documentation status*
   A. *Currently inputting all documents by the following fields*
      1. Month document number - dcn
         a) 01 - January, 1987
         b) 02 - February, 1987
         c) 03 - March, 1987
         d) 04 - April, 1987
         e) 05 - May, 1987
         f) 06 - June, 1987
         g) 07 - July, 1987
         h) 08 - August, 1987
         i) 09 - September, 1987
         j) 10 - October, 1987
         k) 11 - November, 1987
         l) 12 - December, 1987
         m) 13 - January, 1988
         n) 14 - February, 1988
         o) 15 - March, 1988
         p) 16 - April, 1988
         q) 17 - May, 1988
         r) 18 - June, 1988
         s) 19 - July, 1988
         t) 20 - August, 1988
         u) 21 - September, 1988
         v) 22 - October, 1988
         w) 23 - November, 1988
         x) 24 - December, 1988
         y) 25 - January, 1989
         z) 26 - February, 1989
         aa) 27 - March, 1989
         ab) 28 - April, 1989

ac) 29 - May, 1989
ad) 30 - June, 1989
ae) 31 - July, 1989
af) 32 - August, 1989
ag) 33 - September, 1989
ah) 34 - October, 1989
ai) 35 - November, 1989
aj) 36 - December, 1989
ak) 37 - January, 1990
al) 38 - February, 1990
am) 39 - March, 1990
an) 40 - April, 1990
ao) 41 - May, 1990
ap) 42 - June, 1990
aq) 43 - July, 1990
ar) 44 - August, 1990
as) 45 - September, 1990
at) 46 - October, 1990
au) 47 - November, 1990
av) 48 - December, 1990
aw) 49 - January, 1990
ax) 50 - February, 1991
ay) 51 - March, 1991
az) 52 - April, 1991
ba) 53 - May, 1991
bb) 54 - June, 1991
bc) 55 - July, 1991
bd) 56 - August, 1991
be) 57 - September, 1991
bf) 58 - October, 1991
bg) 59 - November, 1991
bh) 60 - December, 1991
bi) 61 - January, 1992
bj) 62 - February, 1992
bk) 63 - March, 1992
bl) 64 - April, 1992
bm) 65 - May, 1992
bn) 66 - June, 1992
bo) 67 - July, 1992
bp) 68 - August, 1992
bq) 69 - September, 1992
br) 70 - October, 1992
bs) 71 - November, 1992
bt) 72 - December, 1992
bu) 73 - January, 1993
bv) 74 - February, 1993
bw) 75 - March, 1993
bx) 76 - April, 1993
by) 77 - May, 1993
bz) 78 - June, 1993

ca) 79 - July, 1993
cb) 80 - August, 1993
cc) 81 - September, 1993
cd) 82 - October, 1993
ce) 83 - November, 1993
cf) 84 - December, 1993
cg) 85 - January, 1994
ch) 86 - February, 1994
ci) 87 - March, 1994
cj) 88 - April, 1994
ck) 89 - May, 1994
cl) 90 - June, 1994
cm) 91 - July, 1994
cn) 92 - August, 1994
co) 93 - September, 1994
cp) 94 - October, 1994
cq) 95 - November, 1994
cr) 96 - December, 1994

2. Document type - dty
   Examples given below at random. See MSU master list for full list of codes.
   a) dcr - daily construction report
   b) ewr - extra work report
   c) jpm - job progress meeting
   d) mem - memo
   e) roc - report of contact
3. Subject code - sco
   For now only the main subject of the document is being code input. See MSU master list of abbreviations for code meanings.
4. Incoming document indicator - din
5. Outgoing document indicator - dou
6. Date document processed - ddp
7. Date document received - ddr
8. Organization from - ofr
9. Organization to - oto

B. MSU field staff working on month 56 presently - August, 1991

C. All hard copy material has been duplicated, numbered, sorted and put in binders

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May 7, 1992

Subject:	Monitoring Report #16
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Joseph Kavanagh - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265, 281, 301, 303, 305 and 308
Date of monitoring:	Friday, May 7, 1992 (wd 601)
Meeting locations:	Job site office at Power Plant #4

Those attending:

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Dave Sadler - A/C project director
- Jim Cornillie - A/C project director
- John Hacul - A/ C project manager
- Ralph J. Stephenson - consultant

Actions taken:

- Reviewed objectives of meeting, agenda and rjs observations
- Discussed project planning and scheduling in general
- Set preliminary guidelines for future project planning and scheduling

General Summary:

Mr. Simons briefly outlined the need for a full discussion of the current status of the project planning and scheduling. An early question asked by Mr. Simons was - does A/C currently need any information from MSU to proceed with their planning and scheduling work. If so, what is needed? - A/C as a group agreed that they have all information they need from MSU at present to do their planning and scheduling work.

We next discussed the base information from which the bar chart displayed on the trailer wall of MSU was derived. A/C was asked for the predecessor/successor run from which the bar chart was plotted. A/C will attempt to locate the data and furnish it to MSU.

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We stressed the importance of providing planning and scheduling documents with a unique identification for each set of information issued. At present if the same data is printed out twice in sequence, the succeeding run, though containing the identical data, is given a new run number. MSU pointed out that identical content material should carry identical issue identification.

I suggest this identifying information be placed in the heading of the runs, irrespective of the format. Thus data identified as A/C issue #05, dated June 14, 1992 will always be A/C issue #05, dated June 14, 1992, regardless of whether it is a predecessor/successor run, an early start run, a look ahead run for the next 30 calendar days, a bar chart, or a listing in early start, early finish sequence.

When the data is revised or updated, the issue number and date should be changed. Thus the A/C data can always be identified within other project member's data translations.

Mr. Hacul will design an identification system and put it into operation as soon as possible.

A/C will also identify all changes made to their planning and scheduling issues by highlighting, coding or other devices. This is to insure that MSU and others know what changes have been made without the necessity of going through previous activity lists and finding the changes. The process is similar to that by which bulletin revisions on design working drawings are identified by clouds drawn around the changed area of the drawing.

Mr. Sadler asked if we expected the planning and scheduling documents to be changed when job conditions make it essential to change. The reply was yes, that changes are expected. However frequent or excessive changes to planning and scheduling documents as the job proceeds, are often disruptive. The quality and accuracy of an issued plan and schedule should be as high as possible to minimize the need for revisions and subsequent updating.

We discussed the interconnections needed to provide true latest allowable starts and latest allowable finishes. A/C said they will begin now inserting these ties in the predecessor/successor listing. MSU offered their assistance and the use of the network logic models derived from the A/C runs for this process. We shall discuss this matter as the joint monitoring process is implemented.

Currently, according to A/C, they are using the early starts and early finishes of activities as the measure of job status. MSU pointed out the considerable current lag on the project when evaluated by early starts and early finishes from the current monitoring documents in use by MSU. These documents are described in the MSU monitoring reports from rjs.

During the discussion MSU provided copies of the objectives of the meeting, a suggested agenda and observations relative to the topics in the agenda. A set of this material has been lightly edited to correct errors, and is attached to this report.

It was decided that each of the parties at the meeting, MSU, A/C, and rjs would annotate the agenda items and provide them to Mr. Simons by Monday, May 11, 1992. My notes are appended to the agenda outline duplicated below.

Agenda items & recommendations:

01. <u>Tie ins to planning and scheduling documents from other disciplines and trades.</u>

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May 7, 1992

a. What are the interdisciplinary connections

01.) From & to the owner?
02.) From & to the architect/engineer?
03.) From & to others not under A/C contract? (who are these?)

Recommendations - these should be identified jointly by MSU, A/C, B&V and others affected by the connections. A/C should be given any assistance they need in getting interconnecting information from those not under their contract.

b. What construction trades are to be interconnected?

Recommendations - A/C and MSU should determine these. The individual contractor information now in the predecessor/successor runs provides an excellent starting point for completion of all interconnections since most of the major trades are already identified

• **Identification of each issue of the planning and scheduling documents for reference ease and consistency of use.**

Recommendations - Each data run that consists of revised or updated data different than contained in the previous run on which it was based constitutes a new data issue.

This new issue should be identified with a unique system so there is no doubt about the base source.

• **Completion of planning and scheduling documents.**

- When?
- How?
- Who?

Recommendations - The basic data for the runs is now in the computer systems. What is needed is to complete inputting current activity information, particularly future activities, and to complete showing the interconnections.

I suggest we set a target date for A/C to issue the full computer model for the project of June 01, 1992. As mentioned in the meeting, MSU and rjs are available to help by making the current graphic network models available for analysis purposes as A/C desires, and by conferring with A/C as they request.

However the content and preparation of the planning and scheduling material, is the responsibility of A/C. This has been discussed often and thoroughly.

• **Review of and comments on planning and scheduling documents**

- Who?
- When?
- How?

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May 7, 1992

Recommendations - The planning and scheduling documents should be provided for review and comment to all parties participating in or affected by the work. The obligation of these parties is to make their review, and to comment on the accuracy and completeness of the material. A/C still must bear responsibility for planning, scheduling, and constructing within the requirements of the contract.

• Owner monitoring and comments on project progress

- **Who?**
- **When?**
- **How?**
- **What follows?**

Recommendations - MSU and rjs will plan to monitor the project jointly about once per month. Spacing may vary from time to time as job conditions dictate. A/C is invited and encouraged to join MSU and rjs in the job inspection, the monitoring discussion, the analysis of job status, and any other discussions that may relate to their planning, scheduling and job management work.

I shall set the monitoring dates with Mr. Simons and he, in turn will inform A/C. We shall monitor the project from plans and schedules currently in effect. If authentic late starts and late finishes are available, they will be considered. If not the monitoring will be from the early starts and early finishes shown in the planning documents.

The results of the project analysis will be recorded in a monitoring report from me to the owner. I shall try wherever possible to include A/C comments and observations into my analysis and report.

• Identification of project deficiencies

- **Who?**
- **When?**
- **How?**
- **What follows?**

Recommendations - The inspection and subsequent monitoring evaluation and analysis will be done to the greatest possible extent with A/C participation. A/C will be responsible for assigning the individuals with whom I will work in these inspections and discussion.

Mr. Simons will be assumed to represent MSU, although he too might assign other individuals to be involved in the monitoring and inspection. This will be a matter to be worked out as the project monitoring proceeds.

Follow up procedures on monitoring and analysis will be decided jointly by A/C and MSU.

• Correction of project deficiencies

- **Who?**

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May 7, 1992

- **When?**
- **How?**
- **Procedures?**

Recommendations - Correction of project deficiencies will be by discussion and decisions made at the A/C and MSU project staff levels. The process by which corrections are made will probably vary. However resolution methods at the originating level of management should be put to work as soon as deficiencies and conflicts arise, to insure prompt and timely solutions to problems.

Good planning, scheduling and monitoring locates deficiencies and problems.

Good project management corrects deficiencies and solves problems.

I shall be in touch with Mr. Simons soon to set the next planning and monitoring session.

Ralph J. Stephenson P. E.

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May 7, 1992

Subject: Agenda notes - for meeting 05/07/92

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Jim Simons - MSU project representative

From: Ralph J. Stephenson - Consultant

Meeting location: Job site office at Power Plant #4

Those expected to attend:

- Dick Wever - MSU construction superintendent
- Jim Simons - MSU project representative
- Dave Sadler - A/C project director
- Jim Cornillie - A/C project director
- John Hacul - A/C project manager
- Ralph J. Stephenson - Consultant

Suggested agenda items - at random

- Tie ins to planning and scheduling documents from other disciplines and trades.

  - **What are the interdisciplinary connections**

    From & to the owner?
    From & to the architect/engineer?
    From & to others not under A/C contract? (who are these?)

  - **What construction trades are to be interconnected?**

- Identification of each issue of the planning and scheduling documents for reference ease and consistency of use.

- Completion of planning and scheduling documents.

  - **When?**
  - **How?**
  - **Who?**

- Review of and comments on planning and scheduling documents

  - **Who?**
  - **When?**
  - **How?**

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May 7, 1992

- Owner monitoring and comments on project progress

  - Who?
  - When?
  - How?
  - What follows?

- Identification of project deficiencies

  - Who?
  - When?
  - How?
  - What follows?

- Correction of project deficiencies

  - Who?
  - When?
  - How?
  - Procedures?

- Other agenda items?

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May 7, 1992

Objectives of meeting: MSU PP#4 planning and scheduling

• To review the current status of project planning and scheduling by A/C and to discuss and decide on the methods of proceeding with future planning and scheduling efforts with the following in mind.

a. The general project manager (A/C), the owner, the design team, the dfi contractors and the sub contractors must be encouraged to make effective use of the plans and schedules for the project.

b. Adequate review processes must be agreed upon to insure valid acceptance and effective use of A/C project plans and schedules?

c. Input to A/C from all parties including the the owner, the design team, the dfi contractors and the sub contractors must be assured to produce a workable, accurate, consistent and reliable plan and schedule of work.

d. Proper and timely monitoring of the project is essential by all parties having a stake in the job. A/C must provide these parties with planning and scheduling documents that allow all of them, the owner, the design team, the dfi contractors and the sub contractors to conduct such monitorings.

e. The system of identification and distribution of the planning and scheduling documents from A/C must be known and understood by all, and must be followed consistently and constantly.

f. The correction processes for job situations that show deviations from the accepted standards of performance must be formulated, agreed upon by all affected, implemented, and reviewed regularly for their operational worth.

g. The planning and scheduling documents must be completed by A/C in the immediate future. These documents must contain adequate cross restraints between the various disciplines and trades so that the material is accurate and reliable. In addition the material must be such that major true late finishes and starts can be determined with confidence.

h. The use of float time should be clearly understood.

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May 7, 1992

General guideline observations - MSU PP#4 planning and scheduling

01. The A/C planning and scheduling information must provide a unified source of project wide planning, scheduling and monitoring information. The objective of a work plan and schedule is to provide all parties to the project - the owner, the design team, the dfi contractors, the sub contractors and the general project manager - identifiable, consistent, agreed to, and clearly understood standards of performance to which they are all working and planning.

02. A/C must prepare and furnish the owner a set of planning and monitoring information that insures the owner can track the project to the fullest degree desired, and be assured that their analysis is based on accurate information.

03. A/C must make every effort possible to adhere to the planning and scheduling information they provide to the project team. When deviations occur that require updating, explanation or concerted project team effort, A/C must be prepared to explain the need for, and nature of corrections to all parties and expect the corrective action to be understood.

04. A/C plans and schedules must be clearly identified and accurate information made available as to whom are they to be furnished and what are the instructions for their use. The techniques and procedures to be used by A/C should be defined by A/C, approved by the owner, and clearly explained to all members of the project team.

05. Accountability for lags such as now exist on the project must be assignable. Once identified, the machinery for correcting lagging or inadequate actions should be able to be clearly explained to the owner, and the results of the corrective action must be measurable.

06. We do not as yet have adequate tie in data to accurately determine the real late finish and late start dates for each activity. It is only with this data that the true significance of a lag can be determined. It is urgently needed for accurate monitorings to be made. This information should be furnished to the owner by A/C.

07. Each successive monitoring has shown an increase in lag over planned early starts and early finishes. Since it is relatively early in the project these increases should be minimized now, and overall job planning should be brought more closely in line with the expected than is presently the case. This is the responsibility of A/C acting in concert with its subcontractors, the dfi contractors, and the owner.

08. It does not appear that activities in many of the A/C computer runs are fully connected either internally nor to outside constraints to and from the various activities. Lack of this information is presently stalling effective effort to develop an accurate and reliable monitoring system.

09. The mechanical work computer run for IMC activities is yet to be completed. This is a critical set of work since it relates closely to Tampella's boiler work, and probably to GE's turbine generator work. Until we get this data it is not possible to accurately and reliably evaluate work status.

10. Architectural trades work is due to begin within the next two months. This work is critical to closing the building in against winter weather. We need a full evaluation of the current plan of work to insure the close in of the building can be accomplished in a timely fashion without interfering with,

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May 7, 1992

or delaying setting and installation of boiler and generator installation along with all other major equipment setting needs.

11. With the current lags the computer runs should be fully updated by A/C with all current data available used to insure accuracy. The updated plan of work should show valid ties between the various trades work on the project. It should also be clearly identified and issued for use by all concerned with the project work.

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July 1, 1992

Subject:	Monitoring Report #17
Project:	Michigan State University T. B. Simon Power Plant Unit 4 Addition East Lansing, Michigan
To:	Robert Nestle - MSU project manager Richard Wever - MSU construction superintendent Jim Simons - MSU project representative
From:	Ralph J. Stephenson - Consultant
rjs project:	91:14
rjs disks:	253, 265, 281, 301, 303, 305, 308 and 318

Dates of meetings and monitorings:

May 22, 1992 (wd 357)
June 3, 1992 (wd 364)
June 9, and 10, 1992 (wd 368 and 369)
June 11, 1992 (wd 370)
June 24, 1992 (wd 379)
June 29, 1992 (wd 382)
June 30, 1992 (wd 383)

Documents used in monitorings and discussions:

• Alberici/Clark (A/C) Prima Vera computer run #23, dated January 27, 1992 (wd 528) with data date of November 4, 1991 (wd 471). The work shown in this computer run has been designated A/C Issue #01, dated January 27, 1992 (wd 528) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #29 & 30, dated February 22 and 27, 1992 (wds 548 and 551), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 tam, dated February 27, 1992 (wd 551) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #36, dated April 7, 1992 (wd 579), with data date of November 4, 1991 (wd 471). The Tampella work shown in this

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July 1, 1992

computer run has been designated A/C Issue #02 qua, dated April 7, 1992 (wd 579) of the A/C planning documents.

• rjs network model translations of the A/C network issues # 1 and 2. These include the following

- Sheet #1, issue 2a dated February 27, 1992 (wd 551) - Translated from A/C Issues #1 and #2
- Sheet #2, issue 2a dated March 5, 1992 (wd 556) - Translated from A/C Issue #2
- Sheet #3, issue 2a dated April 3, 1992 (wd 577) - Translated from A/C Issue #2
- Sheet #4, issue 2a dated March 26, 1992 (wd 571) - Translated from A/C Issue #1
- Sheet #5, issue 2a dated April 4, 1992 (wd 578) - Translated from A/C Issue #1

General review of various meetings:

Date of meeting - Friday, May 22, 1992 (wd 357)

Location - Job site office at Power Plant #4

Those attending:

• Richard Wever - MSU construction superintendent
• James Simons - MSU project representative
• Alberici/Clark staff - in meetings part time
• Ralph J. Stephenson - consultant

Actions taken:

• Reviewed Tampella procurement status
• Discussed current target completion dates

Summary:

The purpose of this meeting was to generally review and discuss the current status of Tampella Power's manufacturing and buy out for the project. Other related subjects were discussed as the meeting proceeded.

I prepared and distributed a tabulation of the delivery dates for Tampella's material and equipment taken directly from the msu issue 2a, A/C computer run #30, report date 02/27/92.

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July 1, 1992

We reviewed status reports from Alberici/Clark and Tampella identifying the position of the project as of May 22, 1992 (wd 357). From this data we discussed how best to proceed to obtain authentic material for an updating of the current network models.

* * *

Date of meeting - Wednesday, June 3, 1992 (wd 364)

Location - Job site office at Power Plant #4

Those attending:

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Ralph J. Stephenson - consultant

Actions taken:

- Reviewed agenda for discussions with Tampella
- Inspected project with Mr. Wever and Mr. Simons

Summary:

This conference was primarily to discuss the content and agenda of the meeting to be held by me with Tampella at their plant and office in Williamsport, Pennsylvania. The Williamsport meeting had two fundamental purposes. The first was to discuss deliveries and obtain from Tampella their current delivery targets for remaining materials and equipment to be delivered to the job site. The second was to obtain from Tampella an updated plan of work.

At our Michigan State University conference we reviewed in depth the current status of Tampella's delivery and installation work as background for the Tampella office visit. I also toured the project with Mr. Wever and Mr. Simons.

* * *

Dates of meetings - Tuesday and Wednesday, June 9 and 10, 1992 (wd 363 & 369)

Location - Tampella Power's office and plant, Williamsport, Pennsylvania

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Consulting Engineer
323 Hiawatha Drive, Mt. Pleasant, Michigan 48858
ph 517 772 2537
July 1, 1992

Those attending:

Tuesday, June 9, 1992 (wd 363)

- Paul Bianchet - Tampella Manager of Projects - in meetings part time
- Dean Ely - Tampella Project Manager
- Michael A. Fredo - Tampella Assistant Project Manager
- Pete Theis - Tampella Senior Field Engineer
- Tom Jorris - Fuel Economy Senior Project Manager
- Jack Dinsmore - Fuel Economy Site Engineer
- Ralph J. Stephenson - Michigan State University consultant

Wednesday, June 10, 1992 (wd 364)

- Paul Bianchet - Tampella Manager of Projects - in meetings part time
- Dean Ely - Tampella Project Manager - in meetings part time
- Pete Theis - Tampella Senior Field Engineer
- Ralph J. Stephenson - Michigan State University consultant

Actions taken:

- Reviewed desired agendas for meetings
- Discussed project plans and schedules currently in use
- Reviewed current status of Tampella project deliveries
- Reviewed current status of Tampella/Fuel Economy field work
- Discussed distribution of project communications as they relate to Tampella/Fuel Economy planning and scheduling
- Discussed updating of current network models

Job plans and schedules currently in use:

It was generally agreed that the material listed below collectively represents the current Tampella base line planning and scheduling information from which the project is being measured. There was not total agreement that the measurements should actually be made from the material listed below. However all agreed that there are no other issued documents available by which job progress can be measured by msu. They further agreed that Tampella and Fuel Economy are no longer following the plans and schedules listed below.

- Tampella/Fuel Economy computer run #26
- A/C computer run 29/30 - derived from Tampella/Fuel Economy computer run

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#26
• MSU 5 - Fuel Economy name for Tampella/Fuel Economy computer run #27
• msu/rjs issue #2a, various dates, see above - derived from Alberici/Clark computer run 29/30

Summary:

Mr. Fredo, Tampella Assistant Project Manager, met me and drove me to the plant. We first toured the Tampella main offices, design facilities, and the plant facilities adjoining the main office.

The plant appeared to contain up to date, well maintained, highly automated tube and table lines. Production operations seemed slow during our tour. However this could be due to a variety of reasons that are not part of my analysis assignment.

In the early afternoon we discussed variety of subjects including:

• My purpose in being there.
• What Michigan State University wished me to accomplish during my visit.
• The afternoon agenda.
• What was needed from Tampella/Fuel Economy to satisfy Michigan State University needs.

I established as the objectives of my trip the following:

• To receive from Tampella an updated delivery schedule.
• To receive from Tampella an updated computer run showing activities, activity numbers, estimated durations and predecessors and successors.

There was considerable discussion by Tampella and Fuel Economy on the importance of impacts on their work. However I explained that I was not able to discuss impact problems since I had no authentic knowledge of this subject, and that my main assignment was to concentrate on Michigan State University's and my basic objectives noted above. These concerned only the issuance of an updated delivery schedule and an updated network model showing Tampella/Fuel Economy work.

Fuel Economy had provided Tampella with a bar chart of early starts and early finishes derived from a predecessor, successor list prepared by Fuel Economy. Fuel Economy called this run **ms6c**. I requested that Tampella/Fuel Economy use an identification system that did not change each time a new computer run was made.

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Fuel Economy agreed that the p/s (predecessor, successor) run under discussion today would be called **ms6c - 06/05/92.**

I was given copies of the **ms6c - 06/05/92** p/s run, the bar chart, and the arrayed activity data run.

There was considerable discussion among the Fuel Economy/Tampella group about whether or not this issue **ms6c-06/05/92** run should actually be considered an issued set of job management data. I told them that if they wished I would mark in large letters on any translations I might prepare from this run (network diagrams, data runs, or other) that the issue was preliminary for review and discussion only. I also said, however, that this issue could not be officially accepted and used by me, but had to go through official channels for it to see official use.

I explained to the group that with this information I would update my graphic network models to confirm the validity of the logic as an updated network model. They generally agreed this would be acceptable. However it was understood that the network must still be formally issued at some point in the near future.

I called Mr. Wever and Mr. Simons of Michigan State University at 4:00 pm to relay the results of our meeting to that point. All attending were invited to stay for the conversation - they stayed

The following points were covered in this discussion with Mr. Wever and Mr. Simons:

1.) That we were maintaining the objectives of the meeting as being

- To receive from Tampella an updated delivery schedule.
- To receive from Tampella an updated computer run showing activities, activity numbers, estimated durations and predecessors and successors.

2.) That to date we had a new issue ms6c-06/05/92 that was available from Tampella, and could be used for review and comment only.

3.) That I was satisfied the material discussed with Tampella was what was desired from Tampella, but that I still had to validate the material.

4.) Mr. Wever and Mr. Simons said they were interested only in obtaining an action plan of work, and that any discussion of impacts were beyond the scope of my assignment on this trip. I agreed and pointed out that the validity of the issue

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ms6c-06/05/92 plan as a plan of proposed field action could only be determined after additional investigation and study by me. They agreed this should be done if I felt it appropriate.

We concluded the full meeting in late afternoon after which I began working with Mr. Pete Theis to update and print the tabulations of actual and scheduled delivery dates of Tampella equipment.

We also monitored Tampella's current work from sheet #01, issue 2a network model using input from Mr. Theis. As the project was reviewed we removed completed activities from network as a first step in updating the Tampella plan of action.

(The above notes of our first day's activities have been edited slightly to put them in an appropriate narrative form. The rough note file was printed out at the conclusion of our main meeting and provided to each participant to review. They felt it reflected the discussions properly.)

On Wednesday, June 10, 1992 (wd 369), Mr. Theis and I continued to analyze, monitor and update the issue #2a network model to reflect the revisions from the Tampella issue provided the previous day. This work continued throughout the day.

At the close of the second day's meeting Mr. Theis and I met with Mr. Bianchet and Mr. Ely to review our progress. I told them that there was still considerable work to be done to provide a usable and accurate updated network model of the work to be accomplished from the current date to the end of the project. They agreed to continue their analysis of the issue ms6c-06/05/92 and provide Michigan State University with the updated material as it was revised.

* * *

Date of meeting - Thursday, June 11, 1992 (wd 370)

Location - Physical plant offices - Michigan State University

Those attending:

- Robert Nestle - MSU engineer
- Richard Wever - MSU construction superintendent
- Ralph J. Stephenson - consultant

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Actions taken:

- Reviewed meetings I had with Tampella Power and Fuel Economy in Williamsport, Pennsylvania.
- Provided Mr. Nestle and Mr. Wever with copies of selected material resulting from Tampella meetings in Williamsport, Pennsylvania.

Summary:

This meeting was primarily to review the meetings I had on June 9 and 10, 1992 (wd 368 & 369) with the Tampella and Fuel Economy staff in Williamsport, Pennsylvania. I provided Mr. Nestle and Mr. Wever copies of several documents including:

Item A - The TAM/FEC computer run labeled ms6c-06/05/92 which had been given to me by Tampella.

Item B - A list of Tampella delivery dates as anticipated on June 10, 1992 (wd 369).

Item C - A list of Alberici/Clark activity numbers related to the corresponding Tampella/Fuel Economy numbers. This was arrayed in Alberici/Clark sequence.

Item D - A list of Alberici/Clark activity numbers related to the corresponding Tampella/Fuel Economy numbers. This was arrayed in TAM/FEC sequence.

Item E - The rough notes prepared at the meetings containing the material substantially as outlined above.

For reference purposes copies of items B, C, and D are attached to this report.

* * *

Date of meeting - June 24, 1992 (wd 379)

Location - Physical plant office, and job site office at Power Plant #4

Those attending:

- Robert Nestle - MSU engineer - AM only
- Richard Wever - MSU construction superintendent

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- James Simons - MSU project representative
- Pete Theis - TAM senior field representative - PM only
- Ralph J. Stephenson - consultant

Actions taken:

- Reviewed course of action to be taken in future planning of project work
- Began active replanning of Tampella work with Mr. Pete Theis, Tampella's senior field manager.

Summary:

In the morning session we made a review of Tampella's plan updating and delivery schedule. The review was considered as part of a larger discussion as to how best to plan the project as an ongoing process in which the entire project plan was to be combined and interrelated to all activities needed to construction the facility.

It was decided to begin with the Tampella work and to work with the Tampella field forces to rediagram the project using the previous networks and computer listings as the master laundry list.

In the afternoon, I met with Mr. Pete Theis and began active planning of the project using both new input, along with existing activity data from previous issues of the Tampella work plan. Mr Theis and I numbered activities with both the Tampella/Fuel Economy numbers and the Alberici/Clark numbers.

I printed the afternoon rough network draft at the close of our meeting for Mr. Theis to review and revise as needed.

* * *

Dates of meetings - Monday and Tuesday, June 29 and 30, 1992 (wd 382 & 383)

Location - Job site office at Power Plant #4

Those attending:

- Richard Wever - MSU construction superintendent - in meetings part time
- James Simons - MSU project representative - in meetings part time
- John Hucul - A/C project manager - in meetings part time

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- Pete Theis - TAM senior field engineer
- Ralph J. Stephenson - consultant

Actions taken:

- Continued preparing network model for Tampella's procurement and field work
- Inspected storage and laydown areas with Mr. Theis of Mr. Tampella
- Inspected project with Mr. Theis and Mr. Clark Reeves of Tampella

Summary:

The main work at these two sessions centered on the ongoing preparation of the network plan for Tampella's work from now to the end of the project.

Mr. Theis and I worked on preparing the logic plan for both procurement and field construction. Mr. Wever, Mr. Simons and Mr. Hucul were all invited to attend as much of the sessions as they desired. Mr. Hucul sat in on some of the actual diagraming and observed the methodology and procedures being used.

The meetings and diagraming resulted in production and printing of a rough preliminary draft for review and comment entitled sheets #01 and #02, issue #4, dated June 24, 1992 (wd 379). Mr. Theis was provided a copy of the network model and will immediately make a detailed review of the material to allow the plan of action to be revised as necessary and issued and officially accepted as the current plan of work.

Mr. Theis was asked to provide a copy of the network to Mr. Simons for MSU's use. Mr Simons has marked this material as preliminary, with any transmittals used further marked as for review only.

As Mr. Theis is reviewing the Tampella issue #4 network model, dated June 24, 1992 (wd 379), I shall begin a series of meetings with those responsible for other work on the project. Most of these will require input and information from the contractor doing the work coupled with the comments and input of Alberici/Clark as the general project manager.

These meetings are being arranged by the Michigan State University project staff. The work to be addressed in our future planning includes the following, listed generally in the sequence with which I suggest we consider their planning.

The planning of each is expected to overlap with the planning of other related

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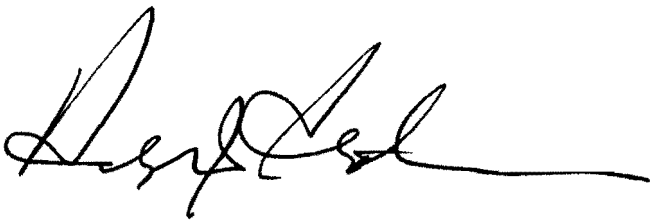
work. Numbers in ( ) are the proposal package numbers assigned during the early stages of the project by the design team.

- Completion of Tampella steam generator work (62.3401)
- General Electric turbine work (62.1001)
- Electrical equipment work (63.0000)
- Building miscellaneous structural, architectural and close in work (71.0403)
- Mechanical construction work (72.0200)
- Electrical construction work (73.0200)
- Remaining structural steel work (61.4001 and others)
- Coal and other conveyor work
- Electrical configuration work
- Cooling tower work (62.0212)
- Fabric filter building work (62.0203)
- Distributed control work (62.0212)

The above list is subject to further review and additions or subdividing as required during the planning process.

Our next meeting is set for Tuesday, July 7, 1992 at the site. In this session we will concentrate on planning the building close in including related access for installing major equipment. This will include setting the turbine generator.

As time permits we will also work on the plan for mechanical construction work. This work is to be done from contractor input and by those responsible for the work.



Ralph J. Stephenson, P. E.

	activity	tam sched del es	tam sched del ef	uc	act start	act fin	tamplfec activity #	es tam run #26
1	140482-TAM DELIVER - FURNACE ROOF TUBES - PM 05/04/92				3/12/92	3/12/92	213	5/4/92
2	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM				3/13/92	3/13/92	225	3/6/92
3	140474-TAM DELIVER - UPPER FW FURNACE TUBES - PM 04/24/92				3/13/92	3/13/92	208	4/24/92
4	140430-TAM DELIVER - CYCLONES - 02/14/92 PM - TO 140006				3/18/92	3/18/92	236	2/14/92
5	140434-TAM DELIVER - FLUOSEAL - 03/02/92 PM				3/18/92	3/18/92	227	3/2/92
6	140456-TAM DELIVER - AIR HEATER HOPPER - PM 03/27/92				3/19/92	3/19/92	238	3/27/92
7	140440-TAM DELIVER - FURNACE BUCKSTAYS - 03/06/92 PM - TO 140024				3/23/92	3/23/92	219	3/6/92
8	140452-TAM DELIVER - SUPPORTS & HANGERS - 03/16/92 PM				3/26/92	3/26/92	220	3/16/92
9	140454-TAM DELIVER STEAM DRUM - AM 03/26/92				4/1/92	4/1/92	201	3/25/92
10	140436-TAM DELIVER - FURNACE LOWER HEADERS - 03/04/92 PM - TO 140018				4/7/92	4/7/92	203	3/4/92
11	140438-TAM DELIVER - FURNACE FLOOR TUBES - 03/05/92 PM - TO 140020				4/7/92	4/7/92	214	3/5/92
12	140446-TAM DELIVER - COAL FEEDERS - 03/12/92 PM - TO 140028				4/9/92	4/13/92	235	3/12/92
13	140458-TAM DELIVER LIMESTONE FEEDERS - PM 04/02/92				4/9/92	4/13/92	236	4/2/92
14	140472-TAM DELIVER - TUBES, FURNACE UPPER SW - PM 04/21/92				4/22/92	4/22/92	206	4/21/92

listed in es actual or scheduled order

	activity	tam sched del es	tam sched del ef	uc	act start	act fin	tampfec activity #	es tam run #26
15	140498-TAM DELIVER - DIVISION WALL TUBES - PM 06/01/92				4/22/92	4/22/92	212	6/1/92
16	140466-TAM DELIVER - UPPER FURNACE HEADER				4/23/92	5/22/92		
17	140464-TAM DELIVER - SAND SCREW FEEDER - PM 04/13/92				4/30/92	4/30/92	244	4/13/92
18	140490-TAM DELIVER - SW LOWER FURNACE TUBES - PM 05/27/92				4/30/92	4/30/92	207	5/27/92
19	140476-TAM DELIVER - UPPER RW FURNACE TUBES - PM 04/24/92				5/7/92	5/7/92	210	4/27/92
20	140492-TAM DELIVER - FW FURNACE LOWER TUBES - PM 05/27/92				5/18/92	5/18/92	209	5/27/92
21	140480-TAM DELIVER - ECONOMIZER 1				5/20/92	5/20/92	229	5/1/92
22	140478-TAM DELIVER - AIRHEATER - PM 05/01/92				5/20/92	5/29/92	230	5/1/92
23	140484-TAM DELIVER ECONOMIZER TO AH - PM 05/14/92				5/22/92	5/22/92	257	5/24/92
24	140528-TAM DELIVER DUCT - SECONDARY AIR FAN TO AH - PM 07/10/92				5/28/92	5/28/92	260	7/10/92
25	140468-TAM DELIVER - SNCR SYSTEM TANK - PM 04/15/92				6/1/92	6/1/92	245	4/15/92
26	140526-TAM DELIVER - PRI AIR FANS TO AH - PM 07/06/92				6/1/92	6/1/92	258	7/3/92
27	140494-TAM DELIVER - RW LOWER FURNACE TUBES - PM 05/27/92				6/3/92	6/3/92	211	5/27/92
28	140508-TAM DELIVER - PRIMARY FAN W/ DRIVE - PM 06/02/92				6/5/92	6/5/92	232	6/2/92

listed in es actual or scheduled order

	activity	tam sched del es	tam sched del ef	uc	act start	act fin	tampfec activity #	es tam run #26
29	140506-TAM DELIVER - SECONDARY FAN W/ DRIVE - PM 06/02/92				6/5/92	6/5/92	233	6/2/92
30	140542-TAM DELIVER - CYCLONE OUTLET DUCT - PM 08/11/92				6/7/92	6/7/92	254	8/11/92
31	140532-TAM DELIVER - NON METAL AIR DUCT EXP JOINT - PM 07/16/92				6/8/92	6/8/92	253	7/16/92
32	140432-TAM DELIVER - AIR HEATER TO PLENUM DUCT - 02/28/92 PM				6/9/92	6/9/92	259	2/28/92
33	140538-TAM DELIVER INSTRUMENTS & CONTROLS - PM 07/27/92			x			243	7/27/92
34	140460-TAM DELIVER DUCT - SEC AIR AH TO BUSTLE - PM 04/08/92	6/23/92	6/23/92	x			250	4/8/92
35	140514-TAM DELIVER - SUPERHEATER HEADERS - PM 06/05/92	6/26/92	6/26/92	x			204	6/5/92
36	140462-TAM DELIVER DUCT - COAL FD PURGE AIR - PM 04/10/92	6/30/92	6/30/92	x			251	4/10/92
37	140444-TAM DELIVER - ASH CLASSIFIER - 03/09/92 - TO 140180	7/1/92	7/1/92	x			222	3/9/92
38	140496-TAM DELIVER - RETRACTABLE SOOT BLOWERS - PM 05/28/92	7/1/92	7/1/92	x			241	5/28/92
39	140502-TAM DELIVER SOOTBLOWER ROTARY - PM 06/01/92	7/1/92	7/1/92	x			240	6/1/92
40	140500-TAM DELIVER SOOT BLOWER CONTROLS - 06/01/92	7/1/92	7/1/92	x			242	6/1/92
41	140510-TAM DELIVER - PNEUMATIC LIMESTONE SYSTEM - PM 06/02/92	7/1/92	7/1/92	x			510	6/2/92
42	140524-TAM DELIVER - ASH COOLING SCREWS - PM 07/01/92	7/1/92	7/1/92	x			246	7/1/92

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1	140482-TAM DELIVER - FURNACE ROOF TUBES - PM 05/04/92				3/12/92	3/12/92	213	5/4/92
2	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM				3/13/92	3/13/92	225	3/6/92
3	140474-TAM DELIVER - UPPER FW FURNACE TUBES - PM 04/24/92				3/13/92	3/13/92	208	4/24/92
4	140430-TAM DELIVER - CYCLONES - 02/14/92 PM - TO 140006				3/18/92	3/18/92	236	2/14/92
5	140434-TAM DELIVER - FLUOSEAL - 03/02/92 PM				3/18/92	3/18/92	227	3/2/92
6	140456-TAM DELIVER - AIR HEATER HOPPER - PM 03/27/92				3/19/92	3/19/92	238	3/27/92
7	140440-TAM DELIVER - FURNACE BUCKSTAYS - 03/06/92 PM - TO 140024				3/23/92	3/23/92	219	3/6/92
8	140452-TAM DELIVER - SUPPORTS & HANGERS - 03/16/92 PM				3/26/92	3/26/92	220	3/16/92
9	140454-TAM DELIVER STEAM DRUM - AM 03/26/92				4/1/92	4/1/92	201	3/25/92
10	140436-TAM DELIVER - FURNACE LOWER HEADERS - 03/04/92 PM - TO 140018				4/7/92	4/7/92	203	3/4/92
11	140438-TAM DELIVER - FURNACE FLOOR TUBES - 03/05/92 PM - TO 140020				4/7/92	4/7/92	214	3/5/92
12	140446-TAM DELIVER - COAL FEEDERS - 03/12/92 PM - TO 140028				4/9/92	4/13/92	235	3/12/92
13	140458-TAM DELIVER LIMESTONE FEEDERS - PM 04/02/92				4/9/92	4/13/92	236	4/2/92
14	140472-TAM DELIVER - TUBES, FURNACE UPPER SW - PM 04/21/92				4/22/92	4/22/92	206	4/21/92

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	activity	tam sched del es	tam sched del ef	uc	act start	act fin	tamp/fec activity #	es tam run #26
15	140498-TAM DELIVER - DIVISION WALL TUBES - PM 06/01/92				4/22/92	4/22/92	212	6/1/92
16	140466-TAM DELIVER - UPPER FURNACE HEADER				4/23/92	5/22/92		
17	140464-TAM DELIVER - SAND SCREW FEEDER - PM 04/13/92				4/30/92	4/30/92	244	4/13/92
18	140490-TAM DELIVER - SW LOWER FURNACE TUBES - PM 05/27/92				4/30/92	4/30/92	207	5/27/92
19	140476-TAM DELIVER - UPPER RW FURNACE TUBES - PM 04/24/92				5/7/92	5/7/92	210	4/27/92
20	140492-TAM DELIVER - FW FURNACE LOWER TUBES - PM 05/27/92				5/18/92	5/18/92	209	5/27/92
21	140480-TAM DELIVER - ECONOMIZER 1				5/20/92	5/20/92	229	5/1/92
22	140478-TAM DELIVER - AIRHEATER - PM 05/01/92				5/20/92	5/29/92	230	5/1/92
23	140484-TAM DELIVER ECONOMIZER TO AH - PM 05/14/92				5/22/92	5/22/92	257	5/24/92
24	140528-TAM DELIVER DUCT - SECONDARY AIR FAN TO AH - PM 07/10/92				5/28/92	5/28/92	260	7/10/92
25	140468-TAM DELIVER - SNCR SYSTEM TANK - PM 04/15/92				6/1/92	6/1/92	245	4/15/92
26	140526-TAM DELIVER - PRI AIR FANS TO AH - PM 07/06/92				6/1/92	6/1/92	258	7/3/92
27	140494-TAM DELIVER - RW LOWER FURNACE TUBES - PM 05/27/92				6/3/92	6/3/92	211	5/27/92
28	140508-TAM DELIVER - PRIMARY FAN W/ DRIVE - PM 06/02/92				6/5/92	6/5/92	232	6/2/92

	activity	tam sched del es	tam sched del ef	uc	act start	act fin	tampifec activity #	es tam run #26
29	140506-TAM DELIVER - SECONDARY FAN W/ DRIVE - PM 06/02/92				6/5/92	6/5/92	233	6/2/92
30	140542-TAM DELIVER - CYCLONE OUTLET DUCT - PM 08/11/92				6/7/92	6/7/92	254	8/11/92
31	140532-TAM DELIVER - NON METAL AIR DUCT EXP JOINT - PM 07/16/92				6/8/92	6/8/92	253	7/16/92
32	140432-TAM DELIVER - AIR HEATER TO PLENUM DUCT - 02/28/92 PM				6/9/92	6/9/92	259	2/28/92
33	140538-TAM DELIVER INSTRUMENTS & CONTROLS - PM 07/27/92			x			243	7/27/92
34	140460-TAM DELIVER DUCT - SEC AIR AH TO BUSTLE - PM 04/08/92	6/23/92	6/23/92	x			250	4/8/92
35	140514-TAM DELIVER - SUPERHEATER HEADERS - PM 06/05/92	6/26/92	6/26/92	x			204	6/5/92
36	140462-TAM DELIVER DUCT - COAL FD PURGE AIR - PM 04/10/92	6/30/92	6/30/92	x			251	4/10/92
37	140444-TAM DELIVER - ASH CLASSIFIER - 03/09/92 - TO 140180	7/1/92	7/1/92	x			222	3/9/92
38	140496-TAM DELIVER - RETRACTABLE SOOT BLOWERS - PM 05/28/92	7/1/92	7/1/92	x			241	5/28/92
39	140502-TAM DELIVER SOOTBLOWER ROTARY - PM 06/01/92	7/1/92	7/1/92	x			240	6/1/92
40	140500-TAM DELIVER SOOT BLOWER CONTROLS - 06/01/92	7/1/92	7/1/92	x			242	6/1/92
41	140510-TAM DELIVER - PNEUMATIC LIMESTONE SYSTEM - PM 06/02/92	7/1/92	7/1/92	x			510	6/2/92
42	140524-TAM DELIVER - ASH COOLING SCREWS - PM 07/01/92	7/1/92	7/1/92	x			246	7/1/92

listed in es actual or scheduled order

	activity	tamp/fec activity #
1	140000- TAMPELLA MOBILIZATION - 15 (15)	001
2	140002-TAM INSTALL LIMESTONE SILO - 1 (1) - is in almet's contract	800
3	140004-TAM - LIMESTONE FOUNDATION STRUCTURE - 1 (1) - is in almet's contract	810
4	140006-TAM GROUND ASSEMBLE - CYCLONE - 40 (40)	10-101
5	140008-TAM GROUND ASSEMBLE DUCT - ECON TO AH - 7 (7)	10-230GA
6	140010-TAM ROUGH SET DUCT - AIR HEATER TO PLENUM - 2 (2)	10-240RS
7	140012-TAM SET SAND BIN - 2 (2)	50-010
8	140014-TAM ROUGH SET - FURN DW LOWER HDR - 1	76-002LRS
9	140016-TAM ROUGH SET DOWNCOMBERS - 2	76-101RS
10	140018-TAM ROUGH SET - FURN SW LOWER HDR - 1	76-001LRS
11	140020-TAM ROUGH SET - FLOOR/PLENUM - 1	76-016RS
12	140022-TAM INSTALL FLUOSEAL SUPPORT STEEL - 3 (3)	09-003
13	140024-TAM ROUGH SET - BUCKSTAYS - 4 (4)	09-013RS
14	140026-TAM ROUGH SET - FLUOSEAL - 2 (2)	10-170RS
15	140028-TAM ROUGH SET - COAL GRAVIMETRIC FEEDER - 2	54-030RS
16	140030-TAM ERECT - FLUOSEAL/J VALVE - 6 (6)	10-170E
17	140032-TAM ROUGH SET - FLUOSEAL DISCHARGE LEG - 2 (2)	10-181RS
18	140034-TAM ERECT - COAL GRAVIMETRIC FEEDER - 8	54-030E
19	140036-TAM ROUGH SET - BURNERS & PREPIPE RACK - 1	84-020RS
20	140038-TAM INSTALL COMBUSTION TOP GRID STEEL - 7 (7)	09-001
21	140040-TAM ROUGH SET - CYCLONE INLET EXPANSION JOINT - 1 (1)	10-103RS

listed in a/c task number sequence

	activity	tamp/fec activity #
22	140042-TAM ERECT DUCT - PRI AIR AH TO PLENUM - 30 * (30)	10-245E
23	140044-TAM INSTALL - FLUIDIZING BLOWER - 6 (6)	28-015
24	140046-TAM INSTALL - CYCLONE SUPPORT STEEL - 5 (5)	09-005
25	140048-TAM INSTALL STEAM DRUM - 3	75-001
26	140050-TAM GROUND ASSEMBLE - AIR HEATER HOPPER - 4 (4)	10-235GA
27	140052-TAM INSTALL COMBUSTOR BOILER HANGERS - 10 (10)	09-015C
28	140054-TAM INSTALL - FLUIDIZING DUCT - 15 (15)	28-016
29	140056-TAM LIMESTONE GRAVIMETRIC FEEDER - 3	53-040
30	140058-TAM ROUGH SET DUCT - SEC AIR AH TO BUSTLE - 2 (2)	10-270RS
31	140060-TAM ROUGH SET DUCT - COAL FD PURGE AIR - 2 *	10-280RS
32	140062-TAM ROUGH SET - SCREW CONVEYOR SAND - 2 (2)	50-020RS
33	140064-TAM ROUGH SET - OF DUCT BUSTLE TO BURNERS - 2 (2)	10-290RS
34	140066-TAM UPPER COMBUSTOR HEADERS - 5	76-001U
35	140068-TAM ERECT SAND/FILL - SCREW CONVEYOR - 2 (2)	50-020E
36	140070 - TAM SET - UREA TANK - 2	55-010
37	140072-TAM ROUGH SET - FURN SIDEWALL UPPER - 3	76-014URS
38	140074-TAM ROUGH SET - FURN FW UPPER - 3	76-012URS
39	140076-TAM GROUND ASSEMBLE - FURN DW - 20	76-017GA
40	140078-TAM ROUGH SET - FURN RW UPPER - 2	76-013URS
41	140080-TAM ROUGH SET - AIR HEATER HOPPER - 2 (2)	10-235RS
42	140082-TAM PART ERECT - UPPER FURN SIDEWALL - 3	76-014UE

	activity	tamp/fec activity #
43	140082A-TAM COMP ERECT - UPPER FURN SIDEWALL - 3	76-014UE
44	140084-TAM AIR HEATER SUPPORT STEEL - 3 (3)	09-007
45	140086-TAM FURN SW WELD UPPER - 9 (9)	76-024U
46	140088-TAM ROUGH SET - STEAM COIL AIR HEATER - 2 (2)	81-012RS
47	140090-TAM ERECT - UPPER FURN FW - 6 (6)	76-012UE
48	140092-TAM ROUGH SET - PRIMARY AIR HEATER - 1 (1)	81-001RS
49	140094-TAM ERECT - STEAM COIL AIR HEATER - 4 (4)	81-012E
50	140096-TAM ERECT PRIMARY AIR HEATER - 4 (4)	81-001E
51	140098-TAM ROUGH SET - SECONDARY AIR HEATERS - 1 (1)	81-011RS
52	140100-TAM ROUGH SET DUCT - ECON TO AH - 2 (2)	10-230RS
53	140102-TAM ROUGH SET EXPANSION JOINT - 3 (3)	10-450RS
54	140104-TAM INSTALL - ECONOMIZER SUPPORT STEEL - 3 (3)	09-009
55	140106-TAM ERECT - UPPER FURN RW - 7 (7)	76-013UE
56	140108-TAM ERECT - SECONDARY AIR HEATER - 4 (4)	81-011E
57	140110-TAM ERECT - ECONOMIZER - 3 (3)	77-002
58	140112-TAM ERECT - AIR HEATER HOPPER - 6 (6)	10-235E
59	140114-TAM ROUGH SET DUCT - SH TO ECONOMIZER - 2 (2)	10-220RS
60	140116-TAM ERECT DUCT - ECON TO AH - 6 (6)	10-230E
61	140118-TAM ERECT - EXPANSION JOINT - 6 (6)	10-450E
62	140120-TAM FEEDWATER VALVE & PIPING - 7 (7)	76-060
63	140122-TAM ERECT - 6" FEEDWATER PIPE - 4 (4)	77-060

	activity	tamp/fec activity #
64	140124-TAM ROUGH SET SOOT BLOWER PIPING - 2 (2)	83-006RS
65	140126-TAM ROUGH SET - GAS GUN PURGE AIR - 1 (1)	10-285RS
66	140128-TAM ROUGH SET - FURN FW LOWER - 3 (3)	76-012LRS
67	140130-TAM ERECT BUCKSTAYS - 70 (70)	09-013E
68	140132-TAM ROUGH SET - SAND PIPING TO COAL FEEDER - 2 (2)	50-030RS
69	140134-TAM WELD UPPER FURN RW - 8 (8)	76-023U
70	140136-TAM ROUGH SET - RETRACTABLE SOOT BLOWER - 2 (2)	83-001RS
71	140138-TAM ROUGH SET - HEAT RECOVERY AREA BUCKSTAYS - 3 (3)	09-017RS
72	140140-TAM ERECT - SAND PIPING TO COAL FEEDER - 8 (8)	50-030E
73	140142-TAM ERECT - LOWER FURN FW - 7 (7)	76-012LE
74	140144-TAM ROUGH SET - FURN SW LOWER - 4 (4)	76-014LRS
75	140146-TAM INSTALL - CYCLONE SUPPORT STEEL - 4 - probably should be feedwater pipe	77-062?
76	140146-TAM WELD 6" SCH 80 CS - FEEDWATER PIPING - 4	77-062
77	140148-TAM SOOT BLOWERS - ROTARY - 4 (4)	83-002
78	140150-TAM LIMESTONE SLIDE GATE - 1 (1)	53-020
79	140152-TAM LIMESTONE LINE - FEEDER TO BIN - 6 (6)	53-035
80	140154-TAM LIMESTONE ROTARY AIR LOCK - 2 (2)	53-025
81	140156-TAM ROUGH SET - INT SH OUTLET HEADER - 2 (2)	78-130RS
82	140158-TAM LIMESTONE CHUTES - 4 (4)	53-030
83	140160-TAM ERECT - LOWER FURN SW - 6 (6)	76-014LE
84	140162-TAM ROUGH SET - DESUPERHEATER HDR - 1 (1)	78-300RS

	activity	tamp/fec activity #
85	140164-TAM HEAT RECOVERY AREA TOP GRID STEEL - 5 (5)	09-011
86	140166-TAM ROUGH SET - LOWER FURN RW - 3 (3)	76-013LRS
87	140168-TAM ERECT - DESUPERHEATER HEADER - 2 (2)	78-300E
88	140170-TAM WELD - FURN FW MIDDLE TUBE - 7 (7)	76-022M
89	140172-TAM LIMESTONE ROTARY BLOWER - 3 (3)	53-050
90	140174 -TAM ERECT LOWER FURN RW - 7 (7)	76-013LE
91	140176-TAM WELD - FURN SW MIDDLE TUBE - 9 (9)	76-024M
92	140178-TAM INSTALL SUPERHEAT BOILER HANGERS - 5 (5)	09-015S
93	140180-TAM ROUGH SET - ASH CLASSIFIER - 2 (2)	51-010RS
94	140182-TAM WELD FURN RW MIDDLE TUBE - 7 (7)	76-023M
95	140184-TAM ERECT - UPPER SH WALL RING HEADER - 3	78-021U
96	140186-TAM ERECT - ASH CLASSIFIER - 6 (6)	51-010E
97	140188-TAM ROUGH SET - ASH DUCT - 7 (4)	51-040RS
98	140190-TAM ERECT - FURN SW LOWER HDR - 4 (4)	76-001LE
99	140192-TAM ERECT - SH SIDE WALL PANELS - 4 (4)	78-105
100	140194-TAM ERECT - SH FRONT WALL PANEL - 3 (4)	78-104
101	140196-TAM UREA RECIRC PUMP - 2 (2)	55-020
102	140198-TAM UREA CHEMICAL INJECTION SYSTEM - 4 (4)	55-030
103	140200-TAM UREA DISTRIBUTION MODULES - 5 (5)	55-040
104	140202-TAM FURN SW TUBE WELD LOWER TO HDR - 6? (7)	76-024L
105	140204-TAM ROUGH ERECT DUCT - PRI AIR FANS TO AH - 5 (5)	10-240RS

	activity	tamp/fec activity #
106	140206-TAM ASH COOLING SCREW CONVEYOR - 6 (6)	51-020
107	140208-TAM ERECT - ASH DUCT - 10 (10)	51-040E
108	140210-TAM ERECT - SH REAR WALL PANEL - 4 (4)	78-106
109	140212-TAM UREA INTERCONNECTING PIPING - 9 (9)	55-050
110	140214-TAM ROUGH ERECT DUCT - SEC AIR FAN TO AH - 4 (4)	10-260RS
111	140216-TAM ERECT - LOWER SH WALL RING HDR - 3 (3)	78-021L
112	140218-TAM ERECT - INT SH OUTLET HEADER - 2 (2)	78-130E
113	140220-TAM ERECT - FLOOR PLENUM - 9 (9)	76-016E
114	140222-TAM ERECT DUCT - SH TO ECON DUCT - 6 (6)	10-220E
115	140224-TAM TUBE WELD 1.5 X .180 SH REAR PNL - 5 (5)	78-116
116	140226-TAM WELD SH MEMBRANE - 9 (9)	78-118
117	140228-TAM GROUND ASSEMBLE - PRIMARY SH ELEMENT - 15 (15)	78-121GA
118	140230-TAM GROUND ASSEMBLE - INTERM SH ELEMENTS - 3 (3)	78-131GA
119	140232-TAM ROUGH SET DAMPERS - 2 (2)	10-400RS
120	140234-TAM ROUGH SET - NON METAL AIR DUCTS EXP JOINTS - 4 (4)	10-460RS
121	140234-TAM ROUGH SET - NON METAL AIR DUCTS EXP JOINTS - 4 (4)	10-460RS
122	140236-TAM ERECT - ASH DUCT - 4 - should this be activity 140236 exp jt - ash classifier?	?51-050?
123	140238-TAM TUBE WELD 1.5 X .180 SH SIDE PNL - 8 (8)	76-115
124	140240-TAM FLUOSEAL DUCT - 4 (4)	10-150RS
125	140242-TAM ROUGH SET - SECONDARY AIR FAN - 4 (4)	28-003RS
126	140244-TAM TUBE WELD 1.5 X .180 SH FRONT PNL - 4 (4)	78-114

listed in a/c task number sequence

	activity	tamp/fec activity #
127	140246-TAM ERECT ROOF PANELS - 8 (8)	76-015E
128	140248-TAM TUBE WELD 3.0 X .220 CS FLR PLENUM - 15 (15)	76-026
129	140250-TAM MISC INSTRUMENT PIPING - 28 (28)	60-110
130	140252-TAM ROUGH SET - LOOP SEAL EXPANSION JOINT - 2 (2)	10-180RS
131	140254-TAM ROUGH SET - SECONDARY AIR FAN DRIVE - 2 (2)	28-004RS
132	140256 - TAM ERECT - INTERM SH ELEMENTS - 4 (4)	78-131E
133	140258-TAM ERECT - HEAT RECOVERY AREA BUCKSTAYS - 6 (6)	09-017E
134	140260-TAM ERECT CYCLONE - 8 (8)	10-102
135	140262-TAM ROUGH SET - PRIMARY AIR FAN - 8 (8)	28-001RS
136	140264-TAM ERECT - SECONDARY AIR FAN - 20 (20)	28-003E
137	140266-TAM WELD 2.25 X .180 INT SH ELEMENTS - 4 (4)	78-132
138	140268-TAM ROUGH SET - FURN DW - 2 (2)	76-017RS
139	140270-TAM WELD 3.0 X .220 CS ROOF TUBE - 11 (11)	76-025
140	140272-TAM ERECT - PRIMARY SH ELEMENTS - 5 (5)	78-121E
141	140274-TAM ERECT - FURN DW LOWER HDR - 3 (3)	76-002LE
142	140276-TAM ROUGH SET - RISER PIPE - 5 (5)	76-251RS
143	140278-TAM ERECT - FIN IN/OUT HEADER - 2 (2)	78-140
144	140280-TAM INSTALL - CYCLONE OUTLET DUCT - 6 (6)	10-104
145	140282-TAM 5.5' DIA LOOP SEAL DOWNCOMER - 5 (5)	10-150E
146	140284-TAM ERECT - PRIMARY AIR FAN - 28 (28)	28-001E
147	140286-TAM ROUGH SET - PRIMARY AIR FAN DRIVE - 2 (2)	28-002RS

	activity	tamp/fec activity #
148	140288-TAM ERECT - SH LINK PIPE - 14 (14)	78-200
149	140290-TAM FURN DW LOWER WELD TO HDR - 7 (7)	76-027L
150	140292-TAM WELD 2.25 X .180 PRI SH ELEMENTS - 17 (17)	78-122
151	140294-TAM ERECT - FINISHING SH ELEMENTS - 6 (6)	78-141
152	140296-TAM ERECT-CYCLONE INLET EXPANSION JOINT - 4 (4)	10-103E
153	140298-TAM ERECT - FLUOSEAL DISCHARGE LEG - 8 (8)	10-181E
154	140300-TAM LIMESTONE PNEUMATIC PIPE - 18 (18)	53-060
155	140302-TAM COAL CHUTES - 15 (15)	54-020
156	140304-TAM FURNACE MEMBRANE WELDING - 40 (40)	76-040
157	140306-TAM ERECT - DOWNCOMBER PIPE - 8 (8)	76-101E
158	140308-TAM ERECT - RISER PIPE - 20 (20)	76-251E
159	140310-TAM ROUGH SET - PENTHOUSE CASING - 2 (2)	80-002RS
160	140312-TAM ERECT LOOP SEAL EXPANSION JOINT - 4 (4)	10-180E
161	140314-TAM CYCLONE OUTLET EXPANSION JOINT - 4 (4)	10-110
162	140316-TAM ERECT - DIVISION WALLS - 10 (10)	76-017E
163	140318-TAM ERECT - SH ROOF PANEL - 2 (2)	78-107
164	140320-TAM WELD 2.25 X .180 FIN SH ELEMENTS - 12 (12)	78-142
165	140322-TAM ERECT - RETRACTABLE SOOT BLOWERS - 10 (10)	83-001E
166	140324-TAM CRANE COMPLETE - 1 (0)	950
167	140326-TAM TUBE WELD 1.5 X .180 SH ROOF PNL - 5 (5)	78-117
168	140328-TAM WELD 12" SCH 80 X 106B DOWNCOMER - 8 (8)	76-111

	activity	tamplfec activity #
169	140330-TAM DUCT - SEC AIR FAN TO AH - 20 (20)	10-260E
170	140332-TAM ERECT - SECONDARY AIR FAN DRIVE - 3 (3)	28-004E
171	140334-TAM WELD 10"(8") SCH 80 CS SH LINK PIPE - 13? (14)	78-250
172	140336-TAM ERECT - SOOT BLOWER PIPING - 26 (26)	83-006E
173	140338-TAM WELD 10" SCH 80 X 106B DOWNCOMER - 5 (5)	76-112
174	140340-TAM SH HDR ENCLR CASING - 25 (25)	80-003
175	140342-TAM WELD 10" SCH 80 X 106B RISER - 18 (18)	76-252
176	140344-TAM WELD 8" SCH 80 X 106B DOWNCOMER - 4 (4)	76-113
177	140346-TAM ERECT DUCT - PRIMARY AIR FANS TO AH - 20 (20)	10-240E
178	140348-TAM ERECT - PRIMARY AIR FAN DRIVE - 4 (4)	28-002E
179	140350-TAM WELD 10" X 1.25 P11 SH LINK PIPE - 5 (5)	78-251
180	140352-TAM BEARING COOL WATER PIPING - 4 (4)	60-001
181	140354-TAM MISC TRIM PIPING - 40 (40)	82-001
182	140356-TAM WELD 8" SCH 80 X 106B RISER - 14 (14)	76-253
183	140358-TAM ERECT DUCT - SEC AIR AH TO BUSTLE - 15 (15)	10-270E
184	140360-TAM GRIND INSIDE COMBUSTOR - 15 (15)	76-042
185	140362-TAM HYDRO TEST - SOOT BLOWER PIPING - 2 (2)	83-007
186	140364-TAM ERECT DUCT - COAL FD PURGE AIR - 15	10-280E
187	140366-TAM 6" OFA NOZZLES - 6 (6)	10-292
188	140368-TAM FLOW ELEMENTS - 2 (2)	10-420
189	140370-TAM NON METAL AIR DUCTS EXPANSION JOINTS - 8 (8)	10-460

listed in a/c task number sequence

	activity	tamp/fec activity #
190	140372-TAM INSTALL UREA INJECTION NOZZLES - 4 (4)	55-070
191	140374-TAM UREA PIPING TO COMBUSTOR & CYCLONES - 12 (12)	55-060
192	140376-TAM ERECT - OFA DUCT BUSTLE TO BURNERS - 10 (10)	10-290E
193	140378-TAM HYDROSTATIC TEST - 4 (4)	75-900
194	140380-TAM UREA SYSTEM COMPLETE - 1 (1)	900
195	140382-TAM ERECT DUCT - GAS GUN PURGE AIR - 6 (6)	10-285E
196	140384-TAM ERECT - DAMPERS - 4 (4)	10-400E
197	140386-TAM NON METAL AIR DUCTS EXPANSION JOINTS - 10 (10)	10-470
198	140388-TAM DAMPERS ACTUATORS - 5 (5)	10-410
199	140390-TAM INSTRUMENTATION / CONTROLS - 80 (80)	600
200	140392-TAM PENTHOUSE CASING - 30 (30)	80-002E
201	140394-TAM ACCESS DOORS/PORTS - 5 (5)	80-007
202	140398-TAM ERECT - BURNERS & PREPIPED RACKS - 12 (12)	84-020E
203	140400-TAM AIR TEST - 4 (4)	75-910
204	140402-TAM INSULATION / LAGGING - 78 (80)	500
205	140406-TAM GAS & AIR PIPING - 15 (15)	84-030
206	140408-TAM GAS LANCES - 10 (10)	84-050
207	140410-TAM COMPLETE - 1 (1)	999
208	140412-TAM REFRACTORY CURE-OUT - 5 (5)	REFR 7
209	140414-TAM CHEMICAL CLEANING - 5 (5)	CHEMICAL
210	140416-TAM REFRACTORIZE FLUOSEAL - 5 (5)	REFR 6

	activity	tamp/fec activity #
211	140418-TAM REFRACTORIZE COMBUSTOR - 15 (15)	REFR 5
212	140420-TAM STUD SUPERHEATER - 10 (10)	REFR 4
213	140422-TAM METAL SPRAY - 10 (10)	METAL
214	140424-TAM REFRACTORIZE CYCLONE - 30 (30)	REFR 3
215	140426-TAM STUD MEMBRANE WALLS - 5 (5)	REFR 2
216	140428-TAM REFRACTORY MOBILIZATION - 5 (5)	REFR 1
217	140430-TAM DELIVER - CYCLONES - 02/14/92 PM - TO 140006	236
218	140432-TAM DELIVER - AIR HEATER TO PLENUM DUCT - 02/28/92 PM	259
219	140434-TAM DELIVER - FLUOSEAL - 03/02/92 PM	227
220	140436-TAM DELIVER - FURNACE LOWER HEADERS - 03/04/92 PM - TO 140018	203
221	140438-TAM DELIVER - FURNACE FLOOR TUBES - 03/05/92 PM - TO 140020	214
222	140440-TAM DELIVER - FURNACE BUCKSTAYS - 03/06/92 PM - TO 140024	219
223	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM	225
224	140444-TAM DELIVER - ASH CLASSIFIER - 03/09/92 - TO 140180	222
225	140446-TAM DELIVER - COAL FEEDERS - 03/12/92 PM - TO 140028	235
226	140448-TAM DELIVER - BURNERS & RACKS - 03/16/92 PM - TO 140036	223
227	140450-TAM DELIVER - BURNER INJECTOR & RACKS - 03/16/92 PM	234
228	140452-TAM DELIVER - SUPPORTS & HANGERS - 03/16/92 PM	220
229	140454-TAM DELIVER STEAM DRUM - AM 03/26/92	201
230	140456-TAM DELIVER - AIR HEATER HOPPER - PM 03/27/92	238
231	140458-TAM DELIVER LIMESTONE FEEDERS - PM 04/02/92	236

listed in a/c task number sequence

	activity	tamp/fec activity #
232	140460-TAM DELIVER DUCT - SEC AIR AH TO BUSTLE - PM 04/08/92	250
233	140462-TAM DELIVER DUCT - COAL FD PURGE AIR - PM 04/10/92	251
234	140464-TAM DELIVER - SAND SCREW FEEDER - PM 04/13/92	244
235	140466-TAM DELIVER - UPPER FURNACE HEADER	
236	140468-TAM DELIVER - SNCR SYSTEM TANK - PM 04/15/92	245
237	140470-TAM DELIVER - TEMPERING / PREHEAT COILS - PM 04/20/92	231
238	140472-TAM DELIVER - TUBES, FURNACE UPPER SW - PM 04/21/92	206
239	140474-TAM DELIVER - UPPER FW FURNACE TUBES - PM 04/24/92	208
240	140476-TAM DELIVER - UPPER RW FURNACE TUBES - PM 04/24/92	210
241	140478-TAM DELIVER - AIRHEATER - PM 05/01/92	230
242	140480-TAM DELIVER - ECONOMIZER 1	229
243	140482-TAM DELIVER - FURNACE ROOF TUBES - PM 05/04/92	213
244	140484-TAM DELIVER ECONOMIZER TO AH - PM 05/14/92	257
245	140486-TAM DELIVER - SH DUCT TO ECON - PM 05/26/92	256
246	140488-TAM DELIVER DUCT - GAS GUN PURGE AIR - PM 05/27/92	252
247	140490-TAM DELIVER - SW LOWER FURNACE TUBES - PM 05/27/92	207
248	140492-TAM DELIVER - FW FURNACE LOWER TUBES - PM 05/27/92	209
249	140494-TAM DELIVER - RW LOWER FURNACE TUBES - PM 05/27/92	211
250	140496-TAM DELIVER - RETRACTABLE SOOT BLOWERS - PM 05/28/92	241
251	140498-TAM DELIVER - DIVISION WALL TUBES - PM 06/01/92	212
252	140500-TAM DELIVER SOOT BLOWER CONTROLS - 06/01/92	242

	activity	tamp/fec activity #
253	140502-TAM DELIVER SOOTBLOWER ROTARY - PM 06/01/92	240
254	140504-TAM DELIVER - SUPERHEATER BUCK STAYS - PM 06/02/92	218
255	140506-TAM DELIVER - SECONDARY FAN W/ DRIVE - PM 06/02/92	233
256	140508-TAM DELIVER - PRIMARY FAN W/ DRIVE - PM 06/02/92	232
257	140510-TAM DELIVER - PNEUMATIC LIMESTONE SYSTEM - PM 06/02/92	510
258	140514-TAM DELIVER - SUPERHEATER HEADERS - PM 06/05/92	204
259	140516-TAM DELIVER - SUPERHEATER ENCLOSURE HEADERS - PM 06/08/92	205
260	140518-TAM DELIVER - SUPERHEATER ENCLOSURE WALLS.- PM 06/11/92	217
261	140520-TAM DELIVERY - TRIM PIPING - PM 07/01/92	239
262	140522-TAM DELIVERY - SNCR SYSTEM PUMPS, MODULES - PM 07/01/92	247
263	140524-TAM DELIVER - ASH COOLING SCREWS - PM 07/01/92	246
264	140526-TAM DELIVER - PRI AIR FANS TO AH - PM 07/06/92	258
265	140528-TAM DELIVER DUCT - SECONDARY AIR FAN TO AH - PM 07/10/92	260
266	140530-TAM DELIVER - SUPERHEATER, PRIM & INT ELEMENTS - PM 07/15/92	215
267	140532-TAM DELIVER - NON METAL AIR DUCT EXP JOINT - PM 07/16/92	253
268	140534-TAM DELIVER - PENTHOUSE - PM 07/17/92	221
269	140536-TAM DELIVER - FLUOSEAL DUCT - PM 07/22/92	255
270	140538-TAM DELIVER INSTRUMENTS & CONTROLS - PM 07/27/92	243
271	140540-TAM DELIVER - SUPERHEATER, FIN ELEMENTS - PM 08/07/92	216
272	140542-TAM DELIVER - CYCLONE OUTLET DUCT - PM 08/11/92	254

	activity	tamp/fec activity #	
1	140466-TAM DELIVER - UPPER FURNACE HEADER		
2	140000- TAMPELLA MOBILIZATION - 15 (15)	001	
3	140038-TAM INSTALL COMBUSTION TOP GRID STEEL - 7 (7)	09-001	
4	140022-TAM INSTALL FLUOSEAL SUPPORT STEEL - 3 (3)	09-003	
5	140046-TAM INSTALL - CYCLONE SUPPORT STEEL - 5 (5)	09-005	
6	140084-TAM AIR HEATER SUPPORT STEEL - 3 (3)	09-007	
7	140104-TAM INSTALL - ECONOMIZER SUPPORT STEEL - 3 (3)	09-009	
8	140164-TAM HEAT RECOVERY AREA TOP GRID STEEL - 5 (5)	09-011	
9	140130-TAM ERECT BUCKSTAYS - 70 (70)	09-013E	
10	140024-TAM ROUGH SET - BUCKSTAYS - 4 (4)	09-013RS	
11	140052-TAM INSTALL COMBUSTOR BOILER HANGERS - 10 (10)	09-015C	✓
12	140178-TAM INSTALL SUPERHEAT BOILER HANGERS - 5 (5)	09-015S	
13	140258-TAM ERECT - HEAT RECOVERY AREA BUCKSTAYS - 6 (6)	09-017E	
14	140138-TAM ROUGH SET - HEAT RECOVERY AREA BUCKSTAYS - 3 (3)	09-017RS	
15	140006-TAM GROUND ASSEMBLE - CYCLONE - 40 (40)	10-101	✓
16	140260-TAM ERECT CYCLONE - 8 (8)	10-102	✓
17	140296-TAM ERECT-CYCLONE INLET EXPANSION JOINT - 4 (4)	10-103E	
18	140040-TAM ROUGH SET - CYCLONE INLET EXPANSION JOINT - 1 (1)	10-103RS	
19	140280-TAM INSTALL - CYCLONE OUTLET DUCT - 6 (6)	10-104	
20	140314-TAM CYCLONE OUTLET EXPANSION JOINT - 4 (4)	10-110	
21	140282-TAM 5.5' DIA LOOP SEAL DOWNCOMER - 5 (5)	10-150E	

listed in task number sequence

	activity	tamp/fec activity #	
22	140240-TAM FLUOSEAL DUCT - 4 (4)	10-150RS	
23	140030-TAM ERECT - FLUOSEAL/J VALVE - 6 (6)	10-170E	
24	140026-TAM ROUGH SET - FLUOSEAL - 2 (2)	10-170RS	
25	140312-TAM ERECT LOOP SEAL EXPANSION JOINT - 4 (4)	10-180E	
26	140252-TAM ROUGH SET - LOOP SEAL EXPANSION JOINT - 2 (2)	10-180RS	
27	140298-TAM ERECT - FLUOSEAL DISCHARGE LEG - 8 (8)	10-181E	
28	140032-TAM ROUGH SET - FLUOSEAL DISCHARGE LEG - 2 (2)	10-181RS	
29	140222-TAM ERECT DUCT - SH TO ECON DUCT - 6 (6)	10-220E	
30	140114-TAM ROUGH SET DUCT - SH TO ECONOMIZER - 2 (2)	10-220RS	
31	140116-TAM ERECT DUCT - ECON TO AH - 6 (6)	10-230E	
32	140008-TAM GROUND ASSEMBLE DUCT - ECON TO AH - 7 (7)	10-230GA	✓
33	140100-TAM ROUGH SET DUCT - ECON TO AH - 2 (2)	10-230RS	
34	140112-TAM ERECT - AIR HEATER HOPPER - 6 (6)	10-235E	✓
35	140050-TAM GROUND ASSEMBLE - AIR HEATER HOPPER - 4 (4)	10-235GA	
36	140080-TAM ROUGH SET - AIR HEATER HOPPER - 2 (2)	10-235RS	
37	140346-TAM ERECT DUCT - PRIMARY AIR FANS TO AH - 20 (20)	10-240E	
38	140010-TAM ROUGH SET DUCT - AIR HEATER TO PLENUM - 2 (2)	10-240RS	
39	140204-TAM ROUGH ERECT DUCT - PRI AIR FANS TO AH - 5 (5)	10-240RS	✓
40	140042-TAM ERECT DUCT - PRI AIR AH TO PLENUM - 30 * (30)	10-245E	✓
41	140330-TAM DUCT - SEC AIR FAN TO AH - 20 (20)	10-260E	
42	140214-TAM ROUGH ERECT DUCT - SEC AIR FAN TO AH - 4 (4)	10-260RS	✓

listed in task number sequence

	activity	tamp/fec activity #
43	140358-TAM ERECT DUCT - SEC AIR AH TO BUSTLE - 15 (15)	10-270E
44	140058-TAM ROUGH SET DUCT - SEC AIR AH TO BUSTLE - 2 (2)	10-270RS
45	140364-TAM ERECT DUCT - COAL FD PURGE AIR - 15	10-280E
46	140060-TAM ROUGH SET DUCT - COAL FD PURGE AIR - 2 *	10-280RS
47	140382-TAM ERECT DUCT - GAS GUN PURGE AIR -6 (6)	10-285E
48	140126-TAM ROUGH SET - GAS GUN PURGE AIR - 1 (1)	10-285RS
49	140376-TAM ERECT - OFA DUCT BUSTLE TO BURNERS - 10 (10)	10-290E
50	140064-TAM ROUGH SET - OF DUCT BUSTLE TO BURNERS - 2 (2)	10-290RS ✓
51	140366-TAM 6" OFA NOZZLES - 6 (6)	10-292
52	140384-TAM ERECT - DAMPERS - 4 (4)	10-400E
53	140232-TAM ROUGH SET DAMPERS - 2 (2)	10-400RS
54	140388-TAM DAMPERS ACTUATORS - 5 (5)	10-410
55	140368-TAM FLOW ELEMENTS - 2 (2)	10-420
56	140118-TAM ERECT - EXPANSION JOINT - 6 (6)	10-450E
57	140102-TAM ROUGH SET EXPANSION JOINT - 3 (3)	10-450RS
58	140370-TAM NON METAL AIR DUCTS EXPANSION JOINTS - 8 (8)	10-460
59	140234-TAM ROUGH SET - NON METAL AIR DUCTS EXP JOINTS - 4 (4)	10-460RS
60	140234-TAM ROUGH SET - NON METAL AIR DUCTS EXP JOINTS - 4 (4)	10-460RS
61	140386-TAM NON METAL AIR DUCTS EXPANSION JOINTS - 10 (10)	10-470
62	140454-TAM DELIVER STEAM DRUM - AM 03/26/92	201
63	140436-TAM DELIVER - FURNACE LOWER HEADERS - 03/04/92 PM - TO 140018	203

listed in task number sequence

	activity	tamp/fec activity #
64	140514-TAM DELIVER - SUPERHEATER HEADERS - PM 06/05/92	204
65	140516-TAM DELIVER - SUPERHEATER ENCLOSURE HEADERS - PM 06/08/92	205
66	140472-TAM DELIVER - TUBES, FURNACE UPPER SW - PM 04/21/92	206
67	140490-TAM DELIVER - SW LOWER FURNACE TUBES - PM 05/27/92	207
68	140474-TAM DELIVER - UPPER FW FURNACE TUBES - PM 04/24/92	208
69	140492-TAM DELIVER - FW FURNACE LOWER TUBES - PM 05/27/92	209
70	140476-TAM DELIVER - UPPER RW FURNACE TUBES - PM 04/24/92	210
71	140494-TAM DELIVER - RW LOWER FURNACE TUBES - PM 05/27/92	211
72	140498-TAM DELIVER - DIVISION WALL TUBES - PM 06/01/92	212
73	140482-TAM DELIVER - FURNACE ROOF TUBES - PM 05/04/92	213
74	140438-TAM DELIVER - FURNACE FLOOR TUBES - 03/05/92 PM - TO 140020	214
75	140530-TAM DELIVER - SUPERHEATER, PRIM & INT ELEMENTS - PM 07/15/92	215
76	140540-TAM DELIVER - SUPERHEATER, FIN ELEMENTS - PM 08/07/92	216
77	140518-TAM DELIVER - SUPERHEATER ENCLOSURE WALLS - PM 06/11/92	217
78	140504-TAM DELIVER - SUPERHEATER BUCK STAYS - PM 06/02/92	218
79	140440-TAM DELIVER - FURNACE BUCKSTAYS - 03/06/92 PM - TO 140024	219
80	140452-TAM DELIVER - SUPPORTS & HANGERS - 03/16/92 PM	220
81	140534-TAM DELIVER - PENTHOUSE - PM 07/17/92	221
82	140444-TAM DELIVER - ASH CLASSIFIER - 03/09/92 - TO 140180	222
83	140448-TAM DELIVER - BURNERS & RACKS - 03/16/92 PM - TO 140036	223
84	140442-TAM DELIVER - FRAMING STEEL - 03/06/92 PM	225

listed in task number sequence

	activity	tamp/fec activity #
85	140434-TAM DELIVER - FLUOSEAL - 03/02/92 PM	227
86	140480-TAM DELIVER - ECONOMIZER 1	229
87	140478-TAM DELIVER - AIRHEATER - PM 05/01/92	230
88	140470-TAM DELIVER - TEMPERING / PREHEAT COILS - PM 04/20/92	231
89	140508-TAM DELIVER - PRIMARY FAN W/ DRIVE - PM 06/02/92	232
90	140506-TAM DELIVER - SECONDARY FAN W/ DRIVE - PM 06/02/92	233
91	140450-TAM DELIVER - BURNER INJECTOR & RACKS - 03/16/92 PM	234
92	140446-TAM DELIVER - COAL FEEDERS - 03/12/92 PM - TO 140028	235
93	140430-TAM DELIVER - CYCLONES - 02/14/92 PM - TO 140006	236
94	140458-TAM DELIVER LIMESTONE FEEDERS - PM 04/02/92	236
95	140456-TAM DELIVER - AIR HEATER HOPPER - PM 03/27/92	238
96	140520-TAM DELIVERY - TRIM PIPING - PM 07/01/92	239
97	140502-TAM DELIVER SOOTBLOWER ROTARY - PM 06/01/92	240
98	140496-TAM DELIVER - RETRACTABLE SOOT BLOWERS - PM 05/28/92	241
99	140500-TAM DELIVER SOOT BLOWER CONTROLS - 06/01/92	242
100	140538-TAM DELIVER INSTRUMENTS & CONTROLS - PM 07/27/92	243
101	140464-TAM DELIVER - SAND SCREW FEEDER - PM 04/13/92	244
102	140468-TAM DELIVER - SNCR SYSTEM TANK - PM 04/15/92	245
103	140524-TAM DELIVER - ASH COOLING SCREWS - PM 07/01/92	246
104	140522-TAM DELIVERY - SNCR SYSTEM PUMPS, MODULES - PM 07/01/92	247
105	140460-TAM DELIVER DUCT - SEC AIR AH TO BUSTLE - PM 04/08/92	250

listed in task number sequence

	activity	tamp/fec activity #	
106	140462-TAM DELIVER DUCT - COAL FD PURGE AIR - PM 04/10/92	251	
107	140488-TAM DELIVER DUCT - GAS GUN PURGE AIR - PM 05/27/92	252	
108	140532-TAM DELIVER - NON METAL AIR DUCT EXP JOINT - PM 07/16/92	253	
109	140542-TAM DELIVER - CYCLONE OUTLET DUCT - PM 08/11/92	254	
110	140536-TAM DELIVER - FLUOSEAL DUCT - PM 07/22/92	255	
111	140486-TAM DELIVER - SH DUCT TO ECON - PM 05/26/92	256	
112	140484-TAM DELIVER ECONOMIZER TO AH - PM 05/14/92	257	
113	140526-TAM DELIVER - PRI AIR FANS TO AH - PM 07/06/92	258	
114	140432-TAM DELIVER - AIR HEATER TO PLENUM DUCT - 02/28/92 PM	259	
115	140528-TAM DELIVER DUCT - SECONDARY AIR FAN TO AH - PM 07/10/92	260	
116	140284-TAM ERECT - PRIMARY AIR FAN - 28 (28)	28-001E	
117	140262-TAM ROUGH SET - PRIMARY AIR FAN - 8 (8)	28-001RS	
118	140348-TAM ERECT - PRIMARY AIR FAN DRIVE - 4 (4)	28-002E	
119	140286-TAM ROUGH SET - PRIMARY AIR FAN DRIVE - 2 (2)	28-002RS	
120	140264-TAM ERECT - SECONDARY AIR FAN - 20 (20)	28-003E	
121	140242-TAM ROUGH SET - SECONDARY AIR FAN - 4 (4)	28-003RS	✓
122	140332-TAM ERECT - SECONDARY AIR FAN DRIVE - 3 (3)	28-004E	
123	140254-TAM ROUGH SET - SECONDARY AIR FAN DRIVE - 2 (2)	28-004RS	✓
124	140044-TAM INSTALL - FLUIDIZING BLOWER - 6 (6)	28-015	✓
125	140054-TAM INSTALL - FLUIDIZING DUCT - 15 (15)	28-016	
126	140012-TAM SET SAND BIN - 2 (2)	50-010	

listed in task number sequence

	activity	tamp/fec activity #
127	140068-TAM ERECT SAND/FILL - SCREW CONVEYOR - 2 (2)	50-020E
128	140062-TAM ROUGH SET - SCREW CONVEYOR SAND - 2 (2)	50-020RS
129	140140-TAM ERECT - SAND PIPING TO COAL FEEDER - 8 (8)	50-030E
130	140132-TAM ROUGH SET - SAND PIPING TO COAL FEEDER - 2 (2)	50-030RS
131	140402-TAM INSULATION / LAGGING - 78 (80)	500
132	140186-TAM ERECT - ASH CLASSIFIER - 6 (6)	51-010E
133	140180-TAM ROUGH SET - ASH CLASSIFIER - 2 (2)	51-010RS
134	140206-TAM ASH COOLING SCREW CONVEYOR - 6 (6)	51-020
135	140208-TAM ERECT - ASH DUCT - 10 (10)	51-040E
136	140188-TAM ROUGH SET - ASH DUCT - 7 (4)	51-040RS
137	140510-TAM DELIVER - PNEUMATIC LIMESTONE SYSTEM - PM 06/02/92	510
138	140150-TAM LIMESTONE SLIDE GATE - 1 (1)	53-020
139	140154-TAM LIMESTONE ROTARY AIR LOCK - 2 (2)	53-025
140	140158-TAM LIMESTONE CHUTES - 4 (4)	53-030
141	140152-TAM LIMESTONE LINE - FEEDER TO BIN - 6 (6)	53-035
142	140056-TAM LIMESTONE GRAVIMETRIC FEEDER - 3	53-040
143	140172-TAM LIMESTONE ROTARY BLOWER - 3 (3)	53-050
144	140300-TAM LIMESTONE PNEUMATIC PIPE - 18 (18)	53-060
145	140302-TAM COAL CHUTES - 15 (15)	54-020
146	140034-TAM ERECT - COAL GRAVIMETRIC FEEDER - 8	54-030E
147	140028-TAM ROUGH SET - COAL GRAVIMETRIC FEEDER - 2	54-030RS

	activity	tamp/fec activity #	
148	140070 - TAM SET - UREA TANK - 2	55-010	✓
149	140196-TAM UREA RECIRC PUMP - 2 (2)	55-020	
150	140198-TAM UREA CHEMICAL INJECTION SYSTEM - 4 (4)	55-030	
151	140200-TAM UREA DISTRIBUTION MODULES - 5 (5)	55-040	
152	140212-TAM UREA INTERCONNECTING PIPING - 9 (9)	55-050	
153	140374-TAM UREA PIPING TO COMBUSTOR & CYCLONES - 12 (12)	55-060	
154	140372-TAM INSTALL UREA INJECTION NOZZLES - 4 (4)	55-070	
155	140352-TAM BEARING COOL WATER PIPING - 4 (4)	60-001	
156	140250-TAM MISC INSTRUMENT PIPING - 28 (28)	60-110	
157	140390-TAM INSTRUMENTATION / CONTROLS - 80 (80)	600	
158	140048-TAM INSTALL STEAM DRUM - 3	75-001	
159	140378-TAM HYDROSTATIC TEST - 4 (4)	75-900	
160	140400-TAM AIR TEST - 4 (4)	75-910	
161	140190-TAM ERECT - FURN SW LOWER HDR - 4 (4)	76-001LE	
162	140018-TAM ROUGH SET - FURN SW LOWER HDR - 1	76-001LRS	
163	140066-TAM UPPER COMBUSTOR HEADERS - 5	76-001U	
164	140274-TAM ERECT - FURN DW LOWER HDR - 3 (3)	76-002LE	
165	140014-TAM ROUGH SET - FURN DW LOWER HDR - 1	76-002LRS	✓
166	140142-TAM ERECT - LOWER FURN FW - 7 (7)	76-012LE	
167	140128-TAM ROUGH SET - FURN FW LOWER - 3 (3)	76-012LRS	
168	140090-TAM ERECT - UPPER FURN FW - 6 (6)	76-012UE	

listed in task number sequence

	activity	tamp/fec activity #	
169	140074-TAM ROUGH SET - FURN FW UPPER - 3	76-012URS	
170	140174 -TAM ERECT LOWER FURN RW - 7 (7)	76-013LE	
171	140166-TAM ROUGH SET - LOWER FURN RW - 3 (3)	76-013LRS	✓
172	140106-TAM ERECT - UPPER FURN RW - 7 (7)	76-013UE	
173	140078-TAM ROUGH SET - FURN RW UPPER - 2	76-013URS	
174	140160-TAM ERECT - LOWER FURN SW - 6 (6)	76-014LE	
175	140144-TAM ROUGH SET - FURN SW LOWER - 4 (4)	76-014LRS	
176	140082-TAM PART ERECT - UPPER FURN SIDEWALL - 3	76-014UE	
177	140082A-TAM COMP ERECT - UPPER FURN SIDEWALL - 3	76-014UE	
178	140072-TAM ROUGH SET - FURN SIDEWALL UPPER - 3	76-014URS	
179	140246-TAM ERECT ROOF PANELS - 8 (8)	76-015E	
180	140220-TAM ERECT - FLOOR PLENUM - 9 (9)	76-016E	
181	140020-TAM ROUGH SET - FLOOR/PLENUM - 1	76-016RS	
182	140316-TAM ERECT - DIVISION WALLS - 10 (10)	76-017E	
183	140076-TAM GROUND ASSEMBLE - FURN DW - 20	76-017GA	
184	140268-TAM ROUGH SET - FURN DW - 2 (2)	76-017RS	
185	140170-TAM WELD - FURN FW MIDDLE TUBE - 7 (7)	76-022M	
186	140182-TAM WELD FURN RW MIDDLE TUBE - 7 (7)	76-023M	
187	140134-TAM WELD UPPER FURN RW - 8 (8)	76-023U	
188	140202-TAM FURN SW TUBE WELD LOWER TO HDR - 6? (7)	76-024L	
189	140176-TAM WELD - FURN SW MIDDLE TUBE - 9 (9)	76-024M	✓

listed in task number sequence

	activity	tamp/fec activity #
190	140086-TAM FURN SW WELD UPPER - 9 (9)	76-024U
191	140270-TAM WELD 3.0 X .220 CS ROOF TUBE - 11 (11)	76-025
192	140248-TAM TUBE WELD 3.0 X .220 CS FLR PLENUM - 15 (15)	76-026
193	140290-TAM FURN DW LOWER WELD TO HDR - 7 (7)	76-027L
194	140304-TAM FURNACE MEMBRANE WELDING - 40 (40)	76-040
195	140360-TAM GRIND INSIDE COMBUSTOR - 15 (15)	76-042
196	140120-TAM FEEDWATER VALVE & PIPING - 7 (7)	76-060
197	140306-TAM ERECT - DOWNCOMBER PIPE - 8 (8)	76-101E
198	140016-TAM ROUGH SET DOWNCOMBERS - 2	76-101RS
199	140328-TAM WELD 12" SCH 80 X 106B DOWNCOMER - 8 (8)	76-111 ✓
200	140338-TAM WELD 10" SCH 80 X 106B DOWNCOMER - 5 (5)	76-112 ✓
201	140344-TAM WELD 8" SCH 80 X 106B DOWNCOMER - 4 (4)	76-113
202	140238-TAM TUBE WELD 1.5 X .180 SH SIDE PNL - 8 (8)	76-115
203	140308-TAM ERECT - RISER PIPE - 20 (20)	76-251E
204	140276-TAM ROUGH SET - RISER PIPE - 5 (5)	76-251RS
205	140342-TAM WELD 10" SCH 80 X 106B RISER - 18 (18)	76-252
206	140356-TAM WELD 8" SCH 80 X 106B RISER - 14 (14)	76-253
207	140110-TAM ERECT - ECONOMIZER - 3 (3)	77-002
208	140122-TAM ERECT - 6" FEEDWATER PIPE - 4 (4)	77-060
209	140146-TAM WELD 6" SCH 80 CS - FEEDWATER PIPING - 4	77-062
210	140146-TAM INSTALL - CYCLONE SUPPORT STEEL - 4 - probably should be feedwaterpipe	77-062?

listed in task number sequence

	activity	tamp/fec activity #
211	140216-TAM ERECT - LOWER SH WALL RING HDR - 3 (3)	78-021L
212	140184-TAM ERECT - UPPER SH WALL RING HEADER - 3	78-021U
213	140194-TAM ERECT - SH FRONT WALL PANEL - 3 (4)	78-104
214	140192-TAM ERECT - SH SIDE WALL PANELS - 4 (4)	78-105
215	140210-TAM ERECT - SH REAR WALL PANEL - 4 (4)	78-106
216	140318-TAM ERECT - SH ROOF PANEL - 2 (2)	78-107
217	140244-TAM TUBE WELD 1.5 X .180 SH FRONT PNL - 4 (4)	78-114
218	140224-TAM TUBE WELD 1.5 X .180 SH REAR PNL - 5 (5)	78-116
219	140326-TAM TUBE WELD 1.5 X .180 SH ROOF PNL - 5 (5)	78-117
220	140226-TAM WELD SH MEMBRANE - 9 (9)	78-118
221	140272-TAM ERECT - PRIMARY SH ELEMENTS - 5 (5)	78-121E
222	140228-TAM GROUND ASSEMBLE - PRIMARY SH ELEMENT - 15 (15)	78-121GA
223	140292-TAM WELD 2.25 X .180 PRI SH ELEMENTS - 17 (17)	78-122
224	140218-TAM ERECT - INT SH OUTLET HEADER - 2 (2)	78-130E
225	140156-TAM ROUGH SET - INT SH OUTLET HEADER - 2 (2)	78-130RS
226	140256 - TAM ERECT - INTERM SH ELEMENTS - 4 (4)	78-131E
227	140230-TAM GROUND ASSEMBLE - INTERM SH ELEMENTS - 3 (3)	78-131GA
228	140266-TAM WELD 2.25 X .180 INT SH ELEMENTS - 4 (4)	78-132
229	140278-TAM ERECT - FIN IN/OUT HEADER - 2 (2)	78-140
230	140294-TAM ERECT - FINISHING SH ELEMENTS - 6 (6)	78-141
231	140320-TAM WELD 2.25 X .180 FIN SH ELEMENTS - 12 (12)	78-142

listed in task number sequence

	activity	tamp/fec activity #
232	140288-TAM ERECT - SH LINK PIPE - 14 (14)	78-200
233	140334-TAM WELD 10"(8") SCH 80 CS SH LINK PIPE - 13? (14)	78-250
234	140350-TAM WELD 10" X 1.25 P11 SH LINK PIPE - 5 (5)	78-251
235	140168-TAM ERECT - DESUPERHEATER HEADER - 2 (2)	78-300E
236	140162-TAM ROUGH SET - DESUPERHEATER HDR - 1 (1)	78-300RS
237	140392-TAM PENTHOUSE CASING - 30 (30)	80-002E
238	140310-TAM ROUGH SET - PENTHOUSE CASING - 2 (2)	80-002RS
239	140340-TAM SH HDR ENCLR CASING - 25 (25)	80-003
240	140394-TAM ACCESS DOORS/PORTS - 5 (5)	80-007
241	140002-TAM INSTALL LIMESTONE SILO - 1 (1) - is in almet's contract	800
242	140096-TAM ERECT PRIMARY AIR HEATER - 4 (4)	81-001E
243	140092-TAM ROUGH SET - PRIMARY AIR HEATER - 1 (1)	81-001RS
244	140108-TAM ERECT - SECONDARY AIR HEATER - 4 (4)	81-011E
245	140098-TAM ROUGH SET - SECONDARY AIR HEATERS - 1 (1)	81-011RS
246	140094-TAM ERECT - STEAM COIL AIR HEATER - 4 (4)	81-012E
247	140088-TAM ROUGH SET - STEAM COIL AIR HEATER - 2 (2)	81-012RS
248	140004-TAM - LIMESTONE FOUNDATION STRUCTURE - 1 (1) - is in almet's contract	810
249	140354-TAM MISC TRIM PIPING - 40 (40)	82-001
250	140322-TAM ERECT - RETRACTABLE SOOT BLOWERS - 10 (10)	83-001E
251	140136-TAM ROUGH SET - RETRACTABLE SOOT BLOWER - 2 (2)	83-001RS
252	140148-TAM SOOT BLOWERS - ROTARY - 4 (4)	83-002

	activity	tamp/fec activity #
253	140336-TAM ERECT - SOOT BLOWER PIPING - 26 (26)	83-006E
254	140124-TAM ROUGH SET SOOT BLOWER PIPING - 2 (2)	83-006RS
255	140362-TAM HYDRO TEST - SOOT BLOWER PIPING - 2 (2)	83-007
256	140398-TAM ERECT - BURNERS & PREPIPED RACKS - 12 (12)	84-020E
257	140036-TAM ROUGH SET - BURNERS & PREPIPE RACK - 1	84-020RS
258	140406-TAM GAS & AIR PIPING - 15 (15)	84-030
259	140408-TAM GAS LANCES - 10 (10)	84-050
260	140380-TAM UREA SYSTEM COMPLETE - 1 (1)	900
261	140324-TAM CRANE COMPLETE - 1 (0)	950
262	140410-TAM COMPLETE - 1 (1)	999
263	140236-TAM ERECT - ASH DUCT - 4 - should this be activity 140236 exp jt - ash classifier?	?51-050?
264	140414-TAM CHEMICAL CLEANING - 5 (5)	CHEMICAL
265	140422-TAM METAL SPRAY - 10 (10)	METAL
266	140428-TAM REFRACTORY MOBILIZATION - 5 (5)	REFR 1
267	140426-TAM STUD MEMBRANE WALLS - 5 (5)	REFR 2
268	140424-TAM REFRACTORIZE CYCLONE - 30 (30)	REFR 3
269	140420-TAM STUD SUPERHEATER - 10 (10)	REFR 4
270	140418-TAM REFRACTORIZE COMBUSTOR - 15 (15)	REFR 5
271	140416-TAM REFRACTORIZE FLUOSEAL - 5 (5)	REFR 6
272	140412-TAM REFRACTORY CURE-OUT - 5 (5)	REFR 7

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Subject: Monitoring Report #18

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, and 323

Dates of meetings and monitorings:

July 7, 1992 (wd 387)
July 9, 1992 (wd 389)

Documents used in monitorings and discussions:

• Alberici/Clark (A/C) Prima Vera computer run #23, dated January 27, 1992 (wd 528) with data date of November 4, 1991 (wd 471). The work shown in this computer run has been designated A/C Issue #01, dated January 27, 1992 (wd 528) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #29 & 30, dated February 22 and 27, 1992 (wds 548 and 551), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 tam, dated February 27, 1992 (wd 551) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #36, dated April 7, 1992 (wd 579), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 qua, dated April 7, 1992 (wd 579) of the A/C planning documents.

• rjs network model translations of the A/C network issues # 1 and 2. These include the following

- Sheet #1, issue 2a dated February 27, 1992 (wd 551) - Translated from A/C Issues #1 and #2
- Sheet #2, issue 2a dated March 5, 1992 (wd 556) - Translated from A/C Issue #2
- Sheet #3, issue 2a dated April 3, 1992 (wd 577) - Translated from A/C Issue #2
- Sheet #4, issue 2a dated March 26, 1992 (wd 571) - Translated from A/C Issue #1
- Sheet #5, issue 2a dated April 4, 1992 (wd 578) - Translated from A/C Issue #1

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July 12, 1992

General summary:

Date of meeting - Tuesday, July 7, 1992 (wd 387)

Location - Job site office at Power Plant #4

Those attending:

A. M. meetings - all except Ralph J. Stephenson in meeting part time

- Robert Nestle - MSU project manager
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- John Hucul - Alberici/Clark project manager
- Dave Munroe - Alberici/Clark superintendent
- Ralph J. Stephenson - consultant

P. M. meetings - all except Ralph J. Stephenson in meeting part time

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Bill Carey - Quality Electric
- Roger Hersey, Quality Electric - project manager
- Bill Huyser, Quality Electric - field superintendent
- Tom Dobie - Alberici/Clark - quality control
- Rick Johnson - MSU electrical engineer
- Pete Theis - Tampella senior field engineer
- Ralph J. Stephenson - consultant

Actions taken:

- Updated network model sheets #04 and 05, issue #2a, dated March 26, 1992 (wd 316)

Summary:

The purpose of this meeting was to update A/C's network models for various portions of the building to reflect the current thinking of A/C about performance of the work. Portions of the project included in this updating were:

Sheet #04 - known proposal package numbers are shown in ( )

- Turbine generator (62,1001)
- Interior metal walls (71.0403)

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- Roofing (71.0403)
- Exterior vertical close in (71.0403)
- Chemical, electrical building

Sheet #05 - known proposal package numbers are shown in ( )

- Coal conveyor modifications
- Fire protection systems
- Cooling tower (62.0212)

Mr. Hucul, Mr. Munroe, Mr. Simons and I completed our updating discussions in the early morning session, and I began the logic plan graphic updating in the late morning. The updated network was designated issue #6, dated July 7, 1992 (wd 387). I completed the revisions later, and issued the preliminary update to the MSU field office, for Mr. Hucul's review during my visit to the job site on Thursday, July 9, 1992 (wd 389).

Mr. Hucul said he will attempt to complete his review of the sheets #04 and #05 updates by Monday, July 13, 1992 (wd 391). He will provide me with A/C comments and revisions. I will then make the requested revisions to the networks and issue for project direction and monitoring by A/C. This procedure appears to currently acceptable to A/C.

In the early afternoon I met with Mr. Nestle, Mr. Wever and Mr. Simons to briefly review the status of the work. We discussed current planning activities with Tampella, Alberici/Clark, and with other contractors on the project. MSU is inviting and requesting A/C's attendance at meetings concerned with the planning of work with which they are involved under their contract with MSU.

Later in the afternoon, I met with the project staff of Quality Electric, with Mr. Tom Dobie of Alberici/Clark, and with Mr. Rick Johnson of MSU. We made a thorough review of the current status of electrical work on the project and tabulated the status, along with other electrical data on an electrical data listing. A copy of this tabulation, designated *A*, is attached to this report.

I suggest special attention be paid to obtaining bus duct installation drawings from CPC, items 17 and 18. Mr. Johnson is to review this matter in detail with the suppliers in a plant trip the latter part of the week of July 6, 1992.

Please also note the comments regarding switchgear, transformers, substations, motor control centers, and the data control systems (dcs), items 11 through 16, and 22 and 23. These concern connections to control systems, deliveries, installation needs, and bulk and systems connections to equipment.

We are planning to continue work on the electrical installation planning in our next monitoring and planning session on Tuesday, July 14, 1992 (wd 392). A/C has been requested to participate in this meeting.

In the late afternoon, Mr. Pete Theis and I continued preparing the network model for the boiler

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installation. We have now brought this network to a point where Mr. Theis is making final corrections. These will be incorporated into the full network of TAM's work model and then issued concurrently with other updated networks being worked upon.

* * *

Date of meeting - Thursday, July 9, 1992 (wd 389)

Location - Job site office at Power Plant #4

Those attending:

- Richard Wever - MSU construction superintendent - in meetings part time
- James Simons - MSU project representative - in meeting part time
- Pete Theis - Tampella senior field engineer
- Ralph J. Stephenson - consultant

Actions taken:

- Distributed copies of preliminary updated sheets #04 and 05 to Mr. Simons of MSU
- Completed major updating of boiler installation network model sheets #01 and 02.

Summary:

At the beginning of the morning session I provided Mr. Simons of MSU copies of the updated sheets #04 and #05, prepared in conjunction with A/C earlier in the week. I also gave Mr. Simons copies of a data listing of the activities on sheets #04 and 05, arrayed in early start sequence, and in activity number sequence, along with an early and late, start and finish bar chart. He will issue this update package to A/C for review and comments. A/C said they will try to have these returned with comments by Monday, July 13, 1992 (wd 391).

Next, Mr. Theis and I continued the updating of the TAM boiler network currently in work. We completed bulk work on the diagram except for the activities leading up to removal of the large crane from the project. Mr. Theis is to continue analyzing this removal date to better fit with his and other's needs on the project.

I made a logic plan printout and left it with Mr. Theis. Copies of this preliminary network were also given to A/C by Mr. Simons for their review and comments. At our meetings the week of July 13, 1992 I plan to obtain the update comments for completion of the boiler installation network plan and to put the boiler network into issue form.

Meanwhile I am completing the tie in restraints and deriving the early and late starts and finishes for the complete boiler logic plan.

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July 12, 1992

General

Our next meetings on the project are set for Tuesday and Wednesday, July 14, and 15, 1992 (wd 392 and 393). The suggested agenda for these two days is as follows:

Tuesday, July 14, 1992 (wd 392)

- Review A/C comments on sheets #04 and #05 updating
- Continue, and attempt to complete preparing network models for electrical installation with Quality, A/C, and MSU staff.
- Review Tampella's comments on sheets #01 and #02 updating. This review might have to be deferred in part until Wednesday, July 15, 1992 (wd 392).
- Inspect and monitor project as time permits.

Wednesday, July 15, 1992 (wd 393)

- Complete review of A/C comments on sheets #04 and #05, as needed.
- Complete review of Tampella comments on sheets #01 and #02, as needed.
- Begin detailed network modeling of mechanical construction work with IMC and A/C.
- Complete detailed monitoring and evaluation of project status.

I have requested from Mr. Simons, an updated copy of the project status report used to show work requirements for the next 30 days by A/C. In this report, completed activities along with actual starting and completion dates are tabulated for the project to date. This report is of great assistance in checking the field monitoring evaluations to be made during this site inspection.

Ralph J. Stephenson, P. E.

(A)

	oen	item	deliv date	elev	% comp	remarks
1	1	Cable tray installation		851'0" bsmt floor	95%	
2	2	Cable tray installation		861' 4 1/2" mezzanine floor	90%	
3	3	Cable tray installation		875' 0" operating floor	50%	
4	4	Cable tray installation		890' reactor floor	75%	
5	5	Cable tray installation		894' feeder floor	0%	
6	6	Cable tray installation		912' secondary fan floor	0&	
7	7	Cable tray installation		930' primary air fan floor	0%	
8	8	Cable tray installation		945' 11"	0%	
9	9	Cable tray installation		963' 9"	0%	

X.001 Delivery item
·Design ·Fab
·Appv ·Deliver

listed in original entry number (oen) sequence

	oen	item	deliv date	elev	% comp	remarks
10	10	Cable tray installation		970		no cable tray at this level
11	19	15 kv switchgear 7/14/92	8/10/92 this date to be held	operate 875'		Desirable to install fr north elevation. Now will probably bring at oh door at north end at 851', hoist to 875' and winch or lift into place. When is the wall between buildings at crane being demolished. Could it be penetrated for temporary crane access?
12	20	5 kv switchgear	8/10/92 not firm	861'4½		Desirable to install fr north elevation. Now will probably bring at oh door at north end at 851', hoist to 861' 4 1/2' & winch or lift into place. Will use fork lift to set at floor.
13	12	2 - 4160 v transformers	6/16/92			on site - need to build transf bases - A/C will start excavating on 7/8/92 for bases. Should have bases complete in about 15 working days, assume curing of 5 wkg days. Quality could set transformers on 8/5/92. Confirm this does not intefere with msnry
14	14	~~4160~~ 480 v transformers	6/26/92			on site - need to build transf bases - A/C will start excavating on 7/8/92 for bases. Should have bases complete in about 15 working days, assume curing of 5 wkg days. Quality could set transformers on 8/5/92. Confirm this does not intefere with msnry
15	15	~~4160~~ 480 v. transformers	6/29/92			on site - need to build transf bases - A/C will start excavating on 7/8/92 for bases. Should have bases complete in about 15 working days, assume curing of 5 wkg days. Quality could set transformers on 8/5/92. Confirm this does not intefere with msnry
16	21	480 v substation	8/10/92 Highest priority no word	861'4½		Desirable to install fr north elevation. Now will probably bring at oh door at north end at 851', hoist to 861' 4 1/2' & winch or lift into place. Will use fork lift to set at floor. Should set this equipment before the 5 kv switchgear.
17	18	15 kv bus duct	7/13/92			no installation drawings from cpc - Quality needs - all runs originate out of 15 kv switchgear. to generator, to unit 3 switchgear, 2 runs to reactor, to generator 2 .
18	11	600 v bus duct	6/15/92			some on job - no installation drawings from cpc - Quality needs - 480 volt substation to 2 outside transformers.

Rick & Joe K going to CPC 7/15/92 to check & expedite delivery of items 11, 12, 16.

Will start masonry in next 2 wks (bldg backup)

7/14/92 @ B&V. B&V - ?

msnry A/C] 2 wk

Rick to get info on 7/15/92

	oen	item	deliv date	elev	% comp	remarks
19	13	Unit 2 and 4 station battery	6/16/92			all on job
20	16	Battery chargers	7/7/92			all on job
21	17	UPS system	7/7/92			all on job - need building closed in to connect
22	22	4 back to back - motor control centers - total of 8	8/28/92			begin shipping 8/28/92 - will ship one pair per week - made by Westinghouse, shipped to Bailey, Bailey hooks their controls to the mcc, tests the unit, & ships it to the job site - msu & bv to go to Westinghouse to review shp dwgs 7/8/92. mcc's not built
23	23	data control systems (dcs)	9/25/92			No shop drawing submitted as yet. Are large micro processors. Might have some access problems. Will have to have a weather tight building to set these.

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Subject: Monitoring Report #19

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, and 323

Dates of meetings and monitorings:

July 14, 1992 (wd 392)
July 15, 1992 (wd 393)
July 20, 1992 (wd 396)

Those attending:

Note: Some listed below were in meetings part time only

- Robert Nestle - MSU project manager
- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Sean McCardel - MSU field staff
- John Hucul - Alberici/Clark project manager
- Bill Carey - Quality Electric
- Roger Hersey, Quality Electric - project manager
- Bill Huyser, Quality Electric - field superintendent
- Rick Johnson - MSU electrical engineer
- Pete Theis - Tampella senior field engineer
- Ralph J. Stephenson - consultant

Documents used in monitorings and discussions:

- Alberici/Clark (A/C) Prima Vera computer run #23, dated January 27, 1992 (wd 528) with data date of November 4, 1991 (wd 471). The work shown in this computer run has been designated A/C Issue #01, dated January 27, 1992 (wd 528) of the A/C planning documents.

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July 12, 1992

• Alberici/Clark (A/C) Prima Vera computer runs #29 & 30, dated February 22 and 27, 1992 (wds 548 and 551), with data date of November 4, 1991 (wd 471). The Tampella work shown in this computer run has been designated A/C Issue #02 tam, dated February 27, 1992 (wd 551) of the A/C planning documents.

• Alberici/Clark (A/C) Prima Vera computer runs #36, dated April 7, 1992 (wd 579), with data date of November 4, 1991 (wd 471). The work shown in this computer run has been designated A/C Issue #02 qua, dated April 7, 1992 (wd 579) of the A/C planning documents. This run contains primarily electrical construction work to be done by Quality Electric. (please note change in description from previous monitoring reports)

• rjs network model translations of the A/C network issues # 1 and 2. These include the following

- Sheet #1, issue 2a dated February 27, 1992 (wd 551) - Translated from A/C Issues #1 and #2
- Sheet #2, issue 2a dated March 5, 1992 (wd 556) - Translated from A/C Issue #2
- Sheet #3, issue 2a dated April 3, 1992 (wd 577) - Translated from A/C Issue #2
- Sheet #4, issue 2a dated March 26, 1992 (wd 571) - Translated from A/C Issue #1
- Sheet #5, issue 2a dated April 4, 1992 (wd 578) - Translated from A/C Issue #1
- Sheet #6, issue 2a dated April 27, 1992 (wd 338) - Translated from A/C run #36
- Sheet #7, issue 2a dated April 27, 1992 (wd 338) - Translated from A/C run #36

Actions taken:

• Made brief inspection of project.
• Continued updating Tampella's boiler installation network model with Pete Theis and A/C staff as they desired to participate.
• Continued preparing electrical construction network models with Quality Electric and A/C staff as they desired to participate.
• Made detailed reviews of delivery dates for electrical equipment furnished by MSU and by Quality.
• Discussed methods by which individual tie ins and testing was to be show in network models.
• Identified major components of electrical systems with Quality Electric.

Summary:

The meetings on July 14, 15, and 20, 1992 (wd 392, 393 and 396) were mainly devoted to planning the electrical installation, establishing anticipated deliveries of equipment, completing translation of the A/C computer run #36 into network models, and identifying specific equipment serviced by the electrical distribution system.

Boiler installation planning meetings for the three days consisted of relatively short meetings with Tampella staff to make refinements to the network models currently being prepared.

In addition, during this period, A/C reviewed the various components of their work shown on sheets #4

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and #5, and gave approval to Mr. Simons to put the material in final form for use in monitoring.

The chemical/electrical building work plan can also be completed and issued. I have added the electrical construction logic and durations as shown in the Quality Electric and A/C predecessor, successor run #36, dated April 7, 1992 to the building diagram. New dates will be shown for the electrical work as set by revisions to the chemical/electrical building.

During our electrical planning meetings, and as we discussed the many activities making up the electrical construction work plan, we identified four basic components of the electrical system.

1. *Service power system* - Equipment components that take power from its base source and feed it to the **power routing system**. The service power system includes:

- New turbine generator - as a source of power only
- Existing turbine generator - as a source of power only
- 13.8 kv switchgear
- 4160 v transformer
- 480 v transformers
- 480 v switchgear (some portions may be included in power routing system)
- 4160 v substation (some portions may be included in power routing system)
- Cable connecting the above equipment
- Cable connecting the service power system to the power routing system

2. *Power routing system* - Devices and equipment such as motor control centers that route the power from the **service power system** to the cable tray and other routes along which wire and cable is laid and connected. The current elements of the power routing system include the following:

- 4160 v substation (also in service power system)
- 480 v substation (also in service power system)
- Boiler and turbine mcc #41
- Boiler and turbine mcc #42
- Boiler and turbine mcc #43
- Boiler and turbine mcc #44
- Fabric and filter mcc #45
- Fabric and filter mcc #46
- Cooling tower mcc #47
- Cooling tower mcc #48
- Riser conduit out of equipment to the cable and wire carrying system

3. *Cable and wire carrying system* - Equipment and materials that transport the power from the **power routing system** to the equipment, devices, and operating systems that use the power. The elements of the cable and wire carrying system include the following:

- Bulk cable tray - from equipment risers to equipment risers

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- Bulk conduit - conduit installed to the junction boxes
- Wire or cable laying in cable tray from riser conduit to riser conduit (to be reviewed)
- Wire or cable in conduit and running from junction boxes to junction boxes.

4. Final equipment destination system - Equipment, devices, and operating systems that use the power provided to it from the **service power system**, the **power routing system**, and the **cable and wire carrying system**. These include

- All equipment and equipment components to which electrical connections must be made from the cable and wire carrying system. Includes all equipment to which final connections must be made.

The four electrical system components identified above are not necessarily intended to be the final format into which the electrical construction modeling is to be fitted. However, Mr. Bill Huyser, Quality Electric's field superintendent, Mr. Rick Johnson, MSU electrical engineer on the project and I have diagramed the **service power system**, the **power routing system**, without wire or cable, and portions of the **cable and wire carrying system**. They seem to lend themselves to organizing the project into manageable components.

We have not diagramed any major wire or cable pulling since final placement of equipment, pulling wire and cable, and making final connections will be planned in detail as more information becomes available on the equipment to be connected and its location.

A preliminary listing of equipment to which final connections are to be made has been tabulated in an electrical construction laundry list issue dated 07/19/92. This document was derived from information provided by A/C and taken from the Black and Veatch design documents.

I shall print up all documents completed, to date, for electrical construction, and have these available for our next planning meeting. This meeting will probably be held the week of July 27, 1992.

Meanwhile Mr. Simons will have his field staff identify all electrical equipment and its installation for this meeting. Information needed includes the following:

a. Location of all final connection equipment shown on the electrical construction laundry list.

b. Responsibility identification of all who are to be involved in the activities in the electrical construction laundry list.

c. Up to date information on expected delivery dates of owner furnished equipment (ofe)

d. Information on portions of the control systems that are the responsibility of MSU.

We have completed most of Tampella's network and I am presently cleaning up the networks, and showing late finishes for remote connectors. Tampella has requested we hold issuing the network until

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they and Fuel Economy complete a final check of the network. Mr. Simons is following this final check with Mr. Theis. We should issue the updated work model the week of July 27, 1992.

General:

I shall call Mr. Simons shortly and set the agenda, and the date of our next meeting.

Ralph J. Stephenson, P. E.

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August 14, 1992

Subject: Monitoring Report #20

Please note that the monitoring report dated July 12, 1992 was incorrectly labeled on page #1 as ***Monitoring Report #18***. It should have read ***Monitoring Report #19***. A revised page #1 for this report is enclosed. Please replace the original page #1 with the revised copy.

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, 323 and 326

Dates of meetings and monitorings:

July 29, 1992 (wd 361)
August 4, 1992 (wd 407)
August 10, 1992 (wd 411)

Those attending:

Note: Some of those listed below were in meetings part time only

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- Rick Johnson - MSU electrical engineer
- David Sanger - MSU field inspector
- Greg Holloway - MSU field inspector
- John Hucul - Alberici/Clark project manager
- Roger Hersey, Quality Electric - project manager
- Bill Huyser, Quality Electric - field superintendent
- Pete Theis - Tampella senior field engineer
- Gary Phillips - Environmental Elements field construction superintendent
- Ralph J. Stephenson - consultant

Documents used in monitorings and discussions:

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August 14, 1992

- Sheet #01, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #02, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #03, issue 6, dated July 07, 1992 (wd 387) - Chemical/electrical building
- Sheet #04, issue 6, dated July 07, 1992 (wd 387) - Turbine generator, interior metal walls, roofing and exterior vertical close in
- Sheet #05, issue 6, dated July 07, 1992 (wd 387) - Coal conveyor, fire protection systems, and cooling tower
- Sheet #06, issue 6, dated July 14, 1992 (wd 392) - Electrical construction
- Sheet #07, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work
- Sheet #08, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #09, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #10, issue 6, dated August 10, 1992 (wd 411) - Fabric filter building - preliminary for review and comment only

Actions taken:

- Inspected project.
- Completed updating boiler installation network model and issued to MSU.
- Completed updating Alberici/Clark plans and schedules shown on sheets #04, 05, and 06 noted above. Alberici/Clark staff approved issue of networks.
- Completed preparing and issued electrical network models shown on sheets #06 and 07 noted above. Alberici/Clark participated as they desired.
- Continued preparing electrical construction network models with Quality Electric and MSU staff. Alberici/Clark participated as they desired.
- Continued preparing detailed tabulations of electrical equipment procurement and installation with MSU and Quality Electric. Alberici/Clark participated as they desired.
- Prepared preliminary network model for fabric filter building with Environmental Elements and MSU staff. This plan of work is shown on sheet #10.
- Began preparation of monitoring translations for sheets #01 through 08.
- Evaluated project status.

Summary:

The major objective of this series of meetings was to complete the network models for the MSU Power Plant Addition #4 show currently on sheets #01 through #08. These elements include:

- Boiler construction
- Turbine generator
- Interior metal walls
- Roofing and exterior vertical close in
- Coal conveyor
- Fire protection systems

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August 14, 1992

- Cooling tower
- Portions of the electrical construction work

Those plan elements that are yet to be diagramed and issued to the project staff include:

- Fabric filter building - preliminary network currently being reviewed by Environmental Elements
- Remainder of electrical construction work - to be completed as information re equipment deliveries, routing locations, and final connection locations becomes available. Will be ongoing.
- IMC mechanical construction work - being planned and scheduled by Alberici/Clark. To be issued the week of August 10, 1992.
- Control systems work - to be completed concurrently with ongoing electrical construction planning.
- Final connections and testing - to be planned as the related basic elements plans are completed.
- Plant start up - to be planned in conjunction with MSU operating and construction staff, and all contractors as needed.

There will undoubtedly be additional elements to be planned and diagramed than those noted above. These will be identified in the ongoing monitoring of the project.

As part of the electrical planning, Mr. Rick Johnson and I are assembling a data listing of all elements of the electrical and related systems. This is an ongoing document that will be updated as information becomes available.

At the planning and monitoring meeting of Monday, August 10, 1992 (wd 411), Mr. David Sanger of MSU, Mr. Gary Phillips, superintendent for Environmental Elements, and I prepared a network model for construction of the fabric filter building. The reference document for this work was a bar chart prepared by Fuel Economy, Environmental Elements erection subcontractor.

We decided to start the fabric filter planning process from a base date of August 10, 1992 (wd 412), and to use the logic and activity durations as desired by Mr. Phillips. He will, in turn review this logic and durations with his management, and with Fuel Economy. Comments and changes desired will then be incorporated into the plan of work and the network will be issued for field use. Mr. Phillips will return the reviewed network to Mr. Simons by Monday, August 17, 1992 (wd 416).

Enclosed with this report is a listing of all activities included on the issue #6, network models described above for sheets #01 through #06 and issued to Mr. Simons on August 10, 1992 (wd 411). This list is sorted and arranged first by the sheet number on which the activity appears. Within each sheet number the activities are then``` listed in ascending order of their late starts.

To measure actual status against the late starts, first find the current date in the late start column and then note the status of activities shown above this date. Any of these that are not started as of the selected date can be considered to have missed their latest allowable starting date.

Other listing sequences that are of help in monitoring include the early start, and the late finish arrays. These arrays have not been printed and provided, but can be prepared as desired.

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August 14, 1992

The early start sequence is often used as a master check list, and to prepare bar charts for early start evaluations. The late finish sequence is a supplement to the late start sequence to allow quick determination of those activities that are meeting or have missed their late finish date.

Usually a project evaluation is made from a measurement against one or more of these runs, provided reasonably authentic late starts and finishes are available from a well prepared logic statement, either graphic or narrative.

Project Status:

During this planning and monitoring period I inspected the project on July 29, 1992 (wd 403), and on August 4, 1992 (wd 407).

The status information for these two evaluations was supplemented by discussions with contractors doing the work. The monitorings evaluations below were made by comparing actual status against planned status as shown in the issue #6 network models.

Circulating Fluid Bed Boiler - network sheets #01 and 02

Most major activities are currently meeting dates ranging from early to late start and finish targets as shown on sheets #01 and #02 of the issue #6 network model. This model was prepared in conjunction with Tampella and has been provided to Alberici Clark for their review as it was prepared and issued.

We shall make a more detailed evaluation of boiler work progress at our next monitoring. However if an interim analysis is desired it can be made from the enclosed drawing number/late start activity list described above.

Chemical/Electric Building - network sheet #03

The current issue #06 late finish date for the chemical/electrical building is shown at the pm of November 6, 1992 (wd 475). Using this date as a measure the project is currently in fair condition. Close in of the facility is in work and major activities are meeting or bettering late starts and late finishes.

The acid tank has not yet been installed. This was originally shown as restraining most early work at the facility. There was no current word available regarding tank delivery and installation. I suggest this item be followed closely if there appears to be an access problem for setting the equipment.

Turbine Generator - network sheet #04

The date for completion of turbine systems check out is set as March 10, 1993 (wd 560) in the issue #6 network model. The date was selected with the project staff and should be final reviewed with MSU and the contractors.

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August 14, 1992

As of August 4, 1992 (wd 407), coal conveyor modifications are meeting major targets between early and late starts and finishes. The current target date for completing the new bunker feed belt conveyor is shown as the pm of September 8, 1992 (wd 432) in the issue #6 network. This date should be reviewed at a near future meeting to determine if it is a necessary or a desired date.

Fire Protection Systems - network sheet #06

No authentic word was available on the current status of fire protection installation. The issue #6 target completion date is currently the pm of March 1, 1993 (wd 553).

Cooling Tower - network sheet #05

The cooling tower contractor began to move onto the job site recently, and was stopped by a a picket line that prevented continuation of the move in and installation. Attempts are being made presently to resolve this matter.

Erection of the cooling tower was due to begin on an early start of July 8, 1992 (wd 388) according to the issue #6 network model. Late completion of the cooling tower was set for the pm of November 16, 1992 (wd 480). This late date will be reviewed in a near future monitoring.

Electrical Construction - network sheet #06

As of August 4, 1992 (wd 407) construction and curing of the transformer bases at the north elevation is in work and expected to be completed in a few days. Exterior block walls at the north should be complete by mid August, 1992. At that point service power system elements can be set and connections to equipment begun. Major work here is presently meeting issue #6 early and late starts and finishes.

Planning work on other elements of the electrical system will proceed as information becomes available on deliveries of equipment.

Mechanical Construction

Mechanical construction planning is currently in work by Alberici/Clark and IMC. The predecessor/successor run for this work was to have been submitted to Mr. Simons of MSU the week of August 10, 1992. No current word is available on when it is to be available.

When it is issued to MSU I shall translate it to a monitoring network to use in conjunction with the other network models and plans prepared to date. This is an important element of the total work and is needed now.

Fabric Filter Building - network sheet #10

Mr. Gary Phillips of Environmental Elements, Mr. David Sanger of MSU, and I prepared a preliminary

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draft of the fabric filter building for work through November, 1992. This network was given to Mr. Phillips on Monday, August 10, 1992 (wd 411) for review and approval to issue. He will return the network with comments and suggested revisions by Monday, August 17, 1992 (417). I will put the network model into final form and issue it as soon as possible.

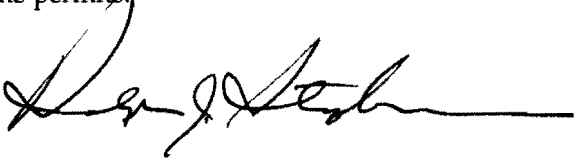
Work on the fabric filter building is currently concentrated on erecting the casing modules, hopper heaters, manifolds, insulation and lagging, fans, and breechings. Much of this activity is proceeding concurrently, and resources needed will have to be studied carefully to insure work space and manpower is available and adequate.

General:

I plan to meet with Mr. Simons on August 24, 1992 (wd 421) to continue our planning and monitoring work. I suggest we include the following activities for our agenda at that session:

- Begin active planning for move in and start up of the plant - this is to be done in conjunction with the MSU staff and the contractors as needed.
- Review work on the remaining elements to be planned.
- Monitor current status of project.

Other items will be added to the agenda as time permits.



Ralph J. Stephenson, P. E.

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
1	140204/10-240RS - DUCT - PRIMARY AIR FANS TO AH - ROUGH ERECT - 5	1	6/24/92	6/30/92	6/30/92	7/7/92	100% comp	100% comp	16
2	140214/10-260RS - DUCT - SECONDARY AIR FAN TO AIR HEATER - ROUGH ERECT - 4	1	6/24/92	6/29/92	7/1/92	7/7/92	100% comp	100% comp	15
3	140098/81-011RS - SECONDARY AIR HEATER - ROUGH SET - 1	1	7/1/92	7/1/92	7/8/92	7/8/92	100% comp	100% comp	30
4	140100/10-230RS - TAM ROUGH SET DUCT - ECON TO AH - 2	1	7/2/92	7/6/92	7/9/92	7/10/92	100% comp	100% comp	41
5	140104/09-009 - ERECT ECONOMIZER SUPPORT STEEL - 3	1	7/7/92	7/9/92	7/13/92	7/15/92	100% comp	100% comp	59
6	140116/10-230E - TAM ERECT DUCT - ECON TO AH - 6	1	7/10/92	7/17/92	7/16/92	7/23/92	in work		74
7	140110/77-002 - TAM ERECT - ECONOMIZER - 3	1	7/20/92	7/22/92	7/24/92	7/28/92	100% comp	100% comp	107
8	140486/256-TAM DELIVER - SH DUCT TO ECON - PM 07/15/92	1	7/16/92	7/16/92	7/29/92	7/29/92	100% comp	100% comp	90
9	140114/10-220RS - TAM ROUGH SET DUCT - SH TO ECONOMIZER - 2	1	7/23/92	7/24/92	7/29/92	7/30/92	100% comp	100% comp	117
10	140222/10-220E - TAM - ERECT DUCT - SH TO ECON DUCT - 6	1	7/27/92	8/3/92	7/31/92	8/7/92	50% comp		134
11	140500/242 - TAM DELIVER SOOT BLOWER CONTROLS - 07/01/92	1	7/2/92	7/2/92	8/10/92	8/10/92	100% comp	100% comp	32
12	140496/241 - TAM DELIVER RETRACTABLE SOOT BLOWER - PM 07/01/92	1	7/2/92	7/2/92	8/10/92	8/10/92			33
13	140136/83-001RS - TAM ROUGH SET - RETRACTABLE SOOT BLOWER - 2	1	8/4/92	8/5/92	8/10/92	8/11/92			167
14	140138/09-017RS - TAM ROUGH SET - HEAT RECOVERY AREA BUCKSTAYS - 3	1	8/6/92	8/10/92	8/12/92	8/14/92			182
15	140516/205-TAM DELIVER - SUPERHEATER ENCLOSURE HEADERS - PM 08/15/92	1	8/17/92	8/17/92	8/17/92	8/17/92			211
16	140156/78-130RS - TAM ROUGH SET - INT SH OUTLET HEADER - 2	1	8/17/92	8/18/92	8/17/92	8/18/92			217
17	140162/78-300RS - TAM ROUGH SET - DESUPERHEATER HDR - 1	1	8/19/92	8/19/92	8/19/92	8/19/92			224
18	140164/09-011 - TAM HEAT RECOVERY AREA TOP GRID STEEL - 5	1	8/20/92	8/26/92	8/20/92	8/26/92			240
19	140178/09-015S - TAM INSTALL SUPERHEAT BOILER HANGERS - 5	1	8/27/92	9/2/92	8/27/92	9/2/92			259
20	140514/204-TAM DELIVER - SUPERHEATER HEADERS - PM 06/26/92	1	6/29/92	6/29/92	9/3/92	9/3/92			24
21	140184/78-021U - TAM ERECT - UPPER SH WALL RING HEADER - 3	1	9/3/92	9/8/92	9/3/92	9/8/92			288
22	140216/78-021L - TAM ERECT - LOWER SH WALL RING HDR - 3	1	9/9/92	9/11/92	9/9/92	9/11/92			298
23	140504/218 - TAM DELIVER SUPERHEATER BUCKSTAYS - PM 07/15/92	1	7/16/92	7/16/92	9/14/92	9/14/92			92
24	140518/217-TAM DELIVER - SUPERHEATER ENCLOSURE WALLS - PM 08/15/92	1	8/17/92	8/17/92	9/14/92	9/14/92			212
25	140192/78-105 - TAM ERECT - SH SIDE WALL PANELS & RELATED BUCKSTAYS - 6	1	9/14/92	9/21/92	9/14/92	9/21/92			307
26	140194/78-104 - TAM ERECT - SH FRONT WALL PANEL & RELATED BUCKSTAYS - 3	1	9/22/92	9/24/92	9/22/92	9/24/92			324
27	140042/10-245E - TAM - PRIMARY AIR HEATER TO PLENUM - 7	1	6/24/92	7/2/92	9/24/92	10/2/92	in work		19
28	140518/217-TAM DELIVER - SUPERHEATER ENCLOSURE HEADERS - PM 08/15/92	1	8/17/92	8/17/92	9/25/92	9/25/92			213

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
29	140210/78-106 - TAM ERECT - SH REAR WALL PANEL & RELATERD BUCKSTAYS - 4	1	9/25/92	9/30/92	9/25/92	9/30/92			333
30	140220/76-016E - TAM ERECT - FLOOR PLENUM - 9	1	7/6/92	7/16/92	10/5/92	10/15/92	100% comp	100% comp	50
31	140128-76-012LRS - ROUGH SET FURNACE FRONT WALL LOWER & RELATED BUCKSTAYS - 6	1	7/17/92	7/24/92	10/16/92	10/23/92	100% comp	100% comp	100
32	140142/76-012LE - TAM ERECT - LOWER FURN FW - 7	1	7/27/92	8/4/92	10/26/92	11/3/92	100% comp	100% comp	135
33	140124/83-006RS - TAM ROUGH SET SOOT BLOWER PIPING - 2	1	7/23/92	7/24/92	11/4/92	11/5/92			118
34	140074/76-012URS - TAM ROUGH SET - FURN FW UPPER & RELATED BUCKSTAYS - 5	1	8/5/92	8/11/92	11/4/92	11/10/92			175
35	140090/76-012UE - TAM ERECT - UPPER FURN FW & RELATED BUCKSTAYS - 8	1	8/12/92	8/21/92	11/11/92	11/20/92			208
36	140168/78-300E - TAM ERECT - DESUPERHEATER HEADER - 2	1	8/20/92	8/21/92	11/19/92	11/20/92			237
37	T/R TO START GROUND ASSEMBLE FURN DW - 07/20/92	1	7/20/92	7/20/92	11/20/92	11/20/92			106
38	140076/76-017GA - TAM - GROUND ASSEMBLE FURN DW - 20	1	7/20/92	8/14/92	11/20/92	12/18/92			111
39	140234/10-460RS - TAM ROUGH SET - NON METAL AIR DUCTS EXP JOINTS AT SEC AIR FAN TO AH - 4	1	6/30/92	7/6/92	11/23/92	11/27/92	in work		27
40	140170/76-022M - TAM WELD - FURN FW MIDDLE TUBE - 7	1	8/24/92	9/1/92	11/23/92	12/2/92			248
41	140014/76-26RS - TAM - ROUGH SET FURN DIV WALL LOWER HEADER - 1	1	7/17/92	7/17/92	11/24/92	11/24/92	100% comp	100% comp	96
42	140166/76-013LRS-TAM ROUGH SET - LOWER FURN RW & RELATED BUCKSTAYS - 3	1	7/20/92	7/22/92	11/25/92	11/30/92	50% comp		108
43	140248/76-026 - TAM TUBE WELD 3.0 X .220 CS FLR / PLENUM - 15	1	7/17/92	8/6/92	11/25/92	12/16/92	10% comp		104
44	140078/76-013URS - TAM ROUGH SET - FURN RW UPPER & RELATED BUCKSTAYS - 5	1	7/23/92	7/29/92	12/1/92	12/7/92			123
45	140246/76-015E - TAM ERECT ROOF PANELS - 8	1	9/2/92	9/14/92	12/3/92	12/14/92			283
46	140106/76-013UE - TAM ERECT - UPPER FURN RW & RELATED BUCKSTAYS - 7	1	7/30/92	8/7/92	12/8/92	12/16/92			152
47	140270/76-025 - TAM WELD 3.0 X .220 CS ROOF TUBE - 11	1	9/15/92	9/29/92	12/15/92	12/30/92			315
48	140052/09-015C - TAM INSTALL COMBUSTOR BOILER HANGERS & RELATED COMB TOP GRID STEEL - 10	1	6/24/92	7/8/92	12/16/92	12/30/92	in work		22
49	140268/76-017RS - TAM - ROUGH SET FURN DW - 2	1	8/17/92	8/18/92	12/21/92	12/22/92			219
50	140274/76-002LE - TAM - ERECT FURN DW LOWER HEADER - 3	1	8/19/92	8/21/92	12/23/92	12/28/92			226
51	140316/76-017E - TAM - ERECT DIVISION WALL - 10	1	8/24/92	9/4/92	12/29/92	1/12/93			249
52	140330/10-260E - DUCT - SEC AIR FAN TO AIR HEATER - 20	1	6/30/92	7/28/92	12/30/92	1/27/93	100% comp	100% comp	29
53	140160/76-014LE - TAM ERECT - LOWER FURN SW - 6	1	7/9/92	7/16/92	12/31/92	1/8/93	100% comp	100% comp	70
54	140120/76-060RS - TAM ROUGH SET FEEDWATER VALVE & PIPING - 7	1	7/23/92	7/31/92	12/31/92	1/11/93			124
55	140360/76-042 - TAM GRIND INSIDE COMBUSTOR - 15	1	9/30/92	10/20/92	12/31/92	1/21/93			338
56	140174/76-013LE - TAM ERECT LOWER FURN RW & RELATED BUCKSTAYS - 7	1	8/10/92	8/18/92	1/4/93	1/12/93			193

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
57	140176/76-024M - TAM WELD - FURN SW MIDDLE TUBE - 9	1	7/17/92	7/29/92	1/11/93	1/21/93	100% comp	100% comp	102
58	140122/77-060 - TAM ERECT - 6" FEEDWATER PIPE - 4	1	8/3/92	8/6/92	1/12/93	1/15/93			163
59	140134/76-023U - TAM WELD UPPER FURN RW - 8	1	9/15/92	9/24/92	1/12/93	1/21/93			313
60	140182/76-023M - TAM WELD FURN RW MIDDLE TUBE - 7	1	8/19/92	8/27/92	1/13/93	1/21/93			233
61	140290/76-027L - TAM FURN DW LOWER WELD TO HDR - 7	1	9/8/92	9/16/92	1/13/93	1/21/93			296
62	140068/50-020E - TAM ERECT SAND / FILL SCREW CONVEYOR - 2	1	6/24/92	6/25/92	1/18/93	1/19/93	50% comp		12
63	140146/77-062 - TAM - WELD 6" SCH 80 CS FEED WATER PIPING - 4	1	8/7/92	8/12/92	1/18/93	1/21/93			188
64	140132/50-030RS - SAND PIPING TO COAL FEEDER - ROUGH SET - 2	1	6/26/92	6/29/92	1/20/93	1/21/93	50% comp		23
65	140140/50-030E - SAND PIPING TO COAL FEEDER - ERECT - 8	1	6/30/92	7/10/92	1/22/93	2/2/93	50% comp		28
66	140522/247-TAM DELIVERY - SNCR SYSTEM PUMPS, MODULERS - PM 07/01/92	1	7/2/92	7/2/92	1/26/93	1/26/93			35
67	140070/55-010 - TAM SET - UREA TANK - 2	1	6/24/92	6/25/92	1/26/93	1/27/93			13
68	140200/55-040 - TAM UREA DISTRIBUTION MODULES - 5	1	7/2/92	7/9/92	1/26/93	2/1/93			46
69	140058/10-270RS - TAM - ROUGH SET DUCT SEC AIR TO BUSTLE - 2	1	7/29/92	7/30/92	1/28/93	1/29/93	100% comp	100% comp	147
70	140198/55-030 - TAM UREA CHEMICAL INJECTION SYSTEM - 3	1	7/2/92	7/7/92	1/28/93	2/1/93			44
71	140196/55-020 - TAM UREA RECIRC PUMP - 2	1	7/2/92	7/6/92	1/29/93	2/1/93			42
72	140212/55-050 - TAM UREA INTERCONNECTING PIPING - 9	1	7/10/92	7/22/92	2/2/93	2/12/93			75
73	140444B/222B - TAM DELIVER - ASH CLASSIFIER 1 - PM 06/26/92	1	6/29/92	6/29/92	2/3/93	2/3/93	100% comp	100% comp	25
74	140444A/222A - TAM DELIVER - ASH CLASSIFIER 2 - PM 07/01/92	1	7/2/92	7/2/92	2/3/93	2/3/93			36
75	140180A/51-010RSA - ASH CLASSIFIER 1 ROUGH SET - 2	1	7/2/92	7/6/92	2/3/93	2/4/93	100% comp	100% comp	43
76	140034/54-030E - ERECT COAL GRAVIMETRIC FEEDER - 8	1	7/13/92	7/22/92	2/3/93	2/12/93	90% comp		80
77	140180B/51-010RSB - TAM ROUGH SET - ASH CLASSIFIER 2 - 2	1	7/7/92	7/8/92	2/5/93	2/8/93			56
78	140186A/51-010EA - TAM PART ERECT - ASH CLASSIFIER - 2	1	7/7/92	7/8/92	2/8/93	2/9/93	40% comp		57
79	140188/51-040RS - TAM ROUGH SET - ASH DUCT - 7	1	7/9/92	7/17/92	2/9/93	2/17/93			72
80	140186B/51-010EB - TAM COMP ERECT - ASH CLASSIFIER - 6	1	7/9/92	7/16/92	2/10/93	2/17/93			71
81	140462/251 - TAM - DELIVER DUCT COAL FD PURGE AIR - PM 07/08/92	1	7/9/92	7/9/92	2/15/93	2/15/93	100% comp	100% comp	68
82	140060/10-280RS - TAM - ROUGH SET DUCT COAL PURGE AIR - 2	1	7/23/92	7/24/92	2/15/93	2/16/93			119
83	140208/51-040E - TAM ERECT - ASH DUCT - 10	1	7/20/92	7/31/92	2/18/93	3/3/93			110
84	140470/231-TAM DELIVER - TEMPERING / PREHEAT COILS - PM 07/06/92	1	7/7/92	7/7/92	3/1/93	3/1/93	100% comp	100% comp	55

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
85	140088/81-012RS - TAM ROUGH SET - STEAM COIL AIR HEATER - 2	1	7/7/92	7/8/92	3/1/93	3/2/93			58
86	140524/246-TAM DELIVER - ASH COOLING SCREWS - PM 07/01/92	1	7/2/92	7/2/92	3/2/93	3/2/93	100% comp	100% comp	37
87	140206/51-020 - TAM ASH COOLING SCREW CONVEYOR - 6	1	7/17/92	7/24/92	3/2/93	3/9/93			101
88	140102/10-450RS - TAM ROUGH SET EXPANSION JOINT BETWEEN SUPERHEATER TO ECONOMIZER - 3	1	7/23/92	7/27/92	3/3/93	3/5/93	100% comp	100% comp	120
89	140108/81-011E - SECONDARY AIR HEATER - ERECT - 4	1	7/2/92	7/8/92	3/3/93	3/8/93	100% comp	100% comp	45
90	140094/81-012E - TAM ERECT - STEAM COIL AIR HEATER - 4	1	7/9/92	7/14/92	3/3/93	3/8/93			69
91	140236/51-050 - TAM ERECT - ASH CLASSIFIER EXP JT - 4	1	8/3/92	8/6/92	3/4/93	3/9/93			164
92	140118/10-450E - TAM ERECT - EXPANSION JOINT BETWEEN SUPERHEATER TO ECONOMIZER - 2	1	7/28/92	7/29/92	3/8/93	3/9/93			142
93	313 - COMPLETE - AH ERECTION - 1	1	7/31/92	7/31/92	3/9/93	3/9/93	100% comp	100% comp	155
94	140322/83-001E - TAM ERECT RETRACTABLE SOOT BLOWERS - 10	1	8/6/92	8/19/92	3/9/93	3/22/93			185
95	140502/240-TAM DELIVER SOOTBLOWER ROTARY - PM 07/01/92	1	7/2/92	7/2/92	3/17/93	3/17/93	100% comp	100% comp	38
96	140148/83-002 - TAM SOOT BLOWERS - ROTARY - 4	1	7/23/92	7/28/92	3/17/93	3/22/93			122
97	140510/510-TAM DELIVER - PNEUMATIC LIMESTONE SYSTEM - PM 07/01/92	1	7/2/92	7/2/92	3/23/93	3/23/93			39
98	140150/53-020 - TAM LIMESTONE SLIDE GATE - 1	1	7/2/92	7/2/92	3/23/93	3/23/93			40
99	140336/83-006E - ERECT SOOT BLOWR PIPING - 26	1	8/20/92	9/25/92	3/23/93	4/27/93			241
100	140154/53-025 - TAM LIMESTONE ROTARY AIR LOCK - 2	1	7/6/92	7/7/92	3/24/93	3/25/93			49
101	140158/53-030 - TAM LIMESTONE CHUTES - 4	1	7/8/92	7/13/92	3/26/93	3/31/93			65
102	140172/53-050 - TAM LIMESTONE ROTARY BLOWER - 3	1	7/14/92	7/16/92	4/1/93	4/5/93			83
103	140300/53-060 - TAM LIMESTONE PNEUMATIC PIPE - 18	1	7/17/92	8/11/92	4/6/93	4/29/93			105
104	140152/53-035 - TAM LIMESTONE LINE - FEEDER TO BIN - 6	1	7/2/92	7/10/92	4/22/93	4/29/93			47
105	140362/83-07 - TAM HYDRO TEST SOOT BLOWER PIPING - 2	1	9/28/92	9/29/92	4/28/93	4/29/93			335
106	140530/215 - TAM DELIVER - SUPERHEATER, PRIM & INT ELEMENTS - PM 07/15/92	2	7/16/92	7/16/92	9/9/92	9/9/92	in work		91
107	140228/78-121GA - TAM GROUND ASSEMBLE - PRIMARY SH ELEMENT - 15	2	7/16/92	8/5/92	9/9/92	9/29/92			95
108	140238/76-111 - TAM TUBE WELD 1.5 X .180 SH SIDE PNL - 8	2	9/14/92	9/23/92	9/15/92	9/24/92			308
109	140224/76-116 - TAM TUBE WELD 1.5 X .180 SH REAR PNL - 5	2	9/14/92	9/18/92	9/18/92	9/24/92			306
110	140244/78-114 - TAM TUBE WELD 1.5 X .180 SH SIDE PNL - 4	2	9/14/92	9/17/92	9/21/92	9/24/92			305
111	140226/78-118 - TAM WELD SH MEMBRANE - 9	2	9/14/92	9/24/92	9/22/92	10/2/92			309
112	28-015 - FLUIDIZING BLOWER - INSTALL - 6	2	6/24/92	7/1/92	9/25/92	10/2/92	100% comp	100% comp	17

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
113	140258/09-017E - TAM ERECT - HEAT RECOVERY AREA BUCKSTAYS - 6	2	9/24/92	10/1/92	9/25/92	10/2/92			331
114	140006/10/101 - TAM COMP GROUND ASSEMBLE - CYCLONE - 10	2	6/24/92	7/8/92	9/28/92	10/9/92			21
115	140230/78-131GA - TAM GROUND ASSEMBLE - INTERM SH ELEMENTS - 3	2	8/6/92	8/10/92	9/30/92	10/2/92			183
116	140218/78-130E - TAM ERECT - INT SH OUTLET HEADER - 2	2	10/1/92	10/2/92	10/1/92	10/2/92			341
117	140536/255 - TAM DELIVER - FLUOSEAL DUCT - PM 07/22/92	2	7/23/92	7/23/92	10/5/92	10/5/92			115
118	140240/10-150RS - TAM FLUOSEAL DUCT - 4	2	7/23/92	7/28/92	10/5/92	10/8/92			121
119	78-132A - ERECT & WELD INTERM & PRIMARY SH ELEMENTS - 14 DS	2	10/5/92	10/22/92	10/5/92	10/22/92			352
120	140252/10-180RS - TAM ROUGH SET - LOOP SEAL EXPANSION JOINT - 2	2	7/29/92	7/30/92	10/9/92	10/12/92			146
121	140040/10-103RS - TAM ROUGH SET - CYCLONE INLET EXP JT - 1	2	7/9/92	7/9/92	10/12/92	10/12/92			67
122	140260/10-102 -TAM ERECT CYCLONE - 8	2	7/31/92	8/11/92	10/13/92	10/22/92			157
123	T/R TO START ROUGH SET RISER PIPE - ASSUME AT AM 09/15/92	2	9/15/92	9/15/92	10/19/92	10/19/92			310
124	140276/251RS - TAM ROUGH SET - RISER PIPE - 5	2	9/15/92	9/21/92	10/19/92	10/23/92			312
125	140278/78-140 - TAM ERECT - FIN IN/OUT HEADER - 2	2	10/23/92	10/26/92	10/23/92	10/26/92			370
126	140280/10-104 - TAM INSTALL - CYCLONE OUTLET DUCT - 6	2	8/12/92	8/19/92	10/23/92	10/30/92			206
127	140308/76-251E - TAM ERECT - RISER PIPE - 20	2	9/22/92	10/19/92	10/26/92	11/20/92			326
128	140540/216 - TAM DELIVER - SUPERHEATER, FIN ELEMENTS - PM 09/15/92	2	9/16/92	9/16/92	10/27/92	10/27/92			316
129	140294/78-141 - TAM ERECT - FINISHING SH ELEMENTS - 6	2	10/27/92	11/3/92	10/27/92	11/3/92			376
130	140314/10-110 - TAM CYCLONE OUTLET EXPANSION JOINT - 4	2	8/20/92	8/25/92	11/2/92	11/5/92			239
131	140534/221 - TAM DELIVER - PENTHOUSE - PM 08/01/92	2	8/3/92	8/3/92	11/4/92	11/4/92			159
132	140518/217 - TAM DELIVER - SUPERHEATER ENCLOSURE WALLS - PM 08/15/92	2	8/17/92	8/17/92	11/4/92	11/4/92			214
133	140310/80-002RS - TAM ROUGH SET - PENTHOUSE CASING - 2	2	9/22/92	9/23/92	11/4/92	11/5/92			323
134	140318/78-107 - TAM ERECT - SH ROOF PANEL - 2	2	11/4/92	11/5/92	11/4/92	11/5/92			384
135	140324-TAM CRANE COMPLETE - 1	2	11/6/92	11/6/92	11/6/92	11/6/92			390
136	140520/239 - TAM DELIVER - TRIM PIPING - PM 10/30/92	2	11/2/92	11/2/92	11/11/92	11/11/92			380
137	140354/82-001 - TAM MISC TRIM PIPING - 40	2	11/2/92	12/29/92	11/11/92	1/8/93			382
138	140288/78-200 - TAM ERECT - SH LINK PIPE - 14	2	10/27/92	11/13/92	11/23/92	12/11/92			377
139	140342/76-252 - TAM WELD 10" SCH 80 X 106B RISER - 18	2	10/20/92	11/12/92	11/23/92	12/17/92			367
140	140242/28-003RS - TAM ROUGH SET - SECONDARY AIR FAN - 4	2	7/7/92	7/10/92	11/30/92	12/3/92	100% comp	100% comp	62

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
141	140306/76-101E - TAM CONT(1) ERECT & WELD DOWNCOMBER PIPE - 8	2	6/24/92	7/6/92	12/3/92	12/14/92			20
142	140254/28-004RS - TAM ROUGH SET - SECONDARY AIR FAN DRIVE - 2	2	7/13/92	7/14/92	12/4/92	12/7/92	100% comp	100% comp	78
143	140262/28-001RS - TAM ROUGH SET - PRIMARY AIR FAN - 8	2	7/15/92	7/24/92	12/8/92	12/17/92	50% comp		87
144	140450/234-TAM DELIVER - BURNER INJECTOR & RACKS - 07/01/92	2	7/2/92	7/2/92	12/10/92	12/10/92			34
145	140448/223-TAM DELIVER - BURNERS & RACKS - 07/30/92	2	7/31/92	7/31/92	12/10/92	12/10/92			153
146	140036/84-020RS - TAM ROUGH SET - BURNERS & PREPIPE RACK - 1	2	7/31/92	7/31/92	12/10/92	12/10/92			154
147	140064/10-290RS - OFA DUCT BUSTLE TO BURNERS - ROUGH SET - 2	2	8/3/92	8/4/92	12/11/92	12/14/92			162
148	140030/10-170E - TAM - ERECT FLUOSEAL / J VALVE - 6	2	6/24/92	7/1/92	12/14/92	12/21/92			18
149	140334/78-250 - TAM WELD 10" SCH 80 CS SH LINK PIPE - 13	2	11/16/92	12/3/92	12/14/92	12/31/92			396
150	140328/76-111 - TAM CONT(2) ERECT & WELD DOWNCOMER PIPE - 8	2	7/7/92	7/16/92	12/15/92	12/24/92			64
151	140376/10-290E - TAM ERECT - OFA DUCT BUSTLE TO BURNERS - 10	2	8/5/92	8/18/92	12/15/92	12/29/92			179
152	140304/76-040 - TAM FURNACE MEMBRANE WELDING - 40	2	8/10/92	10/5/92	12/17/92	2/12/93			194
153	140356/76-253 - TAM WELD 8" SCH 80 X 106B RISER - 14	2	11/13/92	12/3/92	12/18/92	1/8/93			395
154	140284/28-001E - TAM ERECT - PRIMARY AIR FAN - 28	2	7/27/92	9/2/92	12/18/92	1/28/93	25% comp		139
155	RESOLVE, FABRICATE & MODIFY STRUCT STEEL AS REQD AT FLUOSEAL DISCHARGE LEG - 46	2	7/2/92	9/4/92	12/22/92	2/25/93			48
156	140338/76-112 - TAM CONT(3) ERECT & WELD DOWNCOMER PIPE - 5	2	7/17/92	7/23/92	12/28/92	1/4/93			99
157	140366/10-292 - TAM 6" OFA NOZZLES - 6	2	8/19/92	8/26/92	12/30/92	1/7/93			231
158	T/R TO START MOBILIZE FOR INSTALLATION OF LAGGING - AM 11/30/92	2	11/30/92	11/30/92	12/31/92	12/31/92			399
159	500A - TAM - MOBILIZE FOR LAGGING INSTALLATION - 5	2	11/30/92	12/4/92	12/31/92	1/7/93			401
160	140428/REFR 1 - T/R TO TAM REFRACTORY MOBILIZATION - 01/04/93	2	1/4/93	1/4/93	1/4/93	1/4/93			410
161	140326/78-117 - TAM TUBE WELD 1.5 X .180 SH ROOF PNL - 5	2	11/6/92	11/12/92	1/4/93	1/8/93			391
162	140350/78-251 - TAM WELD 10" X 1.25 P11 SH LINK PIPE - 5	2	12/4/92	12/10/92	1/4/93	1/8/93			405
163	140428/REFR 1 - TAM REFRACTORY MOBILIZATION - 5	2	1/4/93	1/8/93	1/4/93	1/8/93			412
164	140344/76-113 - TAM COMP ERECT & WELD DOWNCOMER PIPE - 4	2	7/24/92	7/29/92	1/5/93	1/8/93			128
165	140320/78-142 - TAM WELD 2.25 X .180 FIN SH ELEMENTS - 12	2	11/4/92	11/19/92	1/6/93	1/21/93			386
166	140126/10-285RS - TAM ROUGH SET - GAS GUN PURGE AIR - 1	2	8/17/92	8/17/92	1/7/93	1/7/93			215
167	140488/252-TAM DELIVER DUCT - GAS GUN PURGE AIR - PM 08/15/92	2	8/17/92	8/17/92	1/7/93	1/7/93			216
168	140538/243 - TAM DELIVER INSTRUMENTS & CONTROLS - PM 10/30/92	2	11/2/92	11/2/92	1/8/93	1/8/93			381

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
169	600A - T/R TAM MOBILIZE TO INSTALL INSTRUMENTS & CONTROLS - AM 11/30/92	2	11/30/92	11/30/92	1/8/93	1/8/93			400
170	140382/10-285E - TAM - ERECT DUCT GAS GUN PURGE AIR - 6	2	8/27/92	9/3/92	1/8/93	1/15/93			260
171	600B - TAM PART INSTL INSTRUMENTS & CONTROLS - 40	2	11/30/92	1/26/93	1/8/93	3/4/93			403
172	140402A/500A - TAM PART INSTALL INSULATION / LAGGING - 47	2	12/7/92	2/11/93	1/8/93	3/15/93			408
173	140422/METAL - TAM STUD COMBUSTOR & METAL SPRAY - 5	2	1/11/93	1/15/93	1/11/93	1/15/93			414
174	140426-TAM STUD MEMBRANE WALLS - 4	2	1/18/93	1/21/93	1/18/93	1/21/93			417
175	140398/84-020E - TAM ERECT - BURNERS & PREPIPED RACKS - 12	2	9/4/92	9/22/92	1/18/93	2/2/93			295
176	140378/75-900 - TAM HYDROSTATIC TEST - 4	2	1/22/93	1/27/93	1/22/93	1/27/93			419
177	140250/60-110 - TAM MISC INSTRUMENT PIPING - 28	2	11/30/92	1/8/93	1/26/93	3/4/93			402
178	140418/REFR 5 - TAM REFRACTORIZE COMBUSTOR - 21	2	1/28/93	2/25/93	1/28/93	2/25/93			423
179	140346/10-240E - TAM ERECT DUCT - PRIMARY AIR FANS TO AH - 20	2	9/3/92	10/1/92	1/29/93	2/25/93	50% comp		291
180	140234A/10-460RS - TAM ROUGH SET - NON METAL AIR DUCTS A, EXP JOINTS AT SEC AIR HTR TO BUSTLE - 4	2	7/31/92	8/5/92	2/1/93	2/4/93	70% comp		156
181	140264/28-003E - TAM ERECT - SECONDARY AIR FAN - 20	2	7/15/92	8/11/92	2/1/93	2/26/93	25% comp		89
182	140406/84-030 - TAM GAS & AIR PIPING - 15	2	9/23/92	10/13/92	2/3/93	2/23/93			327
183	140358/10-270E - TAM ERECT DUCT - SEC AIR AH TO BUSTLE - 15	2	8/6/92	8/26/92	2/5/93	2/25/93	25% comp		187
184	140420/REFR 4 - TAM COMP STUD SUPERHEATER - 13	2	1/28/93	2/15/93	2/9/93	2/25/93			422
185	140372/55-070 - TAM INSTALL UREA INJECTION NOZZLES - 4	2	10/6/92	10/9/92	2/15/93	2/18/93			353
186	140364/10-280E - TAM ERECT DUCT - COAL FD PURGE AIR - 15	2	7/27/92	8/14/92	2/17/93	3/9/93			138
187	140374/55-060 - TAM UREA PIPING TO COMBUSTOR & CYCLONES - 12	2	10/12/92	10/27/92	2/19/93	3/8/93			360
188	140286/28-002RS - TAM ROUGH SET - PRIMARY AIR FAN DRIVE - 2	2	7/27/92	7/28/92	2/24/93	2/25/93	100% comp	100% comp	132
189	140386/10-470 - TAM NON METAL AIR DUCTS EXPANSION JOINTS - 10	2	8/27/92	9/10/92	2/24/93	3/9/93			261
190	140408/84-050 - TAM GAS LANCES - 10	2	10/14/92	10/27/92	2/24/93	3/9/93			361
191	140424/REFR 3 - TAM REFRACTORIZE CYCLONE - 37	2	1/11/93	3/2/93	2/24/93	4/15/93			416
192	140282/10-150E - TAM 5.5' DIA LOOP SEAL DOWNCOMER - 5	2	8/12/92	8/18/92	2/25/93	3/3/93			205
193	140348/28-002E - TAM ERECT - PRIMARY AIR FAN DRIVE - 4	2	9/3/92	9/9/92	2/26/93	3/3/93			289
194	140298-TAM ERECT - FLUOSEAL DISCHARGE LEG - 8	2	9/8/92	9/17/92	2/26/93	3/9/93			297
195	140370/10-460 - TAM NON METAL AIR DUCTS EXPANSION JOINTS - 8	2	10/2/92	10/13/92	2/26/93	3/9/93			347
196	140416/REFR 6 - TAM REFRACTORIZE FLUOSEAL - 35	2	2/26/93	4/15/93	2/26/93	4/15/93			429

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
197	140332/28-004E - TAM ERECT - SECONDARY AIR FAN DRIVE - 3	2	8/12/92	8/14/92	3/1/93	3/3/93			201
198	140394/80-007 - TAM ACCESS DOORS/PORTS - 5	2	1/28/93	2/3/93	3/3/93	3/9/93			421
199	140296/10-103E - TAM ERECT-CYCLONE INLET EXPANSION JOINT - 4	2	8/12/92	8/17/92	3/4/93	3/9/93			202
200	140312/10-180E - TAM ERECT LOOP SEAL EXPANSION JOINT - 4	2	8/19/92	8/24/92	3/4/93	3/9/93			227
201	140352/60-001 - TAM BEARING COOL WATER PIPING - 4	2	9/10/92	9/15/92	3/4/93	3/9/93			301
202	140390/600-TAM COMP INSTL INSTRUMENTATION / CONTROLS - 40	2	1/27/93	3/23/93	3/5/93	4/29/93			420
203	140368-TAM FLOW ELEMENTS - 2	2	8/27/92	8/28/92	3/8/93	3/9/93			256
204	140380/900 - TAM UREA SYSTEM COMPLETE - 1	2	10/28/92	10/28/92	3/9/93	3/9/93			378
205	140400/75/910 - TAM AIR TEST - 4	2	2/4/93	2/9/93	3/10/93	3/15/93			426
206	140402B/500B - TAM COMP INSULATION / LAGGING - 33	2	2/12/93	3/30/93	3/16/93	4/29/93			427
207	140392/80-002E - TAM PENTHOUSE CASING - 30	2	1/28/93	3/10/93	3/19/93	4/29/93			425
208	140340/80-003 - TAM SH HDR ENCLR CASING - 25	2	1/28/93	3/3/93	3/26/93	4/29/93			424
209	145036/255 - TAM - DELIVER FLUOSEAL DUCT - 07/22/92	2	7/23/92	7/23/92	4/9/93	4/9/93			116
210	140054/28-016 - TAM INSTALL - FLUIDIZING DUCT - 15	2	7/23/92	8/12/92	4/9/93	4/29/93			125
211	140302/54-020 - TAM COAL CHUTES - 15	2	7/23/92	8/12/92	4/9/93	4/29/93			126
212	XXXX - TAM DELIVER DAMPERS - PM 07/11/92	2	7/13/92	7/13/92	4/15/93	4/15/93	100% comp	100% comp	77
213	140232/10-400RS - TAM ROUGH SET DAMPERS - 2	2	8/27/92	8/28/92	4/15/93	4/16/93	in work		257
214	140412/REFR 7 - TAM REFRACTORY CURE-OUT - 5	2	4/16/93	4/22/93	4/16/93	4/22/93			431
215	140384/10-400E - TAM ERECT - DAMPERS - 4	2	8/31/92	9/3/92	4/19/93	4/22/93			271
216	140388-TAM DAMPERS ACTUATORS - 5	2	9/4/92	9/11/92	4/23/93	4/29/93			294
217	140414/CHEMICAL - TAM CHEMICAL CLEANING - 5	2	4/23/93	4/29/93	4/23/93	4/29/93			432
218	140056/53-040 - TAM LIMESTONE GRAVIMETRIC FEEDER - 3	2	6/24/92	6/26/92	4/27/93	4/29/93			14
219	140410-TAM COMPLETE - 1	2	4/30/93	4/30/93	4/30/93	4/30/93			433
220	T/R TO IMC START SETTING ACID TANK - AM 06/15/92 - KEEP ISS #2A DATE	3	6/15/92	6/15/92	8/12/92	8/12/92	in work		4
221	FAB & DELIVER ACID TANK AT CHEMICAL ELECT BUILDING - ?	3	7/7/92	7/7/92	8/12/92	8/12/92			53
222	170001-IMC - SET ACID TANK - 1	3	7/7/92	7/7/92	8/12/92	8/12/92			54
223	170002-IMC - PART SET AND PIPE CHEM / ELEC. EQUIPMENT - 5	3	7/8/92	7/14/92	8/13/92	8/19/92			66
224	T/R TO 180380 - QEDF C/E EQUIPMENT GROUDING - AM 06/15/92	3	6/15/92	6/15/92	8/19/92	8/19/92			5

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
225	180380 - QEDF C/E - BUILDING & EQUIPMENT GROUNDING - 5	3	6/15/92	6/19/92	8/19/92	8/25/92			6
226	080005-VAN DELIVER HOLLOW METAL CHEM / ELEC. BUILDING - 5	3	6/23/92	6/29/92	8/19/92	8/25/92	-	100% comp	9
227	022000-A/C A/C PART DEM0 THREE WINDOWS & CURB - 2	3	7/15/92	7/16/92	8/20/92	8/21/92	100% comp	100% comp	85
228	022000A - A/C A/C COMP DEMO THREE WINDOWS & CURB - 2	3	7/17/92	7/20/92	8/24/92	8/25/92		80% comp	97
229	030030-SCH PART ELECT / CHEM BUILDING MASONRY - 2	3	7/17/92	7/20/92	8/24/92	8/25/92	100% comp	100% comp	98
230	090005-ESS DELIVER HARDWARE CHEM / ELEC BUILDING - 5	3	6/23/92	6/29/92	8/24/92	8/28/92			10
231	030030A-SCH COMP ELECT / CHEM BUILDING MASONRY - 3	3	7/21/92	7/23/92	8/26/92	8/28/92		80% comp	112
232	022005-A/C A/C - INSTALL DOORS AND HARDWARE - 2	3	7/24/92	7/27/92	8/31/92	9/1/92			127
233	180001-DFIE DFI - SET MAJOR ELECT. EQUIPMENT - 1	3	7/28/92	7/28/92	9/2/92	9/2/92			141
234	040005-GJOH SET ROOF STEEL - 5	3	7/29/92	8/4/92	9/3/92	9/10/92		80% comp	149
235	180384 - QEDF C/E CABLE TRAY - 5	3	8/5/92	8/11/92	9/11/92	9/17/92			174
236	180386 - QEDF C/E PART INSTRUMENT CONDUIT / J BOX - 5	3	8/12/92	8/18/92	9/18/92	9/24/92			204
237	O60005A-CEI CHEM/ELECTRICAL BUILDING ROOFING - 4	3	8/5/92	8/10/92	9/21/92	9/24/92			172
238	180386A - QEDF C/E COMP INSTRUMENT CONDUIT / J BOX - 5	3	8/19/92	8/25/92	9/25/92	10/1/92			230
239	180410 - QEDF C/E 110 V POWER CONDUIT / J BOX - 20	3	7/24/92	8/20/92	9/25/92	10/22/92			130
240	180404 - QEDF C/E DCS PANELS - 30	3	8/11/92	9/22/92	9/25/92	11/5/92			200
241	180390 - QEDF C/E - LIGHTING CONDUIT/ J BOX - 5	3	8/26/92	9/1/92	10/2/92	10/8/92			254
242	180398 - QEDF C/E COMMUNICATION CONDUIT / J BOX - 5	3	9/2/92	9/9/92	10/9/92	10/15/92			280
243	040010-GJOH INSTALL INTERIOR MISC. STEEL - 2	3	8/5/92	8/6/92	10/14/92	10/15/92			170
244	180388 - QEDF C/E INSTRUMENT CABLE - 10	3	8/19/92	9/1/92	10/16/92	10/29/92			235
245	180400 - QEDF C/E COMMUNICATIONS CABLE / WIRE - 10	3	9/10/92	9/23/92	10/16/92	10/29/92			304
246	115002-GMID CHEM/ELEC. PAINTING & SEAL FLOOR - 15	3	8/7/92	8/27/92	10/16/92	11/5/92			189
247	180412 - QEDF C/E 110 V POWER WIRE - 5	3	8/21/92	8/27/92	10/23/92	10/29/92			244
248	190005-QUAL QUALITY - ELECT MACHINERY HOOK-UP - 10	3	8/5/92	8/18/92	10/23/92	11/5/92			178
249	119000-ALL DELIVER LOUVERS CHEM/ELEC. BUILDING - 5	3	6/23/92	6/29/92	10/28/92	11/3/92	-	100% comp	11
250	180394 - QEDF C/E LIGHTING PANEL CW - 5	3	8/11/92	8/17/92	10/29/92	11/4/92			198
251	180392 - QEDF C/E - LIGHTING WIRE - 5	3	9/2/92	9/9/92	10/29/92	11/4/92			281
252	170002-IMC - COMP SET AND PIPE CHEM / ELEC. EQUIPMENT - 5	3	7/15/92	7/21/92	10/30/92	11/5/92			86

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
253	070002-WEST CHEM / ELEC. CAULKING - 5	3	7/24/92	7/30/92	10/30/92	11/5/92			129
254	180406 - QEDF C/E MCC #47 - 5	3	8/11/92	8/17/92	10/30/92	11/5/92			199
255	180416 - QEDF C/E 110 V POWER DEVICES - 5	3	8/28/92	9/3/92	10/30/92	11/5/92			262
256	180382 - QEDF C/E ISOLATED INSTRUMENT GROUNDING - 5	3	9/2/92	9/9/92	10/30/92	11/5/92			282
257	180402 - QEDF C/E COMMUNICATIONS EQUIPMENT - 5	3	9/24/92	9/30/92	10/30/92	11/5/92			330
258	119005-ALL INSTALL LOUVERS CHEM/ELEC. BUILDING - 2	3	6/30/92	7/1/92	11/4/92	11/5/92	-	100% comp	26
259	180408 - QEDF C/E MCC #48 - 1	3	8/11/92	8/11/92	11/5/92	11/5/92			196
260	180396 - QEDF C/E - LIGHTING FIXTURES - 1	3	9/10/92	9/10/92	11/5/92	11/5/92			300
261	000002-MILE CHEM/ELECTL BUILDING COMPLETE - 1	3	10/1/92	10/1/92	11/6/92	11/6/92			339
262	E T/R TO SET END DATE OF CHEM/ELECT BLDG AT PM 11/06/92 - DESIRED DATE BY A/C?	3	10/1/92	10/1/92	11/7/92	11/7/92			340
263	T/R TO START OF GEC GENERAL ELECTRIC MOBILIZATION - 07/07/92	4	7/7/92	7/7/92	7/7/92	7/7/92	100% comp	100% comp	52
264	010005-GEC GENERAL ELECTRIC MOBILIZATION - 4	4	7/7/92	7/10/92	7/7/92	7/10/92	100% comp	100% comp	61
265	BRICK MANUFACTURER DELIVER SAMPLE BRICK PANEL TO JOB - 5	4	7/7/92	7/13/92	7/10/92	7/16/92			63
266	T/R TO START OF ZACK COMPANY MOBILIZATION - 07/13/92	4	7/13/92	7/13/92	7/13/92	7/13/92		100% comp	76
267	050001-ZAC ZACK COMPANY MOBILIZATION - 5	4	7/13/92	7/17/92	7/13/92	7/17/92		100% comp	79
268	010010-GEC TURBINE - PART INSTALL SOLE PLATES - 10	4	7/13/92	7/24/92	7/13/92	7/24/92			81
269	OWNER REVIEW & APPROVE BRICK PANEL SAMPLES - 2	4	7/14/92	7/15/92	7/17/92	7/20/92			82
270	050002-ZAC PART INTERIOR METAL WALL ELEV. 875 & 891 - 6	4	7/20/92	7/27/92	7/20/92	7/27/92			109
271	MANUFACTURE & DELIVER EARLY BRICK - 10	4	7/16/92	7/29/92	7/21/92	8/3/92			93
272	T/R TO 07/22/92 FOR START OF SCH INT MASONRY	4	7/22/92	7/22/92	7/22/92	7/22/92	100% comp	100% comp	113
273	030005-SCH - INTERIOR MASONRY WALLS - 11	4	7/22/92	8/5/92	7/22/92	8/5/92		in work	114
274	010015-PART GEC TURBINE - SETUP AND INSTALL TB GENERATOR - 10	4	7/27/92	8/7/92	7/27/92	8/7/92			136
275	050002-ZAC COMP INTERIOR METAL WALL ELEV. 875 & 891 - 11	4	7/28/92	8/11/92	7/28/92	8/11/92			143
276	050004-ZAC INTERIOR METAL WALL ELEV. 894 & 912 - 11	4	7/28/92	8/11/92	7/28/92	8/11/92			144
277	010010A-GEC TURBINE - COMP INSTALL SOLE PLATES - 5	4	7/27/92	7/31/92	8/3/92	8/7/92			133
278	030010-SCH EAST ELEV MASONRY 851 TO 905 - 2	4	7/30/92	7/31/92	8/4/92	8/5/92			151
279	030020-SCH EAST ELEV MASONRY 851 TO 967 - 2	4	8/3/92	8/4/92	8/6/92	8/7/92			160
280	010020-GEC TURBINE - INSTALL M.S.V. - 5	4	8/10/92	8/14/92	8/10/92	8/14/92			191

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
281	010015A-COMP GEC TURBINE - SETUP AND INSTALL TB GENERATOR - 5	4	8/10/92	8/14/92	8/10/92	8/14/92			192
282	030055-SCH WEST ELEVATION MASONRY F-K - 10	4	8/5/92	8/18/92	8/10/92	8/21/92			177
283	050006-ZAC INTERIOR METAL WALL ELEV. 930 & 945 - 8	4	8/12/92	8/21/92	8/12/92	8/21/92			207
284	010025-GEC TURBINE - SET LUBE OIL TANK - 2	4	8/17/92	8/18/92	8/17/92	8/18/92			218
285	010030-PART GEC TURBINE - INSTALL STEAM PIPING - 5	4	8/19/92	8/25/92	8/19/92	8/25/92			228
286	030065-SCH WEST ELEVATION MASONRY A-F - 20	4	8/19/92	9/16/92	8/24/92	9/21/92			236
287	050008-ZAC INTERIOR METAL WALL ELEV. 955 & 963 - 24	4	8/24/92	9/25/92	8/24/92	9/25/92			250
288	010035-PART GEC TURBINE - INSTALL LUBE OIL PIPING - 5	4	8/26/92	9/1/92	8/26/92	9/1/92			253
289	010030A-COMP GEC TURBINE - INSTALL STEAM PIPING - 15	4	8/26/92	9/16/92	8/26/92	9/16/92			255
290	030035-SCH SOUTH ELEVATION MASONRY - 12	4	8/5/92	8/20/92	8/31/92	9/16/92			180
291	010040-GEC TURBINE - PART ALIGN TO GENERATOR - 10	4	9/2/92	9/16/92	9/2/92	9/16/92			284
292	010035A-COMP GEC TURBINE - INSTALL LUBE OIL PIPING - 15	4	9/2/92	9/23/92	9/2/92	9/23/92			285
293	SUBMIT STONE SHOP DWGS FOR REVIEW & APPROVAL - 3	4	7/7/92	7/9/92	9/17/92	9/21/92		100% comp	60
294	010040A-GEC TURBINE - CONT(1) ALIGN TO GENERATOR - 5	4	9/17/92	9/23/92	9/17/92	9/23/92			318
295	010045-PART GEC TURBINE - INSTALL J-BOS, PT & SCT CABINETS - 5	4	9/17/92	9/23/92	9/17/92	9/23/92			319
296	030040-SCH SOUTH ELEVATION STONE - 13	4	8/21/92	9/9/92	9/17/92	10/5/92			246
297	030060-SCH WEST ELEVATION STONE F-K - 9	4	8/19/92	8/31/92	9/21/92	10/1/92			234
298	OWNER REVIEW & APPROVE STONE SHOP DRAWINGS - 5	4	7/10/92	7/16/92	9/22/92	9/28/92		in work	73
299	050010-ZAC EAST ELEVATION METAL WALL PANELS - 10	4	9/17/92	9/30/92	9/22/92	10/5/92			320
300	T/R TO START OF NORTH ELEVATION MASONRY 851 TO 967 - AM 09/03/92	4	9/3/92	9/3/92	9/23/92	9/23/92	in work		287
301	030045-SCH NORTH ELEVATION MASONRY 851 TO 967 - 12	4	9/3/92	9/21/92	9/23/92	10/8/92			290
302	010040B-GEC TURBINE - COMP ALIGN TO GENERATOR - 5	4	9/24/92	9/30/92	9/24/92	9/30/92			328
303	010045A-COMP GEC TURBINE - INSTALL J-BOS, PT & SCT CABINETS - 5	4	9/24/92	9/30/92	9/24/92	9/30/92			329
304	MANUFACTURE & DELIVER EARLY STONE - 10	4	7/17/92	7/30/92	9/29/92	10/12/92			103
305	010060-PART GEC TURBINE - HARDWIRE CONTROL SYSTEM - 15	4	10/1/92	10/21/92	10/1/92	10/21/92			346
306	030070-SCH WEST ELEVATION STONE A-F - 26	4	9/17/92	10/22/92	10/2/92	11/6/92			322
307	050015-ZAC SOUTH ELEVATION METAL WALL PANELS - 7	4	10/1/92	10/9/92	10/6/92	10/14/92			345
308	030050-SCH NORTH ELEVATION STONE 851 TO 967 - 14	4	9/22/92	10/9/92	10/9/92	10/28/92			325

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
309	030015-SCH EAST ELEV STONE 851 TO 905 - 2	4	8/3/92	8/4/92	10/13/92	10/14/92			161
310	T/R TO START OF ROOFING MOBILIZATION - 10/05/92	4	10/5/92	10/5/92	10/15/92	10/15/92			348
311	030025-SCH EAST ELEV STONE 851 TO 967 - 2	4	8/5/92	8/6/92	10/15/92	10/16/92			171
312	060001-CEI CEI ROOFING MOBILIZATION - 5	4	10/5/92	10/9/92	10/15/92	10/21/92			350
313	050025-ZAC WEST ELEVATION METAL WALL PANELS - 10	4	10/12/92	10/23/92	10/15/92	10/28/92			359
314	T/R TO START INSTALL EXTERIOR WINDOWS EAST ELEVATION - 10/05/92	4	10/5/92	10/5/92	10/19/92	10/19/92			349
315	070015-WES CAULK EXTERIOR EAST ELEVATION - 5	4	10/1/92	10/7/92	10/19/92	10/23/92			342
316	100005-ABP INSTALL EXTERIOR WINDOWS EAST ELEVATION - 5	4	10/5/92	10/9/92	10/19/92	10/23/92			351
317	010060A-COMP GEC TURBINE - HARDWIRE CONTROL SYSTEM - 5	4	10/22/92	10/28/92	10/22/92	10/28/92			368
318	060010-CEI GENERAL BUILDING ROOF COL. F - K @ 922.5 (TURBINE) - 6	4	10/12/92	10/19/92	10/22/92	10/29/92			358
319	010070-PART GEC TURBINE - PIPE FOR STEAM BLOW DOWN / BLOW DOWN - 10	4	10/22/92	11/4/92	10/22/92	11/4/92			369
320	100010-ABP INSTALL EXTERIOR WINDOWS SOUTH ELEVATION - 5	4	10/12/92	10/16/92	10/26/92	10/30/92			356
321	070020-WES CAULK EXTERIOR SOUTH ELEVATION - 5	4	10/12/92	10/16/92	10/26/92	10/30/92			357
322	050020-ZAC NORTH ELEVATION METAL WALL PANELS - 7	4	10/26/92	11/3/92	10/29/92	11/6/92			375
323	060015-CEI GENERAL BUILDING ROOF COL. E - F @ 967 (COAL) - 3	4	10/20/92	10/22/92	10/30/92	11/3/92			366
324	100015-ABP INSTALL EXTERIOR WINDOWS NORTH ELEVATION - 5	4	10/19/92	10/23/92	11/2/92	11/6/92			363
325	070030-WES CAULK EXTERIOR WEST ELEVATION - 5	4	10/26/92	10/30/92	11/2/92	11/6/92			373
326	060020-CEI GENERAL BUILDING ROOF COL. E - A @ 977-9 (HIGH) - 7	4	10/23/92	11/2/92	11/4/92	11/12/92			372
327	010070A-COMP GEC TURBINE - PIPE FOR STEAM BLOW DOWN / BLOW DOWN - 5	4	11/5/92	11/11/92	11/5/92	11/11/92			387
328	100020-ABP INSTALL EXTERIOR WINDOWS WEST ELEVATION - 5	4	10/26/92	10/30/92	11/9/92	11/13/92			374
329	070025-WES CAULK EXTERIOR NORTH ELEVATION - 5	4	11/4/92	11/10/92	11/9/92	11/13/92			385
330	030075-SCH WEST ELEVATION MASONRY A-AA - 2	4	9/17/92	9/18/92	11/10/92	11/11/92			317
331	030080-SCH WEST ELEVATION STONE A-AA - 2	4	10/23/92	10/26/92	11/12/92	11/13/92			371
332	060025-CEI GENERAL BUILDING ROOF COL. A - AA @ 904 - 1	4	11/3/92	11/3/92	11/13/92	11/13/92			383
333	000001- MILE BUILDING ENCLOSURE COMPLETE - 1	4	11/11/92	11/11/92	11/16/92	11/16/92			394
334	010065-GEC TURBINE - HARDWIRE PT & CTS - 30	4	9/24/92	11/4/92	12/15/92	1/27/93			332
335	010075-GEC TURBINE - PIPE COOLING WATER - 10	4	11/5/92	11/18/92	1/14/93	1/27/93			388
336	010050-GEC TURBINE - INSTALL MOTOR CONTROL CENTER - 5	4	10/1/92	10/7/92	1/21/93	1/27/93			343

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
337	01055-GEC TURBINE - INSTALL PIPING AND VALVES - 5	4	10/1/92	10/7/92	1/21/93	1/27/93			344
338	010080-GEC TURBINE - SYSTEMS CHECK OUT - 30	4	11/19/92	1/4/93	1/28/93	3/10/93			397
339	T/R TO SET LATE FINISH OF TURBINE GENERATOR SYSTEMS CHECK OUT AT PM 03/10/93	4	1/4/93	1/4/93	3/11/93	3/11/93			411
340	130005-FAI DELIVER COAL CONVEYOR EQUIPMENT - 15	5	4/6/92	4/24/92	4/13/92	5/1/92	-	100% comp	1
341	130010-FAI REWORK EXIST. 24" FEED CONVEYOR - 41	5	5/4/92	6/30/92	5/4/92	6/30/92	-	100% comp	2
342	130015 - T/R TO FAI DELIVER TRIPPER ROOM ROOF STEEL - 10	5	7/1/92	7/15/92	7/1/92	7/15/92		100% comp	31
343	130035-FAI DELIVER BUNKER PURGE CONVEYOR - 10-15/E-F - 15	5	7/6/92	7/24/92	7/6/92	7/24/92			51
344	T/R TO START OF THERMAL - DYNAMIC MOBILIZATION - 06/22/92	5	6/22/92	6/22/92	7/8/92	7/8/92	in work		7
345	136001-THE - THERMAL - DYNAMIC MOBILIZATION - 5	5	6/22/92	6/26/92	7/8/92	7/14/92			8
346	130025-FAI DELIVER NEW BUNKER FEED BELT CONVEYOR - 2-15/E-F - 19	5	6/2/92	6/26/92	7/9/92	8/4/92			3
347	136005-THE - PART COOLING TOWER STRUCTURAL FRAMING - 15	5	7/15/92	8/4/92	7/15/92	8/4/92			88
348	130020-FAI INSTALL TRIPPER ROOM ROOF STEEL - 14	5	7/16/92	8/4/92	7/16/92	8/4/92		100% comp	94
349	130040-FAI INSTALL BUNKER PURGE CONVEYOR - 10-15/E-F - 30	5	7/27/92	9/4/92	7/27/92	9/4/92			140
350	136025-THE - PART COOLING TOWER DISTRIBUTION - 1	5	8/5/92	8/5/92	8/5/92	8/5/92		in work	169
351	136010-THE - COOLING TOWER PARTITION WALLS - 6	5	8/5/92	8/12/92	8/5/92	8/12/92			176
352	130030-FAI INSTALL NEW BUNKER FEED BELT CONVEYOR - 2-15/E-F - 24	5	8/5/92	9/8/92	8/5/92	9/8/92			181
353	136025-THE - COMP COOLING TOWER DISTRIBUTION - 5	5	8/6/92	8/12/92	8/6/92	8/12/92			184
354	136005A-THE - COMP COOLING TOWER STRUCTURAL FRAMING - 5	5	8/5/92	8/11/92	8/11/92	8/17/92			173
355	T/R TO START OF SILO FILL AREA SPRINKLER PIPING - 08/03/92	5	8/3/92	8/3/92	8/12/92	8/12/92		100% comp	158
356	135010-MOR INSTALL EXISTING COAL CONVEYOR SPRINKLER PIPING - 22	5	8/3/92	9/1/92	8/12/92	9/11/92			166
357	136015-THE - COOLING TOWER WIND WALLS - 6	5	8/13/92	8/20/92	8/13/92	8/20/92			209
358	136020-THE - COOLING TOWER FILL - 12	5	8/6/92	8/21/92	8/13/92	8/28/92			186
359	136035-THE - PART COOLING TOWER DECK FAN - 5	5	8/12/92	8/18/92	8/18/92	8/24/92			203
360	136055-THE - COOLING TOWER STAIR TOWER - 4	5	8/21/92	8/26/92	8/21/92	8/26/92			243
361	135005A-MOR INSTALL SILO FILL AREA SPRINKLER PIPING - 15	5	8/3/92	8/21/92	8/21/92	9/11/92			165
362	130045-T/R TO FAI DELIVER EXISTING PURGE CONVEYOR DISCHARGE - AM 08/14/92	5	8/14/92	8/14/92	8/24/92	8/24/92			210
363	130050-FAI INSTALL EXISTING PURGE CONVEYOR DISCHARGE - 25	5	8/24/92	9/28/92	8/24/92	9/28/92			251
364	136035A-THE - COMP COOLING TOWER DECK FAN - 2	5	8/19/92	8/20/92	8/25/92	8/26/92			225

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
365	136040-THE - COOLING TOWER MECHANICAL - 7	5	8/19/92	8/27/92	8/25/92	9/2/92			232
366	136050-THE - PART COOLING TOWER CASING - 5	5	8/19/92	8/25/92	8/26/92	9/1/92			229
367	136060-THE - COOLING TOWER ESCAPE LADDER - 3	5	8/27/92	8/31/92	8/27/92	8/31/92			258
368	136045-THE - COOLING TOWER FAN STACKS - 6	5	8/21/92	8/28/92	8/27/92	9/3/92			245
369	136030-THE - COOLING TOWER DRIFT ELIMINATORS - 4	5	8/24/92	8/27/92	8/31/92	9/3/92			247
370	136065-THE - PART COOLING TOWER MISCELLANEOUS - 2	5	9/1/92	9/2/92	9/1/92	9/2/92			273
371	136050A-THE - COMP COOLING TOWER CASING - 2	5	8/26/92	8/27/92	9/2/92	9/3/92			252
372	136065A-THE - COMP COOLING TOWER MISCELLANEOUS - 1	5	9/3/92	9/3/92	9/3/92	9/3/92			286
373	136070-THE - COOLING TOWER CLEAN UP / DEMOBILIZATION - 1	5	9/4/92	9/4/92	9/4/92	9/4/92			292
374	135015-MOR INSTALL FIRE & JOCKEY PUMPS - 5	5	9/2/92	9/9/92	9/14/92	9/18/92			279
375	135025-MOR INSTALL FIRE PUMP DISCHARGE PIPING - 5	5	9/10/92	9/16/92	9/21/92	9/25/92			302
376	135020A-MOR COMP INSTALL FIRE PUMP SUCTION PIPING - 5	5	9/10/92	9/16/92	9/21/92	9/25/92			303
377	135030-MOR INSTALL TURBINE BULD. HEADERS / RUNOUTS TO HOSE ST - 15	5	9/17/92	10/7/92	9/28/92	10/16/92			321
378	135035-MOR INSTALL BOILER BULD. HEADERS / RUNOUTS TO HOSE ST - 15	5	10/8/92	10/28/92	10/19/92	11/6/92			354
379	135040-MOR INSTALL VALVE STATIONS - 5	5	10/29/92	11/4/92	11/9/92	11/13/92			379
380	135045-MOR INSTALL TURBINE UNDERFLOOR SPRINKLER PIPE - 14	5	11/5/92	11/24/92	11/16/92	12/4/92			389
381	135050-MOR PART INSTALL TURBINE / GENERATOR BEARING SYSTEM - 14	5	11/25/92	12/15/92	12/7/92	12/24/92			398
382	135050A-MOR COMP INSTALL TURBINE / GENERATOR BEARING SYSTEM - 14	5	12/16/92	1/6/93	12/28/92	1/15/93			409
383	135060-MOR INSTALL FIRE PANELS AND EQUIPMENT - 5	5	1/11/93	1/15/93	1/11/93	1/15/93			415
384	135065-MOR INSTALL AND WIRE ALARM SYSTEM - 25	5	1/18/93	2/19/93	1/18/93	2/19/93			418
385	135055A-MOR COMP INSTALL HOSE RACKS - 5	5	1/7/93	1/13/93	2/22/93	2/26/93			413
386	135070-MOR TEST AND CHECK OUT FIRE ALARM SYSTEM - 5	5	2/22/93	2/26/93	2/22/93	2/26/93			428
387	135075 - MOR COMMISSION FIRE PROTECTION SYSTEM - 1	5	3/1/93	3/1/93	3/1/93	3/1/93			430
388	180372 - QEDF 861' 4" - INSTL LIGHTING SWITCHGEAR SUB #41 - 15	6	7/14/92	8/3/92	7/14/92	8/3/92			84
389	T/R TO START 180298 - QEDF 875' - INSTL 13.8 KV DIST SWITCHGEAR - AM 07/27/92	6	7/27/92	7/27/92	7/27/92	7/27/92			131
390	180298 - QEDF 875' - INSTALL 13.8 KV DIST SWITCHGEAR - 15	6	7/27/92	8/14/92	7/27/92	8/14/92			137
391	FAB & DELIVER LEVELING CHANNELS AT 861' & 875'- 4	6	7/29/92	8/3/92	8/5/92	8/10/92	in work		148
392	COMP CONST & CURE TRANSFORMER BASES AT NORTH ELEVATION - 7	6	7/29/92	8/6/92	8/7/92	8/17/92			150

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
393	INSTALL LEVELING CHANNELS AT 480 V & 4160 V SUBSTATION ON ELEV 861' - 4	6	8/4/92	8/7/92	8/11/92	8/14/92			168
394	MFR & DELIVER 480 V SUBSTATION - ASSUME PM 08/10/92	6	8/11/92	8/11/92	8/17/92	8/17/92			195
395	UNLOAD, ROUGH SET, ALIGN & BOLT 480 V SUBSTATION AT 861' 4 1/2" - 3	6	8/11/92	8/13/92	8/17/92	8/19/92			197
396	MFR & DELVR 4160 V SUBSTATION - PM 08/17/92	6	8/18/92	8/18/92	8/18/92	8/18/92	in work		220
397	T/R TO A/C COMPLETE ERECT NORTH ELEV BLOCK BACKUP AT PP4 - PM 08/17/92	6	8/18/92	8/18/92	8/18/92	8/18/92			221
398	SET & ALIGN 4160 & 480 V TRANSFORMERS AT NORTH ELEVATION - 2	6	8/18/92	8/19/92	8/18/92	8/19/92			222
399	UNLOAD, ROUGH SET, ALIGN & BOLT 4160 V SUBSTATION AT 861' 4 1/2" - 3	6	8/18/92	8/20/92	8/18/92	8/20/92			223
400	MSU PROVIDE 600 V BUS DUCT SHOP DRAWING FOR LOCATION & PIECE ARRANGEMENT - ?	6	7/29/92	7/29/92	8/20/92	8/20/92	in work		145
401	INSTALL BUS DUCT FROM 480 V SWITCHGEAR TO 480 V TRANSFORMERS - 4	6	8/20/92	8/25/92	8/20/92	8/25/92			238
402	INSTALL CABLE FROM 4160 V TRANSFORMER TO 4160 SUBSTATION - 4	6	8/21/92	8/26/92	8/21/92	8/26/92			242
403	INSTALL LEVELING CHANNELS AT 13.8 KV SUBSTATION ON ELEV 875' - 2	6	8/10/92	8/11/92	8/28/92	8/31/92			190
404	SET & ALIGN MCC #43 & 44 AT ELEV 851' - 1	6	8/31/92	8/31/92	8/31/92	8/31/92			263
405	SET & ALIGN MCC #41 & 42 AT ELEV 851' - 1	6	8/31/92	8/31/92	8/31/92	8/31/92			264
406	T/R TO FAB & DELIVER MCC #43 & 44 - PM 08/28/92	6	8/31/92	8/31/92	8/31/92	8/31/92			265
407	T/R TO FAB & DELIVER MCC #41 & 42 - PM 08/28/92	6	8/31/92	8/31/92	8/31/92	8/31/92			266
408	T/R TO FAB & DELIVER MCC #45 & 46 - PM 08/28/92	6	8/31/92	8/31/92	8/31/92	8/31/92			267
409	T/R TO FAB & DELIVER MCC #47 & 48 - PM 08/28/92	6	8/31/92	8/31/92	8/31/92	8/31/92			268
410	SET & ALIGN MCC #45 & 46 AT ELEV 851' - 1	6	8/31/92	8/31/92	8/31/92	8/31/92			269
411	SET & ALIGN MCC #47 & 48 AT ELEV 851' - 1	6	8/31/92	8/31/92	8/31/92	8/31/92			270
412	MFG & DELIV 13.8 KV SWITCHGEAR - PM 08/31/92	6	9/1/92	9/1/92	9/1/92	9/1/92	in work		272
413	SET & ALIGN 13.8 KV SWITCHGEAR AT ELEV 875'0" - 3	6	9/1/92	9/3/92	9/1/92	9/3/92			274
414	INSTL CONDUITS FROM MCC 43 & 44 TO CABLE TRAY - 3	6	9/1/92	9/3/92	9/1/92	9/3/92			275
415	INSTL CONDUITS FROM MCC 41 & 42 TO CABLE TRAY - 3	6	9/1/92	9/3/92	9/1/92	9/3/92			276
416	INSTL CONDUITS FROM MCC 45 &642 TO CABLE TRAY - 3	6	9/1/92	9/3/92	9/1/92	9/3/92			277
417	INSTL CONDUITS FROM MCC 47 & 48 TO CABLE TRAY - 3	6	9/1/92	9/3/92	9/1/92	9/3/92			278
418	PULL HIGH VOLTAGE WIRE FROM 13.8 V SWITCHGEAR TO 480 V TRANFORMER & 4160 V TRANSFORMER - 2	6	9/4/92	9/8/92	9/4/92	9/8/92			293
419	MAKE POWER TERMINATIONS AT 13.8 V SWITCHGEAR & 480 V TRANSFORMER - 4	6	9/9/92	9/14/92	9/9/92	9/14/92			299
420	180288A - QEDF - 861'4" - COMP INSTL 600KV BUS DUCT - 5	6	9/15/92	9/21/92	9/15/92	9/21/92			311

	activity	sht #	early start	early finish	late start	late finish	as of 07/29/92	as of 08/04/92	oen
421	180290 - QEDF 861'4" - INSTL 15KV BUS DUCT - 10	6	9/15/92	9/28/92	9/15/92	9/28/92			314
422	T/R TO ST INSTL 180296 - QEDF 851' - INSTL DCS CABINETS #428 & 429 - AM 09/28/92	6	9/28/92	9/28/92	9/28/92	9/28/92			334
423	180296 - QEDF 851' - INSTL DCS CABINETS #428 & 429 - 10	6	9/28/92	10/9/92	9/28/92	10/9/92			336
424	180292 - QEDF 875' - INSTL 15KV BUS DUCT - 25	6	9/29/92	11/2/92	9/29/92	11/2/92			337
425	180374 - QEDF 861' 4" - INSTL FREE STANDING DCS CAB - 5	6	10/12/92	10/16/92	10/12/92	10/16/92			355
426	T/R TO START OF 180432 - AM 10/19/92	6	10/19/92	10/19/92	10/19/92	10/19/92			362
427	180432 - QEDF INSTL ELEVATOR POWER CONDUIT - 15	6	10/19/92	11/6/92	10/19/92	11/6/92			364
428	180304 - QEDF 875' - INSTL FREE STANDING DCS CABINETS - 15	6	10/19/92	11/6/92	10/19/92	11/6/92			365
429	180376 - QDEF 930' 9" - INSTL FREE STANDING DCS CAB - 10	6	11/9/92	11/20/92	11/9/92	11/20/92			392
430	180434 - QEDF INSTL ELEVATOR POWER WIRE - 15	6	11/9/92	11/30/92	11/9/92	11/30/92			393
431	180436 - QEDF ELEVATOR POWER FINAL CONNECTION - 15	6	12/1/92	12/21/92	12/1/92	12/21/92			404
432	T/R TO 180366 - QEDF 875' INSTL POWER RAIL EXTENSIONS - AM 12/07/92	6	12/7/92	12/7/92	12/7/92	12/7/92			406
433	180366 - QEDF 875' INSTL POWER RAIL EXTENSION - 10	6	12/7/92	12/18/92	12/7/92	12/18/92			407

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Subject: Monitoring Report #21

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, 323, 326 & 329

Dates of meetings and monitorings:

August 24, 1992 (wd 421)
August 31, 1992 (wd 426)

Those attending:

Note: Some of the people listed below were in meetings part time only

August 24, 1992 (wd 421) - am meeting

- Richard Wever - MSU construction superintendent
- James Simons - MSU project representative
- David Sanger - MSU field inspector
- Gary Phillips - Environmental Elements field construction superintendent
- Ralph J. Stephenson - consultant

August 24, 1992 (wd 421) - pm meeting

- Robert Ellerhorst - Director of Utilities - MSU
- James Simons - MSU project representative
- Doug MacDonald - Mechanical Engineer - MSU
- Roy Gies - Operations Supervisor - MSU
- Ralph J. Stephenson - Consultant

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August 31, 1992 (wd 426)

- Richard Wever - MSU construction superintendent
- Robert Ellerhorst - Director of utilities - MSU
- James Simons - MSU construction representative
- Donald Clendenan - Shift first engineer - MSU
- Pete Theis - Senior field engineer - Tampella Power
- Ralph J. Stephenson - Consultant

Documents used in monitorings and discussions:

- Sheet #01, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #02, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #03, issue 6, dated July 07, 1992 (wd 387) - Chemical/electrical building
- Sheet #04, issue 6, dated July 07, 1992 (wd 387) - Turbine generator, interior metal walls, roofing and exterior vertical close in
- Sheet #05, issue 6, dated July 07, 1992 (wd 387) - Coal conveyor, fire protection systems, and cooling tower
- Sheet #06, issue 6, dated July 14, 1992 (wd 392) - Electrical construction
- Sheet #07, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work
- Sheet #08, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #09, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #10, issue 6, dated August 10, 1992 (wd 411) - Fabric filter building - preliminary for review and comment only
- Sheet #10, issue 6a dated August 25, 1992 (wd 421) - Fabric filter building - for issue

Actions taken:

August 24, 1992 (wd 421)

- Inspected project.
- Completed preparing & checking fabric filter building plan of work with Environmental Elements.
- Began discussions with MSU power and water utilities staff re power plant #4 start up action plan.

August 31, 1992 (wd 426)

- Continued preparing power plant #4 start up action plan.

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Summary:

Monday, August 24, 1992(wd 421)

This series of meetings was primarily to complete preparing and issue the network model for the fabric filter building, to inspect as much of the project as time allowed and to begin planning the plant start up operations.

I met with Mr. David Sanger of MSU and Mr. Gary Phillips of Environmental Elements and reviewed the preliminary issue #6, sheet #10 for the fabric filter building. This network model had been prepared at our previous meeting with Mr. Phillips. He had reviewed and marked the revisions he wished to make on the preliminary model copy.

Mr. Sanger and I made the suggested corrections, again reviewed the model with Mr. Phillips, and put it into final form to distribute as a part of the current issue #6 set of network models. This network is labeled as issue #6a, dated August 24, 1992 (wd 421), sheet #10. The network model and a bar chart translation was given to Mr. Phillips for his use. The work plan has not yet been issued formally to Mr. Simons, but he is aware of its completion and issue to Mr. Phillips. I shall issue the plan to Mr. Simons on my next visit to the job site.

During the morning session, Mr. Sanger and I inspected the project and determined by visual observations and by the information available, the overview status of the project. I shall make a full monitoring inspection and report on the project status with all parties shortly, and issue a formal monitoring report.

In the afternoon I met with Mr. Simons and a few of the MSU power and water utilities staff to initiate planning for the power plant #4 start up sequencing. The major objectives of this meeting was to determine the general procedures to be used in planning and managing the start up.

It was decided tentatively in the meeting that Mr. Roy Gies of the utilities department will be the start up manager. He will be responsible and have the authority under Mr. Robert Ellerhorst, to make MSU decisions relative to the plant start up. Mr. Gies will be considered to be the individual empowered to make binding decisions in start up matters, within the limits of his positional authority.

Much of the discussions in this meeting centered around how best to classify and define the actions to be taken in the start up process. The power and water department had earlier prepared a preliminary startup sequence dated 23 July, 1992 (wd 399). We used this as a springboard into a full discussion of start up task identification.

Monday, August 31, 1992(wd 426)

Those attending this session continued discussing the methodology of planning how to bring the plant on line. Using the preliminary startup sequence, we expanded it into a stepped data base which began with a statement of the ***main system class***. In our preliminary discussions four of these were identified

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and numbered:

- 100.0000 - **Control system start up**
- 200.0000 - **Plant start up**
- 300.0000 - **Turbine start up**
- 400.0000 - **Boiler start up**

Other system start up components of similar scale and complexity will be added to the ***main system class*** as our planning discussions proceed.

We next identified the major actions in the ***main system classes*** and assigned each a ***sub system class.*** For instance, under the ***main system class*** 100.0000 two ***sub system classes*** were identified at this preliminary discussion session. These were:

- 100.0000 - **Control system start up**
  + 101.0000 - ***Power***
  + 102.0000 - ***Control***

Under the ***sub system class*** we began to define the detailed actions which will become a part of the logic action plan and schedule for the start up. For instance under the ***sub system classes*** shown above, some sample major activities were defined as follows:

- 100.0000 - **Control system start up**
  + 101.0000 - ***Power***
    - 101.0100 - *Start UPS*
  + 102.0000 - Control
    - 102.0100 - *Start DCS gate*
    - 102.0200 - *Install operator interface station*

Thus, for example, a full activity outline might take the following form:

- 100.0000 - **Control system start up**
  + 101.0000 - ***Power***
    - 101.0100 - *Start UPS*
  + 102.0000 - ***Control***
    - 102.0100 - *Start DCS gate*
    - 102.0200 - *Install operator interface station*
- 200.0000 - **Plant start up**
- 300.0000 - **Turbine start up**
- 400.0000 - **Boiler start up**

In our work on August 31, 1992 (wd 426) we prepared a list of approximately 86 activities classified as above. The system still must be refined in the definition of classes, and in the numbering hierarchy. We will continue to make these refinements as activities are added. This list will then be the data base

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upon which our start up action models are built.

We will next begin to interface these start up models with the construction network models for major construction elements of the building, and with the design, fabricate and install equipment and systems models.

A copy of the preliminary data base run prepared in our meeting is attached to this report. Copies were provided to Mr. Ellerhorst and Mr. Wever at the meeting. Subsequently some minor column arrangement revisions have been made and are reflected in the enclosed copy. This list will be checked, revised and expanded at subsequent start up planning meetings.

A set of meeting notes from the two start up sessions is also attached to this report for your files.

Construction plan elements to be used for interfacing start up, and are yet to be prepared include:

- Remainder of electrical construction work - to be completed as information concerning equipment delivery status, routing locations, and final connection locations becomes available.

- Control systems work - to be completed concurrently with ongoing electrical and mechanical construction planning.

- IMC mechanical construction work - provided by IMC through A/C in pv run #54, report date 25 August, 1992, and data date 4 November, 1991.

  This information is currently being translated into a network model.

- Final electrical and mechanical connections and testing - to be planned as related basic elements plans are completed.

Mr. Rick Johnson and I are continuing to assemble a data listing of all elements of the electrical and related systems. This document will be used to identify each piece of equipment in the plant to which power must be fed. The list will, in turn be tied into the start up work plan.

General:

There are several items which must be addressed relative to planning, scheduling and monitoring. I have listed below some suggestions relative to agenda for our meetings over the next three to five weeks. I will discuss the priority to be assigned each when I discuss the meetings and work with Mr. Simons and Mr. Wever.

- Continue start up planning with construction and plant start up team

  Those involved:
  - Bob Ellerhorst

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- Dick Wever
- Jim Simons
- Roy Gies
- Doug MacDonald
- Rick Johnson
- A/C staff as desired by A/C or as required
- Various dfi and subcontractor staff as needed

• Inspect and monitor project progress. This is a high priority item since we are presently approaching several important project milestones.

Those involved:
- Jim Simons
- MSU staff as required or available
- A/C staff as desired by A/C or as required
- dfi and subcontractor staff as required

• Complete required planning work. See above for list of planning work remaining to be done.

Those involved:
- Jim Simons
- dfi and subcontractor staff as required
- A/C staff as desired by A/C or as required
- MSU staff as required or available

• Review and check mechanical construction plan and schedule of action. The predecessor/successor list has been prepared by A/C, and was issued to the MSU project staff. I am presently preparing a logic translation of this material for field and related monitoring and planning use.

Those involved:
- Jim Simons
- IMC staff
- A/C staff as desired by A/C or as required

Other items will be added as desired by those involved.

I shall be in touch with Mr. Simons and Mr. Wever shortly to set dates for continuing our planning and monitoring work.

Ralph J. Stephenson, P. E.

	system #	main system class	sub system class	level A actions	level B actions	notes
1	100.0000	control system start up - 100				
2	101.0000	control system start up - 100	power	Start UPS		
3	102.0000	control system start up - 100	control	Start dcs gate		
4	102.0100	control system start up - 100	control	Install operator interface stations		
5	200.0000	plant start up - 200				
6	201.0000	plant start up - 200	power	Complete unit 4 13800 v buss		
7	201.0101	plant start up - 200	power	Complete unit 4 13800 v buss	Calibrate 480v breaker metering	
8	201.0102	plant start up - 200	power	Complete unit 4 13800 v buss	Start 480v transformer	
9	201.0201	plant start up - 200	power	Complete unit 4 13800 v buss	Calibrate lighting sub metering	
10	201.0202	plant start up - 200	power	Complete unit 4 13800 v buss	Start lighting substation	
11	201.0300	plant start up - 200	power	Complete unit 4 13800 v buss	Start plant paging system	
12	202.0000	plant start up - 200	fire water	Complete raw water piping		
13	202.0100	plant start up - 200	fire water	Complete raw water piping	Start fire safety system	
14	203.0000	plant start up - 200	cooling water	Complete ct 480 v feed		
15	204.0000	plant start up - 200	cooling water	Complete ct 120 v feed		
16	204.0100	plant start up - 200	cooling water	Complete ct 120 v feed	Start ct dcs nodes	
17	204.0200	plant start up - 200	cooling water	Complete ct 120 v feed	Start cooling tower make up	
18	204.0300	plant start up - 200	cooling water	Complete ct 120 v feed	Start cooling tower chemical feed	
19	204.0400	plant start up - 200	cooling water	Complete ct 120 v feed	Start cooling tower acid feed	
20	205.0000	plant start up - 200	cooling water	Complete condenser piping		
21	206.0000	plant start up - 200	cooling water	Complete cooling tower system		
22	206.0100	plant start up - 200	cooling water	Complete cooling tower system	Start ct circulating pumps	
23	206.0200	plant start up - 200	cooling water	Complete cooling tower system	Start ct fans	
24	207.0000	plant start up - 200	cooling water	Complete ct security fencing		

	system #	main system class	sub system class	level A actions	level B actions	notes
25	208.0000	plant start up - 200	cooling water	Complete ccw plant piping		
26	208.0100	plant start up - 200	cooling water	Complete ccw plant piping	Start Bailey dcs nodes	
27	208.0200	plant start up - 200	cooling water	Complete ccw plant piping	Start ccw system	
28	209.0000	plant start up - 200	instrument air	Complete plant air piping		
29	209.0100	plant start up - 200	instrument air	Complete plant air piping	Start Bailey dcs nodes	
30	209.0200	plant start up - 200	instrument air	Complete plant air piping	Start instrument air dryer	
31	209.0300	plant start up - 200	instrument air	Complete plant air piping	Start instrument air compressor	
32	210.0100	plant start up - 200	heat	Complete bldg heating system	Strt bldg prv station (90# to 20# stm)	
33	210.0200	plant start up - 200	heat	Complete bldg heating system	Start bldg heating system (20# stm)	
34	210.0300	plant start up - 200	heat	Complete bldg heating system	Start condensate system	see 306.0100 & 213.0200
35	211.0000	plant start up - 200	feed water	Complete feed water header		
36	211.0100	plant start up - 200	feed water	Complete feed water header	Start deareator & heater	
37	212.0000	plant start up - 200	main steam	Complete main stm hdr (900#) system		
38	212.0100	plant start up - 200	main steam	Complete main stm hdr (900#) system	Start main steam prv (900# to 90#)	
39	213.0000	plant start up - 200	sendout steam	Comp 90# stm hdr		
40	213.0100	plant start up - 200	sendout steam	Complete 90# stm hdr	Start desup spray	
41	213.0200	plant start up - 200	sendout steam	Complete 90# stm hdr	Start condensate system	see 210.0300 & 306.0200
42	214.0100	plant start up - 200	demin water	Complete mixed bed tie in	Start mixed bed demineralizer	
43	300.0000	turbine start up - 300				
44	301.0100	turbine start up - 300	control	Complete turbine generator	Start turbine dcs	
45	301.0101	turbine start up - 300	control	Complete turbine generator	Start turbine dcs	
46	301.0200	turbine start up - 300	control	Complete turbine generator	Start vibration monitor	
47	302.0100	turbine start up - 300	piping & valves	Complete turbine generator	Check turbine valves	
48	303.0100	turbine start up - 300	oil system	Complete turbine generator	Start lube oil system	

	system #	main system class	sub system class	level A actions	level B actions	notes
49	303.0200	turbine start up - 300	oil system	Complete turbine generator	Start control oil system	
50	303.0300	turbine start up - 300	oil system	Complete turbine generator	Start vapor extractor	
51	303.0400	turbine start up - 300	oil system	Complete turbine generator	Start to warm oil (from 90# system)	
52	304.0100	turbine start up - 300	turning gear	Complete turbine generator	Start turning gear	
53	305.0102	turbine start up - 300	steam seal	Complete turbine generator	Start shaft seals	
54	306.0201	turbine start up - 300	condenser operation	Complete turbine generator	Start condensate system	see 210.0300 & 213.0200
55	306.0203	turbine start up - 300	condenser operation	Complete turbine generator	Start hot well system	
56	306.0204	turbine start up - 300	condenser operation	Complete turbine generator	Start steam ejector	
57	307.0100	turbine start up - 300	stm chest operation	Complete turbine generator	Operate admission valve	
58	307.0200	turbine start up - 300	stm chest operation	Complete turbine generator	Operate turbine trip valve	
59	308.0100	turbine start up - 300	generator operation	Complete turbine generator	Start generator cooler	
60	308.0201	turbine start up - 300	generator operation	Complete turbine generator	Calibrate exciter meter	
61	308.0202	turbine start up - 300	generator operation	Complete turbine generator	Operate generator exciter	
62	308.0203	turbine start up - 300	generator operation	Complete turbine generator	Test exciter metering	
63	308.0300	turbine start up - 300	generator operation	Complete turbine generator	Operate sych cabinet	
64	308.0401	turbine start up - 300	generator operation	Complete turbine generator	Calibrate generator metering	
65	308.0402	turbine start up - 300	generator operation	Complete turbine generator	Operate generator breaker	
66	308.0403	turbine start up - 300	generator operation	Complete turbine generator	Test generator metering	
67	400.0000	boiler start up - 400				
68	401.0101	boiler start up - 400	power	Complete cfb (boiler)	Calibrate 4160 metering	
69	401.0102	boiler start up - 400	power	Complete cfb (boiler)	Start 4160 substation	
70	401.0103	boiler start up - 400	power	Complete cfb (boiler)	Start 480 mcc's	
71	402.0000	boiler start up - 400	control	Complete cfb (boiler)	Start boiler dcs	
72	403.0000	boiler start up - 400	sand	Complete cfb (boiler)	Start sand system	

	system #	main system class	sub system class	level A actions	level B actions	notes
7 3	404.0100	boiler start up - 400	gas	Complete cfb (boiler)	Start inbed gas system	
7 4	404.0200	boiler start up - 400	gas	Complete cfb (boiler)	Start main gas system	
7 5	405.0100	boiler start up - 400	air	Complete cfb (boiler)	Start primary air fans	
7 6	405.0200	boiler start up - 400	air	Complete cfb (boiler)	Start secondary air fans	
7 7	406.0101	boiler start up - 400	bag house - power	Complete cfb (boiler)	Close 4160 v breaker	
7 8	406.0102	boiler start up - 400	bag house - power	Complete cfb (boiler)	Start 480 v mcc's	
7 9	406.0201	boiler start up - 400	bag house - control	Complete cfb (boiler)	Start bag house dcs	
8 0	406.0300	boiler start up - 400	bag house	Complete cfb (boiler)	Start id fans	
8 1	406.0400	boiler start up - 400	bag house	Complete cfb (boiler)	Start reverse air fans	
8 2	406.0500	boiler start up - 400	bag house	Complete cfb (boiler)	Start opacity monitor	
8 3	406.0600	boiler start up - 400	bag house	Complete cfb (boiler)	Start CEM's	
8 4	407.0000	boiler start up - 400	limestone	Complete cfb (boiler)	Start limestone system	
8 5	408.0000	boiler start up - 400	coal	Complete cfb (boiler)	Start coal system	
8 6	409.0000	boiler start up - 400	ash	Complete cfb (boiler)	Start ash handling system	

msu pp#4 - msu pp#4 notes - d326

I. **8:31:41 AM - August 24, 1992**

A. **Agenda**

1. Review bag house network with Gary Phillips and David Sanger
2. Complete & issue bag house network issue #6
3. Inspect project
4. Initiate discussions re plant start up with MSU staff

B. **Bag house meeting and job inspection - am**

1. Those attending
   a) David Sanger - MSU field inspector
   b) Gary Phillips - Environmental Elements field construction superintendent
   c) Ralph J. Stephenson - Consultant

C. **Start up conference - pm**

1. Those attending
   a) Jim Simons - Field representative
   b) Bob Ellerhorst - Utility director
   c) Doug MacDonald - Mechanical engineer
   d) Roy Gies - Operations supervisor
   e) Ralph J. Stephenson - Consultant
2. Agenda
   a) Who is in charge? Who will spearhead the effort?
   b) Discuss laundry list - nature, content and method of preparation
   c) Discuss training
3. Questions and random comments
   a) Are we including the curing refractory and chemical cleaning in the start up?
      (1) What fuel and heat will be used for start up operations?
      (2) Jim indicated we must decide where the curing heat is to come from.
      (3) Cannot use natural gas in boiler without sand.
   b) Must circulate sand to avoid impingement on the opposite wall.
   c) When, where and how should Tampella be involved?
   d) Set pattern for next meeting
4. Organization
   a) Mr. Roy Gies was appointed the Start Up Manager
      Mr. Gies will be responsible for, and have the authority to make, most management decisions concerning start up. He will also have the MSU construction, design, general construction, and dfi (design, fabricate and install) group from which to draw technical help as needed.
   b) Discussed organizational structure of start up operations

II. **8:50:42 AM - August 31, 1992**

A. **Phone call to Purdue University re start up**

1. Those involved
   a) Wayne Kjonaas - Director of Utilities - Purdue University
   b) Bob Ellerhorst - Director of Utilities - Michigan State University
   c) Dick Wever - Construction Superintendent - Michigan State University
   d) Don Clendenan - Shift first engineer - Michigan State University
   e) Ralph J. Stephenson - Consultant
2. Notes
   a) Start up staff
      (1) Design team

(2) Owner team

b) Method of starting up
  (1) Organization of start up team
    (a) Selected university staff member for start up coordinator
    (b) Initially used a combination of the design team and university operators to manage the start up work.
    (c) Found it best to tie start to and with the actual plant operation
    (d) Start up responsibility and authority were gradually shifted to the start up coordinator.
    (e) The pco was actually in charge of starting up the systems
  (2) How start up team solved problems
    (a) Tried to identify current and future problems early so as to anticipate the difficulties they might cause.
      i) Engineering problems
      ii) Construction problems
    (b) Attempted to resolve problems before they adversely affected the start up process.
    (c) pco went back to the construction project manager and the design team for technical help in solving problems.

c) Performance testing
  (1) How to determine if and when the boiler unit is performing?
    (a) pco was in charge
    (b) Foster Wheeler had engineers on site to help the pco
    (c) Other engineers helped the pco
  (2) Engineers assigned to each system
    (a) Utility engineering was responsible for all systems (?)

d) Systems - preliminary list given on phone without reference to faxed list below
  If a system had its own start up it was included as a unit system in the start up
  (1) Limestone system
  (2) Ash system
  (3) Compressed air system
  (4) Material handling system
  (5) Boiler feed water pumps
  (6) Steam systems
    (a) Broken down by pressures
  (7) Other? - Mr. Kjonaas will fax Bob full list of systems Purdue used in starting up.

e) Major categories of start up work
  (1) Mr. Kjonaas faxed Bob Ellerhorst list of categories - the list sent on 08/31/92 included the following for the Purdue power plant
    (a) Dodge - lead engineer
      i) Boiler feedwater
      ii) 15# steam piping
      iii) Elevator
    (b) Dwyer - lead engineer
      i) 650# steam piping
      ii) Coal handling
      iii) Emissions monitoring
      iv) Compressed air and gas

(c) Miller - lead engineer
  i) Distributed control
  ii) Building lighting
  iii) Building communications
(d) Nethercutt/Dwyer - lead engineers
  i) Boiler
(e) Nethercutt - lead engineer
  i) Combustion air
  ii) Flue gas
(f) Porte - lead engineer
  i) Electrical power systems
(g) Rafacz - lead engineer
  i) Limestone handling
  ii) Condensate and demineralized water
  iii) 125# steam piping
  iv) Fire protection bldg and ct
(h) Rodgers - lead engineer
  i) Process water and steam sampling
  ii) Ash and inerts handling
  iii) Building heating and ventilation
  iv) Blowdown

f) Start up definition

Any time a system had to be started it was a part of start up. Boiler start up & sand is a good example.

On simple systems start up began as far along as after 95% construction complete.

On complex systems such as the bag house, the pre startup was Foster Wheeler's work until the university began to be involved.

When a university employee started an actual operational action, this was considered to be the beginning of the start up operation. Purdue supplied all labor for operational activities.

g) Regulatory involvement
  (1) Indiana Department of Environmental Protection was major state agency.
  (2) University staff kept in close touch with the Indiana Department of Environmental Protection.
    (a) During start up operations kept in constant communication with the DEP
  (3) Unsupported 1st coal firing trigged permit requirement considerations.
  (4) Refractory cure out - used gas burners for curing - not considered to be a firing
  (5) CEM's operable at first firing
h) Miscellaneous
  (1) University added coal crusher just ahead of silo - everything is crushed to 3/4" or smaller going into the silo..
i) Turbine project at Purdue
  (1) Will probably start in early 1993

B. **Meeting notes**

1. Those attending
  a) Bob Ellerhorst - MSU director of utilities

b) Dick Wever - MSU construction superintendent
c) Don Clendenan - Shift first engineer
d) Ralph J. Stephenson - Consultant

2. Agenda
   a) Decide on key players and what they are going to do
   b) Set approach to planning start up
3. Key players - during start up
   a) Roy Gies - Operations supervisor & start up manager
      Responsible for and has the authority to make decisions re start up. He will have technical help available from the MSU construction, design, general construction, and design, fabricate and install contractors as may be needed and related to start up.
   b) Shift first engineers
      Will be involved as start up events occur on their shift, or as special start up assignments appear to which they can contribute special skills.
      (1) Don Clendenan - Shift first engineer
      (2) Gil Davis - Shift first engineer
      (3) Bob Lee - Shift first engineer
      (4) Jack Hubbard - Shift first engineer
      (5)
   c) Doug MacDonald - Mechanical engineer
      Provides technical liaison between design, construction & start up of power plant #4. Also responsible, with Bob Ellerhorst, for procurement and quality assurance of fuel, stone & sand needed for start up.
   d) Rick Johnson - Electrical engineer
      Responsible for technical electrical liason between design, construction, and start up in conjunction with Bob Ellerhorst and Jim Simons.
   e) Black & Veatch - Architect engineer of record
      Duties in start up are as defined by contract.
   f) Others to be defined
      (1) Dick Wever
      (2) Jim Simons
      (3) Bob Nestle
4. Definitions
   a) Start up
      The work leading to commercial operation by the am of 09/07/93, which is triggered by the a university staff member in starting an actual operational action on a major start up system.

      (This definition is to be refined)
   b) Others to be added as the start up is planned
5. Laundry lists
   a) To be defined within the major system classes
6. Main system classes
   a) Control system start up
   b) Plant start up
   c) Turbine start up
   d) Boiler start up

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Subject: **Monitoring Report #22**

Project: **Michigan State University**
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: **Robert Nestle - MSU project manager**
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative

From: **Ralph J. Stephenson - Consultant**

rjs project: **91:14**

rjs disks: **253, 265, 281, 301, 303, 305, 308, 315, 318, 322, 323, 326, 329 & 332**

Dates of meetings and monitorings:

September 11, 1992 (wd 434)
September 14, 1992 (wd 435)
September 23, 1992 (wd 442)

176 working days remaining from am September 23, 1992 (wd 442) to pm June 1, 1993 (wd 618)

Those attending meetings:

Note: Some people listed below were in meetings part time only

September 11, 1992 (wd 434)

- Robert Ellerhorst - MSU director of Utilities
- Roy Gies - MSU operations supervisor & start up manager
- Rick Johnson - MSU electrical engineer
- Dave Munroe - A/C field superintendent
- John Hucul - A/C project manager
- Ralph J. Stephenson - Consultant

September 14, 1992 (wd 435)

- Robert Ellerhorst - MSU director of utilities
- Jim Simons - MSU project representative
- Roy Gies - MSU operations supervisor & start up manager
- Rick Johnson - MSU electrical engineer

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- Ron McClintic - MSU utilities systems and controls
- Dave Munroe - A/C field superintendent
- John Hucul - A/C project manager
- Ralph J. Stephenson - Consultant

September 23, 1992 (wd 442)

- Jim Simons - MSU project representative
- Dick Wever - MSU construction superintendent
- Pete Theis - Tampella field superintendent
- Dave Sanger - MSU field inspector
- Ralph J. Stephenson - Consultant

Documents used in monitorings and discussions:

- Sheet #01, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #02, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #03, issue 6, dated July 07, 1992 (wd 387) - Chemical/electrical building
- Sheet #04, issue 6, dated July 07, 1992 (wd 387) - Turbine generator, interior metal walls, roofing and exterior vertical close in
- Sheet #05, issue 6, dated July 07, 1992 (wd 387) - Coal conveyor, fire protection systems, and cooling tower
- Sheet #06, issue 6, dated July 14, 1992 (wd 392) - Electrical construction
- Sheet #07, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work
- Sheet #08, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #09, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #10, issue 6a dated August 25, 1992 (wd 421) - Fabric filter building - for issue
- Sheet #11, issue 6 dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
- Sheet #12, issue 6 dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.

Actions taken:

September 11, 1992 (wd 434)

- Continued defining start up and the actions related to start up.
- Continued preparing start up data base material.
- Reviewed Alberici/Clark's suggestions for start up procedures.
- Discussed how start up card system might be implemented.
- Continued refining major systems classes of start up operations.

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September 14, 1992 (wd 435)

- Began defining start up procedures.
- Began preparing logic plans for major systems start up.
- Continued discussions of start up card procedures and responsibilities.

September 23, 1992 (wd 442)

- Inspected project.
- Reviewed current status with various project team members.
- Reviewed contractor's work scope with Mr. Wever and Mr. Simons.

Summary:

September 11, 1992 (wd 434) & September 14, 1992 (wd 435)

These meetings were concentrated on start up procedures as viewed by the owner and the general project manager, Alberici/Clark. Working notes were taken at each of the sessions described above. I have rough edited these and they are attached to this monitoring report for reference.

The start up process was discussed and refined as the various elements of the start up were identified. The turnover procedure from the contractors to MSU is very important since it represents the point in time where a MSU employee will actually take a start up action. A/C suggested that the starting point begin with the transmission of a turnover card from the project construction staff to MSU's utility staff. The sequence is expected to be roughly as follows:

1. The turnover card is prepared by the construction team.

   The turn over card contains a detailed list of all construction elements making up a working system, and is a tabulation of components installed by the contractor. It attests that the construction of a designated system is complete in accordance with the responsible contractor's understanding of the contract scope.

2. The turnover card is given to the MSU construction field staff by the constructing party responsible.

   The MSU construction staff verifies that the system is complete, or indicates where a need for additional construction is required for completion.

   Once the construction contractors and the MSU construction staff are satisfied that the work in place is in accordance with the contract and represents a complete and workable system, the MSU field staff signs the turnover card.

3. The signed card is transmitted by the MSU construction staff to the MSU utilities staff.

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The MSU construction staff is represented by Mr. Jim Simons and the MSU utility staff is represented by Mr. Roy Gies.

Upon delivery of the turnover card Mr. Gies acknowledges that he has received the turnover card, and that he is taking over the responsibility for MSU utilities work in starting up the system as defined.

4. The turnover card is used to officially convey information from the MSU utilities staff to the MSU construction staff, and back.

As startup proceeds, the turnover card is used to identify required construction changes, adjustments and other revisions. The card is transferred from and to the MSU utilities group and the MSU construction staff as required.

5. When the turnover card no longer returns to the MSU construction staff it can be generally considered the system defined on the card is accepted by the MSU start up team.

It will be essential that Mr. Simons and Mr. Gies remain in close contact with each other throughout start up. This is because there will undoubtedly be a need for input from the general project manager (A/C), the design, furnish and install (dfi) contractors, and the architect/engineer (B & V) of record to the start up staff.

The above is a broad outline of the general procedure under consideration at present. Mr. Munroe and Mr. Hucul of A/C will prepare an outline and mock up of the contents and form of the turnover card for discussion with MSU construction, and MSU utilities.

A/C next described how they intend to classify the mechanical systems being installed under the mechanical construction contract. This document was converted from the listing prepared by Mr. Munroe into a data base format. Copies were distributed at the meeting. A copy is attached to this report and is designated Attachment A.

It was stressed by A/C that the material contained in attachment A is preliminary and is to be reviewed further by them.

Later in the meeting the MSU staff discussed further details of the various systems in the plant that must be considered in setting the logic plans and schedules for the start up. We continued reviewing the fundamental systems descriptions and rearranged the data in the preliminary data runs described on pages 3, 4, and 5, in monitoring report #21, dated September 1, 1992. The rearranged data shown by level of detail is contained in Attachment B enclosed with this report. Notice that the level 1 main system is designated as Plant Start Up. The level 2 systems are controls, cooling tower, turbine, boiler, bag house and continuous emissions. These are further subdivided into level 3, 4 and 5 systems under the six main sub headings.

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Mr. Gies and Mr. Simons expect additional subsystem designations to emerge as we continue our planning. However we will use attachment B as the base reference for our present planning.

At our meeting on September 14, 1992 (wd 435), Mr. Gies and I began preparing some experimental logic plans to test the validity of the system designations. We found that we should identify within each major system plan and schedule, all construction work that must be complete before the start up process begins. This data was shown on the early network models, and will be expanded and refined as planning proceeds.

Copies are not enclosed since they are very early plans and should be brought further along by Mr. Gies, Mr. Simons, and I before distribution. They are available however, to those receiving this report as may be desired.

September 23, 1992 (wd 442)

This set of meetings concentrated on inspecting the project and evaluating the current status of the work. We also discussed the contents of the briefing manual prepared by the MSU construction staff for their early scope of work discussions with Alberici/Clark.

A brief review of the project status is given below:

- **Boiler installation**

The first portion of the project monitored was the Tampella boiler work. Mr. Pete Theis provided the basic information which was recorded on the MSU office network, sheets 1 & 2, issue #6, dated July 20, 1992 (wd 396).

Overall, boiler installation is currently meeting most major targets between early and late starts and finishes. The areas that appear to lag, or show potential to lag, run generally along the action path leading to the crane complete milestone on sheet #2. This is the point where the large crane on the job is to be removed. The current issue #6 date to complete large crane use is the pm of November 6, 1992 (wd 475).

Given the current status of those elements restraining crane dismantling, there is some question about whether or not this date can be met. Mr. Theis however, is ground assembling as many units as he can at present and generally feels that the date structure shown in the issue #6 network model for boiler work is valid.

I suggest that at our next monitoring we make a complete update of the network and confirm or reestablish the milestones in relation to the current job status. I recommend this be done in mid October, 1992.

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• **Chemical/Electrical Building**

Progress at the chemical/electrical building was measured against the issue 6 network model, dated July 7, 1992 as derived from the A/C computer run. In this plan of work the objective was to complete the facility by a late finish of November 6, 1992 (wd 475). Currently the work lags late starts and late finishes by from 2 to 14 working days. The measurement is against roofing and setting electrical equipment.

Target end dates for the work may not be critical for the total installation. However with cold weather at hand it would be well to review and update the issue 6 plan of work. I shall discuss this with Mr. Simons in the near future.

• **Turbine Generator**

Monitoring the turbine generator against the issue #6 network model dated July 7, 1992 (wd 387) indicates the lag in work as of September 23, 1992 (wd 442) is about 31 working days. The issue 6 network shows a late finish of the turbine generator systems check out of the pm of March 10, 1993 (wd 560).

Apparently there have been some difficulties in sole plate elevations, and this has undoubtedly contributed to the behind position in relation to the desired dates. In light of the lag I recommend that the network plan, which was derived from the A/C computer run, be updated in the very near future. I also suggest the plan logic be reviewed to insure an accurate sequence of work is shown in the work being scheduled.

• **Fabric filter building**

Mr. Sanger reviewed the status of the work with Environmental Elements and provided the input for monitoring the facility. As of September 23, 1992 (wd 442) all major activities at the fabric filter building are currently meeting or bettering early and late starts and finishes as shown in the issue 6a network model, dated August 24, 1992 (wd 421). The late finish for main equipment work shown in this model is the pm of November 25, 1992 (wd 488).
Installation of the fabric filter bags will be held until next July, 1993, since it is a relatively short term project, and it is preferred to install the material when the danger of damage is less than now.

• **General building work**

The major activity in progress at present is erection of exterior masonry. This is a very critical task since building enclosure is needed before winter. At present the target date for building enclosure is shown at the pm of November 16, 1992 (wd 481). Block backup erection is meeting late start, late finish targets, and the roofer is mobilizing to start his work in the near future.

As yet there is appears to be no resolution of the face brick delivery problem. This may result in some detail difficulties closing the building to weather. It also may result in access difficulties to the

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exterior and interior of the building if the scaffold is to be left in place.

Exterior stone is in work and moving moderately well, although in a different sequence than shown in the issue 6 network model.

I recommend that a complete updating of the masonry, interior metal walls, and roofing work plans be made in the very near future.

• **Cooling tower**

The target late finish for completion of the cooling tower is shown at the pm of November 16, 1992 (wd 481) in the issue #6 network model dated July 7, 1992 (wd 387). As of September 23, 1992 (wd 442), work lags this late date by about 18 working days. The lag is serious in that it may force the work into cold weather conditions. I suggest we discuss the cooling tower needs in detail at our next planning and monitoring session. This matter is important in relation to start up planning.

• **Coal conveyor modifications**

Not monitored in detail at this meeting.

• **Fire protection systems**

Not monitored in detail at this meeting.

• **Electrical construction**

Not monitored in detail at this meeting.

• **Mechanical construction**

I am presently converting the A/C mechanical construction computer runs into logic plans. However it appears that the information in the computer runs may not be fully related to the actual delivery and installation conditions. I shall discuss this matter with Mr. Simons and A/C in the near future to determine the appropriate method by which we can obtain a accurate plan of action.

Mr. Munroe has prepared some network models of the installation of the mechanical systems as outlined in the A/C mechanical systems listing enclosed with this report (attachment A). We should obtain copies of these sequences as soon as they are possible, since they do affect start up procedures and planning.

<u>General:</u>

Mr. Rick Johnson has substantially completed his input to the detailed electrical equipment final connection listing. I am currently bringing this document up to date for use in the start up planning.

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In addition other items which are to be addressed relative to near future planning and scheduling include the following:

- Continue start up planning with construction and plant start up team.

Those involved include:

- Bob Ellerhorst
- Dick Wever
- Jim Simons
- Roy Gies
- Doug MacDonald
- Rick Johnson
- A/C staff as desired by A/C or as required
- Various dfi and subcontractor staff as needed

- Inspect and monitor project progress on a regular basis. This is a high priority item since we are approaching the point where a full completion and updating of the action plans and schedules will be required. This updating should be started in early October, 1992.

Those involved include:

- Jim Simons
- MSU staff as required or available
- A/C staff as desired by A/C or as required
- dfi and subcontractor staff as required

I shall be in touch with Mr. Simons and Mr. Wever shortly to set dates for further planning and monitoring on the project.

Ralph J. Stephenson, P. E.

MSU PP4 start up meeting notes

IV. **Monday, September 14, 1992**

- A. **msu pp #4 notes - d 329**
- B. **Agenda**
  1. **Review definitions**
     - a) Start up procedures
     - b) A/C turnover procedures
  2. **Begin preparing start up networks with Roy Gies**
- C. **Those attending**
  1. **Bob Ellerhorst - MSU utility director - in meeting part time**
  2. **Jim Simons - MSU project representative - in meetings part time**
  3. **Roy Gies - MSU operations supervisor & start up manager**
  4. **Dave Munroe - A/C field superintendent - in meetings part only**
  5. **John Hucul - A/C project manager - in meetings part time only**
  6. **Rick Johnson - MSU electrical engineer - in meetings part time only**
  7. **Ralph J. Stephenson - Consultant**
- D. **Major categories of start up**
  1. **Decided to use the following category tree**
     - a) Plant #4 start up
       - (1) 100 - Control system start up
         - (a) Bailey systems software
       - (2) 200 - Cooling tower system start up
         - (a) Mechanical construction systems
           - i) wsc - raw water system - make up water to hrc system
           - ii) hrc - circulating water systems
           - iii) fpu - fire protection system
           - iv) hre - chemical feed systems
           - v) cab - instrument air system
           - vi) cab - control air system
           - vii) etc.
         - (b) Electrical construction systems
           - i) High voltage system
           - ii) Low voltage system
           - iii) Control system
         - (c) dcs systems
           - i) Software system
         - (d) Calgon system
       - (3) 300 - Turbine system start up
         - (a) Mechanical construction systems
           - i) sgg - main steam system
           - ii) tea - extraction steam
           - iii) hrc - circulating water system
           - iv) hra - condensate systems
           - v) cab - instrument air system
           - vi) ecb - closed cooling water system
           - vii) cab - control air system
         - (b) Electrical construction systems
           - i) High voltage system
           - ii) Low voltage system
           - iii) Control system
           - iv) Relaying system- multilin electrical relaying system
           - v) etc.

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(c) dcs systems
(d) General Electric systems
i) Turbine systems
(1) Lube oil system
(2) Control oil system
ii) Generator systems
iii) etc.
(4) 400 - Boiler system start up
(a) Mechanical construction systems
i) ecb - closed cooling water system
ii) cab - control air system
(5) 500 - Bag house system start up
(a) Mechanical construction systems
i) cab - instrument air system
ii) asg - ash collection
iii) ecb - closed cooling loop system
iv) cab - control air system
(b) Electrical construction systems
(c) dcs systems
(d) Environmental Elements systems
(6) 600 - Continuous emissions monitoring system start up
(a) Environmental Elements systems
(b) Mechanical construction systems
i) cab - control air system
(c) Electrical construction systems

2. **General information**
a) Must have a startup card for all construction systems that make up a plant operating system
(1) All contractors must prepare a startup card - construction
(a) Fabric filter building contract - Environmental Elements (62.0203)
(b) Distributed control work contract - Bailey (62.0212)
(c) Cooling tower contract - Thermal Dynamics (62.0601)
(d) Turbine generator contract - General Electric (62.1001)
(e) Circulating fluidized bed system generator - Tampella (62.3401)
(f) Electrical equipment - CPC (63.0000) - assigned to Quality
(g) Architectural/mechanical contract - A/C (71.0200)
(h) Electrical construction work contract - Quality (73.0200)
(i) Electrical configuration work contract - Hatzel Buehler/MSU (purchase order)
(j) (?)Alberici/Clark assignments (?)

MSU PP4 start up meeting notes

III. **8:46:25 AM - September 11, 1992**

A. **msu pp #4 notes - d 329**

B. **Agenda**

1. **Define start up**
2. **Continue listing systems as a part of the start up**

C. **Those attending**

1. **Bob Ellerhorst - MSU utility director**
2. **Roy Gies - MSU operations supervisor**
3. **Rick Johnson - MSU electrical engineer**
4. **Dave Munroe - A/C field superintendent**
5. **John Hucul - A/C project manager**
6. **Ralph J. Stephenson - Consultant**

D. **General notes**

1. **Dave Munroe described how A/C wants to turn over the system.**
2. **Decisions - preliminary for final review**
   a) A/C wants to turn over each system as completely as possible to the utility group.
   b) Decision was made that A/C will work with Roy Gies as the single point contact representative with MSU.
   c) Definition of start up
      (1) Draft #2
      Start up is the period from where construction of a system is considered complete through to commercial operation of the plant by the am of 09/07/93. The startup period for a system begins when the start up manager receives the initial turnover card.
         (a) Turnover card is prepared by A/C
         Represents that construction of a designated system is complete in accordance with A/C understanding of the contract scope. The turnover card when completed is signed off on by A/C, its subs, and the MSU construction staff.
         (b) The turnover card is sent to Roy Gies who is the official startup manager for MSU. Roy Gies formally acknowledges by his signature that he has received the completed turnover card, and that he is taking over responsibility for MSU work in starting up the system.
         (c) As the turnover proceeds the turnover card provides a vehicle by which responsibility for required corrections, adjustment, and other changes that may be required can be transferred to and from A/C from and to MSU.
         (d) When the turnover card no longer returns to A/C the system is considered accepted by the MSU startup team for their work.

3. **Systems**
   a) Plant system start up - major category of start up work
      (1) Cooling tower system start up
         (a) Mechanical construction items
            i) hrc
            ii) hre
            iii) Chemical feed
            iv) etc.
         (b) Electrical construction items
      (2) Control system start up
      (3) Turbine system start up
      (4) Boiler system start up
      (5) Bag house system start up

4. **Process of planning start up actions**
   a) Identify systems
   b) Establish dependencies
   c) Set priorities
   d) Establish the time frame.
5. **<u>Plant system start up</u> - major categories of start up work. Preliminary - for review & comment only.**
   a) Control system start up (1)
      (1) Bailey systems software
   b) Cooling tower system start up (2)
      (1) Mechanical construction systems
         (a) wsc - raw water system - make up water to hrc system
         (b) hrc - circulating water systems
         (c) fpu - fire protection system
         (d) hre - chemical feed systems
         (e) cab - instrument air system
         (f) cab - control air system
         (g) etc.
      (2) Electrical construction systems
         (a) High voltage system
         (b) Low voltage system
         (c) Control system
      (3) dcs systems
         (a) Software system
      (4) Calgon system
   c) Turbine system start up (3)
      (1) Mechanical construction systems
         (a) sgg - main steam system
         (b) tea - extraction steam
         (c) hrc - circulating water system
         (d) hra - condensate systems
         (e) cab - instrument air system
         (f) ecb - closed cooling water system
         (g) cab - control air system
      (2) Electrical construction systems
         (a) High voltage system
         (b) Low voltage system
         (c) Control system
         (d) Relaying system- multilin electrical relaying system
         (e) etc.
      (3) dcs systems
      (4) General Electric systems
         (a) Turbine systems
            i) Lube oil system
            ii) Control oil system
         (b) Generator systems
         (c) etc.
   d) Boiler system start up (4)
      (1) Mechanical construction systems
         (a) ecb - closed cooling water system
         (b) cab - control air system

e) Bag house system start up (5)
   (1) Mechanical construction systems
      (a) cab - instrument air system
      (b) asg - ash collection
      (c) ecb - closed cooling loop system
      (d) cab - control air system
   (2) Electrical construction systems
   (3) dcs systems
   (4) Environmental Elements systems

f) Continuous emissions monitoring system (6)
   (1) Environmental Elements systems
   (2) Mechanical construction systems
      (a) cab - control air system
   (3) Electrical construction systems

	oen	b & v p&id #	discipline	discipline system	system code	target turnover date to MSU (prelim - to be confirmed)	notes	major system start up category
1	1	M2029	mechanical	building drains & vents	DPA	11/27/92		cooling tower
2	2	M2012	mechanical	service water	WSC	11/27/92		cooling tower
3	3	M2012	mechanical	fire protection	FPU	2/1/93		cooling tower
4	4	M2016	mechanical	heater vents & miscellaneous drains	TEF	11/27/92		cooling tower
5	5	M2016	mechanical	heater drains	TED	11/27/92		cooling tower
6	6	M2015	mechanical	steam unit heaters & air handling unit	SCA	11/27/92	for partial use only - phase 1 - see also SCA phase 2	cooling tower
7	7	M2010	mechanical	control air	CAB	2/12/93		cooling tower
8	8	M2003	mechanical	condensate	FWC	3/5/93	see PMA systems	
9	9	M2003	mechanical	condensate air extraction	HRB	3/5/93		
10	10	M2003	mechanical	condensate	HRA	3/5/93		
11	11	M2005	mechanical	circulating water chemical feed	HRE	1/8/93		
12	12	M2005	mechanical	cycle chemical feed	FWE	1/15/93		
13	13	M2007	mechanical	circulating water	HRC	1/29/93		
14	14	M2006	mechanical	closed cycle cooling water	ECB	1/15/93		
15	15	M2010	mechanical	station air	CAA	2/12/93		
16	16	M2013	mechanical	chemical clean	PMA	1/29/93	pre boiler chem clean - FWC, FWA & FWG - from 01/15/93 to 01/29/93	
17	17	M2028	mechanical	attemporator spray water	FWG	3/5/93	see PMA systems	

	oen	b & v p&id #	discipline	discipline system	system code	target turnover date to MSU (prelim - to be confirmed)	notes	major system start up category
18	18	M2002	mechanical	feed water	FWA	3/5/93	see PMA systems	
19	19	M2002	mechanical	desuperheater water	FWH	3/5/93		
20	20	M2003	mechanical	demineralized water	FWF	3/5/93		
21	21	M2014	mechanical	sampling & analysis	SAC	3/5/93		
22	22	M2023	mechanical	boiler drains & vents	SGF	4/9/93		
23	22	?	mechanical	natural gas	SGE	4/9/93		
24	23	M2001	mechanical	main steam	SGG	4/9/93		
25	24	M2025	mechanical	steam blow piping	SGK	4/16/93		
26	25	M2016	mechanical	extraction traps & drains	TEC	4/16/93		
27	26	M2016	mechanical	extraction steam	TEA	4/16/93	turbine ready to go	
28	27	M2015	mechanical	building space conditioning	SCA	4/30/93	for phase 2 - see other SCA for phase 1	
29	28	M2010	mechanical	soot blower air	CAC	2/12/93		
30	29	M?	mechanical	coal handling system	CHD	6/1/93	requires CHC	
31	30	M2009	mechanical	limestone handling	BMD	6/1/93		
32	31	?	mechanical	sand handling (inert)	BME	6/1/93		
33	32	M2008	mechanical	ash collection	ASG	6/1/93		
34	33	M2008	mechanical	combustion waste storage	ASF	6/1/93		

	oen	b & v p&id #	discipline	discipline system	system code	target turnover date to MSU (prelim - to be confirmed)	notes	major system start up category
35	34	M4009	mechanical	vacuum cleaning	PMC	6/1/93	bag house ready to come on line.	
36	35							

B

	oen	level 1	level 2	level 3	level 4	level 5
1	1	a) Plant #4 start up				
2	2		(1) 100 - Control system start up			
3	3			(a) Bailey systems software		
4	4		(2) 200 - Cooling tower system start up			
5	5			(a) Mechancial construction systems		
6	6				i) wsc - raw water system - make up water to hrc system	
7	7				ii) hrc - circulating water systems	
8	8				iii) fpu - fire protection system	
9	9				iv) hre - chemical feed systems	
10	10				v) cab - instrument air system	
11	11				vi) cab - control air system	
12	12				vii) etc.	
13	13			(b) Electrical construction systems		
14	14				i) High voltage system	
15	15				ii) Low voltage system	

	oen	level 1	level 2	level 3	level 4	level 5
16	16				iii) Control system	
17	17			(c) dcs systems		
18	18				i) Software system	
19	19			(d) Calgon system		
20	20		(3) 300 - Turbine system start up			
21	21			(a) Mechanical construction systems		
22	22				i) sgg - main steam system	
23	23				ii) tea - extraction steam	
24	24				iii) hrc - circulating water system	
25	25				iv) hra - condensate systems	
26	26				v) cab - instrument air system	
27	27				vi) ecb - closed cooling water system	
28	28				vii) cab - control air system	
29	29			(b) Electrical construction systems		
30	30				i) High voltage system	

	oen	level 1	level 2	level 3	level 4	level 5
31	31				ii) Low voltage system	
32	32				iii) Control system	
33	33				iv) Relaying system- multilin electrical relaying system	
34	34				v) etc.	
35	35			(c) dcs systems		
36	36			(d) General Electric systems		
37	37				i) Turbine systems	
38	38					(1) Lube oil system
39	39					(2) Control oil system
40	40				ii) Generator systems	
41	41				iii) etc.	
42	42		(4) 400 - Boiler system start up			
43	43			(a) Mechanical construction systems		
44	44				i) ecb - closed cooling water system	
45	45				ii) cab - control air system	

	oen	level 1	level 2	level 3	level 4	level 5
46	46		(5) 500 - Bag house system start up			
47	47			(a) Mechanical construction systems		
48	48				i) cab - instrument air system	
49	49				ii) asg - ash collection	
50	50				iii) ecb - closed cooling loop system	
51	51				iv) cab - control air system	
52	52			(b) Electrical construction systems		
53	53			(c) dcs systems		
54	54			(d) Environmental Elements systems		
55	55		(6) 600 - Continuous emissions monitoring system			
56	56			(a) Environmental Elements systems		
57	57			(b) Mechanical construction systems		
58	58				i) cab - control air system	
59	59			(c) Electrical construction systems		

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October 18, 1992

Subject: Monitoring Report #23

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative
Roy Gies - MSU operations supervisor & start up manager

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, 323, 326, 329, 332, 333

Dates of meetings and monitorings:

October 6, 1992 (wd 451)
October 9, 1992 (wd 454)
October 15, 1992 (wd 458)
October 16, 1992 (wd 459)

159 working days remaining from am October 16, 1992 (wd 459) to pm June 1, 1993 (wd 618)

Those attending meetings:

Note: Some of those listed below were in meetings part time only

October 6, 1992 (wd 451)

- Robert Nestle - MSU director of engineering
- Robert Ellerhorst - MSU director of Utilities
- Dick Wever - MSU construction superintendent
- Roy Gies - MSU operations supervisor & start up manager
- Jim Simons - MSU field representative
- Dave Sadler - A/C project director
- Dave Munroe - A/C field superintendent
- John Hucul - A/C project manager
- Ralph J. Stephenson - consultant

October 9, 1992 (wd 454)

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- Dick Wever - MSU construction superintendent
- Roy Gies - MSU operations supervisor & start up manager
- Ralph J. Stephenson - consultant

October 15, 1992 (wd 458)

- Dick Wever - MSU construction superintendent
- Jim Simons - MSU field representative
- Roy Gies - MSU operations supervisor & start up manager
- Ralph J. Stephenson - consultant

October 16, 1992 (wd 459)

- Dick Wever - MSU construction superintendent
- Jim Simons - MSU field representative
- Roy Gies - MSU operations supervisor & start up manager
- Ralph J. Stephenson - consultant

Documents used in discussions:

- Sheet #01, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #02, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #03, issue 6, dated July 07, 1992 (wd 387) - Chemical/electrical building
- Sheet #04, issue 6, dated July 07, 1992 (wd 387) - Turbine generator, interior metal walls, roofing and exterior vertical close in
- Sheet #05, issue 6, dated July 07, 1992 (wd 387) - Coal conveyor, fire protection systems, and cooling tower
- Sheet #06, issue 6, dated July 14, 1992 (wd 392) - Electrical construction
- Sheet #07, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work
- Sheet #08, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #09, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #10, issue 6a dated August 25, 1992 (wd 421) - Fabric filter building - for issue
- Sheet #11, issue 6 dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
- Sheet #12, issue 6, dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
- Sheet #sg1, issue 3, dated October 9, 1992 (wd 454) - Steam generator startup work - issued for information only
- Sheet sm1, issue 3, dated October 9, 1992 (wd 454) - Start up master network summary plan - issued for information only,

Actions taken:

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October 6, 1992 (wd 451)

- Continued setting major systems to be used to plan the start up sequence.
- Reviewed how new turbine could be brought on line at early date.
- Discussed turnover package concept, and the process for implementation.
- Discussed interrelating Bailey controls system to start up elements.
- Discussed how start up packet system will be implemented.
- Continued setting startup network model format with Roy Gies.

October 9, 1992 (wd 454)

- Updated summary startup network model.
- Continued preparing master startup laundry list.
- Continued preparing steam generator startup network model.
- Continued preparing master electrical equipment laundry list (name revised to master equipment laundry list).
- Set preliminary coding systems to be used for startup.

October 15, 1992 (wd 458)

- Reviewed current status of project with various project team members.
- Reviewed contractor's work scope with Mr. Wever and Mr. Simons.
- Continued reviewing and tabulating startup operations to be managed by Mr. Gies.
- Discussed startup staffing for MSU, Black and Veatch, and the contractors.

October 16, 1992 (wd 459)

- Completed issue #3 network model of steam generator ready for MSU internal review.
- Reviewed methods of continuing planning efforts on startup with MSU, Black and Veatch, and the contractor group.
- Began detailed planning of the turbine generator startup with Mr. Gies.

Summary:

October 6, 1992 (wd 451)

This meeting was primarily to discuss the overall format and major power plant systems within which startup planning was to proceed. In very broad terms the sequence will be as follows, with the start of installation in sequential order except as noted.

1. Building and structural systems - now in work.
2. UPS and control systems - concurrent with item #1.
3. Heat rejection (cooling) system - concurrent with items #1 & 2.
4. Steam generator (boiler) system - concurrent with earlier items.

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October 18, 1992

5. Combustion cleaning (bag house) system - concurrent with earlier items.
6. Turbine generator system - starts generally with combustion cleaning work.
7. Continuous emissions monitoring system - concurrent with earlier items.

This narrative sequence is displayed graphically in the unquantified network model show on sheet #sm1, issue 2, dated October 9, 1992 (wd 454). A copy is enclosed with this report for your reference use. This summary plan of work was prepared in meetings subsequent to October 6, 1992 (wd 451) as the detailed startup planning proceeded.

The startup card and package system for turning over the constructed building to the start up team was discussed in detail. This work is currently being planned by the design, fabricate and install (dfi) contractors, and by Alberici/Clark, all in conjunction with the MSU construction staff.

The line of demarcation (red stirrer) where startup begins is still being held as the point where the turnover package is provided to Mr. Roy Gies by Mr. Jim Simon. Details of subsequent processing of this turnover packet are presently being refined by Mr. Munroe and Mr. Hucul of Alberici/Clark, and will be discussed at subsequent meetings as the job progresses.

The role of Black and Veatch, the architects/engineers of record, is still under discussion and will also be reviewed as startup planning and building work close out proceeds.

Of great importance is the need to early on establish a well defined process of correcting building and dfi contract deficiencies that may be needed as startup proceeds. Mr. Munroe of Alberici/Clark is reviewing the correction system now.

The intent of Alberici/Clark is to provide the MSU startup team with the first turnover packet in January or February, 1993. This date will be defined as the building is closed in and work on the early dfi items proceeds.

Alberici/Clark and MSU staff discussed a tagging system that would identify, in the plant, all items that are turned over to the MSU startup team. Such a system would apparently be of great help to MSU, A/C, and B&V.

October 9, 15, 16, 1992 (wds 454, 458 and 459)

These meetings were primarily to work with the MSU startup management group to refine earlier startup material. Most of the sessions were devoted to preparing the start up laundry lists, continuing to identify equipment to be installed in the plant, and setting the master systems coding so as to provide a common language for all involved.

The start up laundry lists from which detailed startup planning to the right of the red stirrer proceeds is classified under the following main groupings:

I. Level 1 systems

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A. Plant #4 start up

II. Level 2 systems

A. Controls system (cox)

B. Heat rejection system (cooling) (hrx) - other associated master systems include apx/ bsx/ cox/ dpx/ ecx/ fwx/ sax/ scx/ wsx/

C. Steam generation system (boiler) (sgx) - other associated master systems include apx/ asx/ bmx/ cax/ ccx/cem/ chx/ cox/ ecx/ fgx/ fwx/ hrx/ ppx/ scx/ sax/ wsx/

D. Turbine generator system (tgx) - other associated master systems include apx/ bsx/ cox/ dpx/ ecx/ eex/ gtx/ hrx/ ppx/ sax/ tex/ wsx/

E. Combustion cleaning system (bag house) (ccx) - other associated master systems to be identified.

F. Continuous emissions monitoring (cox) - other associated master systems to be identified.

G. Buildings & structures systems (bsx) - other associated master systems to be identified.

The abbreviations being used by the startup team are derived from the Black and Veatch construction drawings, and conform in general to these for ease of reference. The main systems abbreviations consist of two letters describing the system, i. e. *tg* for turbine generator, with an x at the end to designate it is a level 2 broad classification directly under the plant start up level 1 designation.

The full level 2 systems designations from the startup master list are as follows:

apx	auxiliary power supply
asx	ash handling
bmx	bulk materials (other than coal)
bsx	buildings and structures
cax	compressed air
ccx	combustion gas cleaning and exhaust
cfx	construction facilities
cgx	compressed gas storage
chx	coal handling
cmx	communication
cox	control
dpx	drains & plumbing
ecx	equipment cooling
eex	electrical

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fgx	fuel gas
fpx	fire protection
fwx	feedwater
gtx	generator terminal
hrx	cycle heat rejection
inx	information
ltx	lighting
pmx	plant maintenance
ppx	primary power supply
sax	sampling and analysis
scx	space conditioning
sgx	steam generation
stx	site
tex	turbine extraction
tgx	turbine generator
wsx	water supply and storage
wwx	waste collection and treatment

Under each of the level 2 systems elements are other more detailed systems identifications which will be used to further define the work scope of activities in the network models and schedules.

At our meetings on the above dates, Mr. Gies and I continued upgrading the master equipment list, adding input and output numbers and other data as it is used in our planning. The equipment list is not attached to this report since it is very large and technically detailed. Copies however will be provided on request to those desiring them. Please contact Mr. Gies or Mr. Simons for further information.

At subsequent meetings we will further determine how startup material is to be disseminated.

General:

Our next startup planning meeting has been set for Thursday, October 29, 1992 (wd 468), and will focus on preparing network models for the remaining major level 2 systems. Mr. Gies will work on the laundry lists for these system startups prior to the meetings.

On November 5, 1992 (wd 475), Mr. Gies and I will again meet and complete our work sufficient to discuss the start up process in detail with the MSU, Black and Veatch, Alberici/Clark, and dfi contractors as needed. This detail meeting is currently set for Friday, November 6, 1992 (wd 474).

All parties should prepare for the detail meeting through pre meeting study and review of their respective responsibilities and desires so as to make the turnover packet and subsequent startup proceed as smoothly and as trouble-free as possible. Mr. Gies and I will establish a suggested agenda for this meeting and discuss it with Mr. Ellerhorst, Mr. Wever. and Mr. Simons.

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Attached to this report are copies of the master summary startup network model sheet #sm1, issue 3, dated October 9, 1992 (wd 454), and the detailed boiler startup network model, sheet #sg1, issue 3. dated October 9, 1992 (wd 454). Further distribution of this report and the attached models will be by Mr. Nestle, Mr. Wever, Mr. Simons, and Mr. Gies as they desire.

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November 27, 1992

Subject: Monitoring Report #24

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative
Roy Gies - MSU operations supervisor & start up manager

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, 323, 326, 329, 332, 333

Dates of meetings and monitorings:

October 29, 1992 (wd 468)
November 4, 1992 (wd 472)
November 5, 1992 (wd 473)
November 6, 1992 (wd 474)
November 11, 1992 (wd 477)
November 23, 1992 (wd 485)

• *130 working days remaining from am November 27, 1992 (wd 488) to pm June 1, 1993 (wd 618)*

Those attending meetings:

Note: Some of those listed below were in meetings part time only

Thursday, October 29, 1992 (wd 468)

Roy Gies - Start up manager - MSU
Dick Wever - Construction superintendent - MSU
Ralph J. Stephenson - Consultant

Wednesday, November 4, 1992 (wd 472)

Roy Gies - Start up manager - MSU

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Dick Wever - Construction superintendent - MSU
Ralph J. Stephenson - Consultant

Thursday, November 5, 1992 (wd 473)

Roy Gies - Start up manager - MSU
Ralph J. Stephenson - Consultant

Friday, November 6, 1992 (wd 474)

Dave Monroe - Alberici/Clark
John J. Hucul - Alberici/Clark
Pete Theis - Tampella
Dick Wever - MSU construction
Charles Griffin - Environmental Elements
Pete Sternisha - General Electric
Jim Simons - MSU construction
Phil Dimitry - Black & Veatch
Ron McClintic - MSU utilities
Doug MacDonald - MSU utilities
Roy Gies - MSU utilities - start up manager
Ralph J. Stephenson - consultant

Wednesday, November 11, 1992 (wd 477)

Roy Gies - Start up manager - MSU
Ron McClintic - Technical Supervisor - MSU - in late am & pm
Ralph J. Stephenson - Consultant

Monday, November 23, 1992 (wd 485)

Ron McClintic - Technical Supervisor - MSU
Ralph J. Stephenson - Consultant

Documents used in discussions:

- Sheet #01, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #02, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #03, issue 6, dated July 07, 1992 (wd 387) - Chemical/electrical building
- Sheet #04, issue 6, dated July 07, 1992 (wd 387) - Turbine generator, interior metal walls, roofing and exterior vertical close in
- Sheet #05, issue 6, dated July 07, 1992 (wd 387) - Coal conveyor, fire protection systems, and cooling

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November 27, 1992

tower
• Sheet #06, issue 6, dated July 14, 1992 (wd 392) - Electrical construction
• Sheet #07, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work
• Sheet #08, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
• Sheet #09, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
• Sheet #10, issue 6a dated August 25, 1992 (wd 421) - Fabric filter building - for issue
• Sheet #11, issue 6 dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
• Sheet #12, issue 6, dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
• Sheet #sg1, issue 3, dated October 9, 1992 (wd 454) - Steam generator startup work - issued for information only
• Sheet sm1, issue 3, dated October 9, 1992 (wd 454) - Start up master network summary plan - issued for information only
• Sheet #sg1, issue #5, dated November 04, 1992 (wd 472)

Issued at November 6, 1992 (wd 474) meeting & in use as of then

• Sheet #sg1, iss #5, dated November 4, 1992 (wd 472) - Steam Generator Startup
• Sheet #tg1, iss #5, dated November 4, 1992 (wd 472) - Turbine Generator Startup
• Sheet #tg2, iss #5, dated November 4, 1992 (wd 472) - Turbine Generator Startup
• Sheet #hr1, iss #5, dated November 5, 1992 (wd 473) - Heat Rejection System Startup
• Sheet #sm1, issue #5, dated November 5, 1992 (wd 473) - Summary Startup
• Issue #5, dated November 5, 1992 (wd 473) - Bar chart translation of startup models except sm1

Actions taken:

Thursday, October 29, 1992 (wd 468)

• Continued preparing steam generator and turbine generator start up network models.

Wednesday, November 4, 1992 (wd 472)

• Continued preparing systems start up network models.

Thursday, November 5, 1992 (wd 473)

• Completed preparing start up networks for discussion meeting on Friday, November 6, 1992 (wd 474).
• Prepared bar chart translation of start up network models.
• Duplicated all presentation material for meeting on Friday, November 6, 1992 (wd 474).

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November 27, 1992

Friday, November 6, 1992 (wd 474)

- Presented issue #5 start up network models and bar chart translation to major members of the total project team.
- Discussed methods of checking, commenting on, and updating start up network models.
- Discussed relation of the turnover packet to the start up process.

Wednesday, November 11, 1992 (477)

- Reviewed controls start up with Roy Gies and Ron McClintic.
- Continued preparation of laundry lists and models of major systems start up with Roy Gies.
- Set procedures for near future meetings to be held on control installation and start up.
- Reviewed current status of master equipment list and gave updated list dated November 10, 1992 (wd 476) to those attending.
- Briefly discussed start up information distribution methods.

Monday, November 23, 1992 (wd 485)

- Reviewed start up material and turnover package with Roy McClintic.
- Continued updating master equipment list.
- Prepared typical dcs installation network model.
- Discussed duties of various members of MSU startup teams and how they interact.
- Discussed start up systems classification methods.

Summary:

Thursday, October 29, 1992 (wd 468)

Mr. Roy Gies and I continued preparing start up network models for presentation to the full project team on Friday, November 6, 1992 (wd 474). The prime systems concentration was on the steam generator (sgx) and the turbine generator (tgx).

As planning work proceeded we continued to update the master equipment list and to identify as many of the design, construction, start up and operation system designations as possible.

Wednesday, November 4, 1992 (wd 472)

Mr. Gies and I continued the planning that was in progress on Thursday, October 29, 1992 (wd 468). We proceeded on the assumption that the work at this, and at near future start up meetings, would be subject to technical and higher management review and comment.

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November 27, 1992

The networks were built on the basis of construction completion targets that are in accordance with our current understanding for project construction work. These dates should be checked for validity by the design and the construction group.

Thursday, November 5, 1992 (wd 473)

Mr. Gies and I completed preparing and duplicating start up networks for the discussion meeting to be held on Friday, November 6, 1992 (wd 474).

Friday, November 6, 1992 (wd 474)

This meeting was to present the initial start up planning work to those most directly concerned with the turnover of the plant to MSU. The material presented included the following:

- Steam Generator Start Up - sht #sg1, issue #5, dated 11/04/92 (wd 472)
- Turbine Generator Start Up - sht #tg1, issue #5, dated 11/04/92 (wd 472)
- Turbine Generator Start Up - sht #tg2, issue #5, dated 11/04/92 (wd 472)
- Heat Rejection System Start Up - sht #hr1, issue #5, dated 11/05/92 (wd 473)
- Summary Start Up - sht #sm1 - issue #5, dated 11/05/92 (wd 473)
- Bar chart of network models issued, except sm1.

It was emphasized in the meeting that the start up dates selected were to provide a starting point for ongoing discussions. However it was also pointed out that we had used dates we understand are current project requirements.

During our meeting the dfi contractors and others affected were asked to return their comments on the start up plans to Mr. Roy Gies by Friday, November 13, 1992 pm (wd 480).

The management structure for the start up was reviewed, and is presently as follows:

- Mr. John Hucul is in charge of Alberici/Clark total project management work. This includes responsibility for dfi contractor operations that are part of Alberici/Clark's contract. He will prepare and check the turnover packet material. He will then turn it over to Mr. Jim Simons when the work described in the packet is complete.

- Mr. Jim Simons is in charge of power plant #4 construction for MSU. The turnover packet will be given to him by Mr. Hucul of Alberici/Clark for checking and validation. After checking the packet and finding it satisfactory, Mr. Simons will pass the packet along to the start up manager, Mr. Roy Gies.

- Mr. Gies is in charge of the entire MSU start up process and will work with Mr. Simons and Mr. Hucul to insure that the turnover packet, the start up process and the obligations of all contractors are properly interconnected, implemented and that the plant is successfully brought on line.

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A full description of the turnover packet system is being prepared by Alberici/Clark. I suggest we obtain their recommended procedures and discuss the material in detail within the next month. This will then allow Mr. Jim Simons, Mr. Roy Gies, Mr. Ron McClintic, and Mr. Rick Johnson to continue work on the start up planning.

We concluded the discussion with a brief description of the coding systems being used by the various parties to the contract. These are being brought together by Mr. Gies and Mr. McClintic into a full master reference list that will be issued as work proceeds. A copy of the current abbreviation and systems designation list is attached to this report for your information (attachment A).

The work to be addressed next by Mr. Gies and I is to review comments on the start up plans presented at this meeting and to complete the remaining major systems network models for start up.

Wednesday, November 11, 1992 (wd 477)

This meeting was primarily to continue work on preparing the start up network models for the major systems and to begin interfacing these with installation of the control systems. We also discussed the methods of reviewing and approving or accepting the start up plans.

Mr. Gies and Mr. McClintic feel that Black and Veatch, as the design engineer & architect on the project, will probably be involved in the start up process. It would be desirable to determine how and when they will be needed so plans can be made now for their participation.

Mr. Gies, Mr. McClintic, and I briefly discussed start up information distribution methods. Mr. Gies had an initial discussion meeting with Tampella on November 10, 1992. Those attending the session included Mr. Dan Hurley, TAM project manager, and Mr. Pete Theis, TAM senior field engineer

Mr. Gies said they discussed some preliminary logic shifts, additions & deletions to the start up network. We will defer updating, however, until a full critique is provided by Tampella.

Apparently Tampella has prepared and provided a start up letter containing information about:

- Start up milestones
- Equipment requirements
- Sequencing of start up
- Duration of start up activities
- Start up items by others than Tampella Power
- Training

I suggest that Mr. Simons, Mr. Gies and the others participating in the above activities review this

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letter in detail, and compare it to the sequencing of start up presently being planned by the start up team.

During our meeting Mr. Gies and I compared the anticipated needed dates in the issue #5 start up network models with the preliminary mechanical systems turnover dates given to MSU by Alberici/Clark in our meeting on September 11, 1992. A copy of the tabulation, labeled attachment B, is attached to this report for your information.

It appears presently that there is a reasonably close meshing of completion dates for various mechanical systems with start up needs as presently defined. These start up needs and the turnover dates will be further checked as planning proceeds.

Considerable work is yet to be done on the start up modeling including:

- Planning fabric filter startup.
- Reviewing and planning training needs.
- Completing dcs systems planning.
- Completing cem systems planning.
- Reviewing and integrating software & hardware design into start up plans.
- Completing Bailey work plans.

Monday, November 23, 1992 (wd 485)

Mr. McClintic and I concentrated on updating the master equipment list, identifying the dcs and motor control work related to control systems in general, and preparing a start up network model for a typical dcs. A copy of the master equipment list was given to Mr. McClintic. He will distribute the list to those needing it. Because of its size and complexity the list is not attached to this report. If a copy is desired please contact Mr. McClintic or me.

A portion of our work also was focussed on how to best identify start up codes, abbreviations, definitions and systems designations so they can be easily cross referenced. Presently the equipment and systems information is stored in several information locations or drawers. These include the designer drawer, the dfi drawer, the installer's drawer, the MSU construction drawer, the MSU utilities start up drawer, the separate contractor drawer, and the MSU utilities operational drawer.

We need to insure that during the design, construction and startup period, and in the operational mode, information and documentation about plant elements can be cross referenced for ease of discussion and tracking.

At this session Mr. McClintic and I began preparing Bailey control network models to set interfaces with main systems. A copy of the dcs installation network template is enclosed with this report as attachment C.

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General:

Our next start up planning session is currently set for Monday, December 4, 1992 (wd 493) at the MSU physical plant building. I recommend we address the following:

- Prepare the network plan for fabric filter startup
- Incorporate training actions in the start up plans for each system
- Continue dcs systems planning
- As appropriate, tie remaining control software & hardware design into start up plans.

In addition we should decide on the process by which the turnover packet moves from contractor to MSU construction, to MSU startup team, back to the contractor and then back through the cycle.

This is a process not yet fully understood by all involved.

Attachments
A • List of abbreviations
B • Start up date check
C • DCS controls template

Ralph J. Stephenson, P. E.

	abb	meaning	type	source	b&v des	sort code
1	a/c	Alberici/Clark	org	rjs		alber
2	abb	Abbreviations	gen	rjs		abbre
3	abo	Anchor bolts	sub	rjs		ancho
4	ac	alternating current	tec	rjs		alter
5	ac	ac - alternating current ?	tec	rjs		alter
6	act	action	gen	rjs		actio
7	acu	alternating current - second choice abb	tec	rjs		alter
8	alm	Almet, Inc.	org	rjs		alme
9	apa	ac power supply (120v/240v)	sys	b&v	.0401	acpow
10	apb	ac power supply (120v/208v)	sys	b&v	.0402	acpow
11	apc	ac power supply (480v)	sys	b&v	.0403	acpow
12	apd	ac power supply (4160v)	sys	b&v	.0404	acpow
13	aph	dc power supply	sys	b&v	.0408	dcpow
14	api	Ash pit	sub	rjs		ashpi
15	api	essential service ac	sys	b&v	.0409	essea
16	apj	essential service dc	sys	b&v	.0410	essed
17	apx	auxiliary power supply - generic	sys	b&v	.0400	auxil
18	asf	combustion waste storage	sys	b&v	.0206	combw
19	asg	ash collection	sys	b&v	.0207	ashco
20	asx	ash handling - generic	sys	b&v	.0200	ashha
21	b&v	Black & Veatch	org	rjs		black
22	bai	Bailey Controls	org	rjs		baile
23	bfw	boiler feed water	tec	rjs		boile
24	bkf	Backfill	sub	jsi		backf
25	bmd	limestone handling	sys	b&v	.1004	limes
26	bme	inert bed material handling	sys	b&v	.1005	inert
27	bmx	bulk materials (other than coal) - generic	sys	b&v	.1000	bulkm
28	brk	breaker?	equ	rjs		break
29	bsa	generation building	sys	b&v	.0801	gener
30	bsb	air quality control building	sys	b&v	.0802	airqu
31	bsh	circulating water	sys	b&v	.0808	circw
32	bso	water treatment building	sys	b&v	.0815	water
33	bsx	buildings and structures - generic	sys	b&v	.0800	build
34	bva	Bruce Van Heest - B&V proj & struct engr	ind	rgi		vanhe
35	c/e	chemical/electrical building	tec	rjs		chemi
36	caa	station air	sys	b&v	.1801	stati
37	cab	control air	sys	b&v	.1802	contr
38	cac	corrective action	sub	jsi		corre
39	cac	soot blowing air	sys	b&v	.1803	sootb
40	cai	Caissons	sub	jsi		caiss

	abb	meaning	type	source	b&v des	sort code
41	cax	compressed air - generic	sys	b&v	.1800	compa
42	ccb	particulate removal	sys	b&v	.1402	parti
43	cce	induced draft	sys	b&v	.1405	induc
44	ccx	combustion gas cleaning and exhaust - generic	sys	b&v	.1400	combu
45	cei	Carl Eigenauer, MSU campus fire marshall	ind	jsi		eigen
46	cem	continuous emissions monitoring - see cog & cex	tec	rjs		conti
47	cex	continuous emissions system - generic	sys	rjs	.5201	conti
48	cfa	construction power	sys	b&v	.2201	consp
49	cfb	construction water	sys	b&v	.2202	consw
50	cfd	construction security	sys	b&v	.2204	conss
51	cfe	construction lighting	sys	b&v	.2205	consl
52	cfi	construction laydown and storage	sys	b&v	.2209	consl
53	cfx	construction facilities - generic	sys	b&v	.2200	consf
54	cgc	chlorine storage	sys	b&v	.2003	chlor
55	cgx	compressed gas storage - generic	sys	b&v	.2000	compg
56	chc	in plant coal storage	sys	b&v	.1203	inpla
57	chd	coal handling	sys	b&v	.1204	coalh
58	chf	coal dust control	sys	b&v	.1206	coald
59	chx	coal handling - generic	sys	b&v	.1200	coalh
60	circ	circulating water - 2nd choic abb	gen	rjs		circw
61	cma	plant communication	sys	b&v	.1601	planc
62	cmx	communication - generic	sys	b&v	.1600	commu
63	coa	plant control	sys	b&v	.2401	planc
64	coc	unit protection	sys	b&v	.2403	unitp
65	cog	continuous emissions monitoring	sys	b&v	.2407	conte
66	col	column	tec	rjs		colum
67	cox	control - generic	sys	b&v	.2400	contr
68	css	?	tec			tec
69	csx	CSX Transportation	org	rjs		csxtr
70	ct	current transformers	equ	rjs		curre
71	cto	cooling tower	equ	rjs		cooli
72	cto	cooling tower	tec	rjs		cooli
73	d&b	Design & Build	org	rjs		desig
74	dafd	detail, approve, fab & deliver	gen	rjs		detai
75	dafd	detail, approve, fabricate & deliver	gen	rjs		detai
76	dba	Duct bank	sub	jsi		ductb
77	dca	David Campbell - B&V mech engr	ind	rgi		campb
78	dcl	Don Clendenan - MSU shift first engineer	ind	rjs		clend
79	dcr	Daily construction report	dty	jsi		daily
80	dcr	Daily concrete report	sub	jsi		daily

	abb	meaning	type	source	b&v des	sort code
81	dcr	Daily concrete report	dty	jsi		daily
82	dcs	distributed control system	tec	rjs		distr
83	ddp	Date document prepared	gen	jsi		dated
84	ddr	Date document received	gen	jsi		dater
85	del	Dean Ely - TPC project manager	ind	rjs		elyde
86	demin	demineralizer	equ	rjs		demin
87	dfi	design, furnish & install	gen	rjs		design
88	dim	Dimension	sub	jsi		dimen
89	din	Document in	gen	jsi		docui
90	dma	Douglas MacDonald, MSU design coordinator	ind	rjs		macdo
91	dmc	Douglas MacDonald - MSU mech engr	ind	rgi		macdo
92	dmo	Dave Monroe - A/C field suptd	ind	rgi		monro
93	dou	Document out	gen			docuo
94	dpa	building drains and plumbing	sys	b&v	.2801	build
95	dpx	drains & plumbing - generic	sys	b&v	.2800	drain
96	dsa	David Sanger - MSU construction inspector	ind	rjs		sange
97	dsp	Don Spruit - D&B estimator	ind	jsi		sprui
98	dty	document type	gen	rjs		docut
99	dwg	drawing	sub	jsi		drawi
100	ecb	closed cycle cooling water	sys	b&v	.3202	close
101	ecx	equipment cooling - generic	sys	b&v	.3200	equip
102	eea	freeze protection	sys	b&v	.3001	freez
103	eeb	grounding	sys	b&v	.3002	groun
104	eec	raceway	sys	b&v	.3003	racew
105	eed	cathodic protection	sys	b&v	.3004	catho
106	eel	Environmental Elements	org	rjs		envir
107	eex	electrical - generic	sys	b&v	.3000	elecg
108	ele	electrical	sub	rjs		elect
109	elv	elevator	equ	rjs		eleva
110	equ	equipment	gen	rjs		equip
111	ess	essential systems	tec	rjs		essen
112	fab	fabricate	gen	rjs		fabri
113	fec	Fuel Economy	org	rjs		fuele
114	ffb	fabric filter building	loc	rjs		fabri
115	ffb	fabric filter building	tec	rjs		fabri
116	fga	fuel gas supply	sys	b&v	.3801	fuelg
117	fgx	fuel gas - generic	sys	b&v	.3800	fuelg
118	fhy	fire hydrant	sub	rjs		fireh
119	fms	forms	sub	rjs		forms
120	fpr	fire protection	sub	rjs		firep

	abb	meaning	type	source	b&v des	sort code
121	fpx	fire protection - generic	sys	b&v	.3600	firep
122	fwa	boiler feed water	sys	b&v	.3401	boile
123	fwc	condensate	sys	b&v	.3403	conde
124	fwe	cycle chemical feed	sys	b&v	.3405	cycle
125	fwf	cycle makeup and storage	sys	b&v	.3406	cycle
126	fwg	attemporator spray water	sys	b&v	.3407	attem
127	fwh	desuperheater spray water	sys	b&v	.3408	desup
128	fwx	feedwater - generic	sys	b&v	.3400	feedw
129	gbe	Grade beam	sub	rjs		grade
130	gda	Gil Davis - MSU shift first engineer	ind	rjs		davis
131	gec	General Electric Corporation	org	rjs		gener
132	gen	general abbreviation	typ	rjs		genea
133	gen	General document type	gen	rjs		gener
134	gen	generator	equ	rjs		gener
135	geo	Geotechnical reports	sub/dty	rjs		geote
136	ghe	Gas heater	sub	rjs		gashe
137	gpm	general project manager - Alberici/Clark	org	rjs		genep
138	gro	Grouding	sub	rjs		groun
139	gta	generator bus duct	sys	b&v	.4201	gened
140	gtc	generator surge protection	sys	b&v	.4203	genes
141	gtd	generator neutral grounding	sys	b&v	.4204	genen
142	gtr	Generator	sub	rjs		gener
143	gtx	generator terminal - generic	sys	b&v	.4200	gener
144	hdr	circulating water makeup	sys	b&v	.2604	circm
145	hra	condensing	sys	b&v	.2601	conde
146	hrc	circulating water	sys	b&v	.2603	circw
147	hre	circulating water chemical feed	sys	b&v	.2605	circc
148	hrx	cycle heat rejection - generic	sys	b&v	.2600	cycle
149	idr	Individual from	gen	rjs		indif
150	idt	individual to	gen	rjs		indit
151	imc	Industrial Mechanical Contractors	org	rjs		indus
152	imp	Impact	sub	rjs		impac
153	ind	Individual	gen	rjs		indiv
154	ind	vibration monitoring	sys	b&v	.4404	vibra
155	inx	information - generic	sys	b&v	.4400	infor
156	jhu	Jack Hubbard - MSU shift first engineer	ind	rjs		hubba
157	jhu	John Hucul - A/C project manager	ind	rgi		hucul
158	jka	John Kaman - B&V elect engr	ind	rgi		kaman
159	jsc	James Schaibly - D&B field superintendent	ind	rjs		schai
160	jsi	James Simons - MSU const. rep	ind	rjs		simon

	abb	meaning	type	source	b&v des	sort code
161	kcl	Kent Clark - United Excavators	ind	rjs		clark
162	kgr	Ken Green - MSU maint supvr util	ind	rgi		green
163	lay	Layout	sub	rjs		layou
164	loc	location abbreviation	typ	rjs		locat
165	lta	generation building lighting	sys	b&v	.4601	geneb
166	ltr	air quality control bldg lighting	sys	b&v	.4602	airql
167	ltr	Letter	dty	rjs		lette
168	ltx	lighting - generic	sys	b&v	.4600	light
169	man	Manifest	sub/dty	rjs		manif
170	mcc	motor control center	tec/equ	rjs		motor
171	mec	Mechanical	sub	rjs		mecha
172	mem	Memorandum	dty	rjs		memor
173	mfc	make final connection	act	rjs		makef
174	min	Martin, International	ind	rjs		marti
175	mkr	M. Kroell - TDT	ind	rjs		kroel
176	mlt	Memo letter	dty	rjs		memol
177	msu	Michigan State University	org	rjs		michi
178	mtg	Meeting	sub	rjs		meeti
179	mxd	mixed	tec	rjs		mixed
180	n	north	gen	rjs		north
181	ofe	owner furnished equipment	gen	rjs		owner
182	ofr	Organization from	gen	rjs		orgaf
183	ois	Operator interface system	tec	rjs		opera
184	opis	Operator interface system	tec	rjs		opera
185	org	organization abbreviation	typ	rjs		orgaa
186	org	Organization	gen	rjs		organ
187	oto	Organization to	gen	rjs		orgat
188	pcd	Procedures	sub	rjs		proce
189	pcr	Phil Crockett - D&B president	ind	rjs		crock
190	pdi	Phil Dimitry - B&V proj mgr	ind	rgi		dimit
191	piv	post indicator valve	equ	rjs		posti
192	pla	Paul Larsen - SME senior associate	ind	rjs		larse
193	pma	chemical cleaning	sys	b&v	.4801	chemc
194	pmx	plant maintenance - generic	sys	b&v	.4800	planm
195	ppc	13.8 kv distribution system	sys	b&v	.5003	13.8 k
196	ppx	primary power supply - generic	sys	b&v	.5000	prima
197	prv	pressure relief valve	equ	rjs		press
198	pst	Plant start up	sys	rjs	.0100 x	plans
199	pth	Peter Thies - TAM senior field rep	ind	rjs		thies
200	qel	Quality Electric	org	rjs		quali

	abb	meaning	type	source	b&v des	sort code
201	que	Quality Electric - second choice abbreviation	org	rjs		quali
202	rel	Robert Ellerhorst - MSU director of power & water	ind	rjs		eller
203	rfi	Request for information	dty	rjs		reque
204	rgi	Roy Gies - start up manager	ind	rjs		giesr
205	rhi	Ron Hicks - B&V mechanical engineer	ind	rgi		hicks
206	rjo	Rick Johnson - MSU elect engr	ind	rgi		johns
207	rjs	Ralph J. Stephenson - consultant	ind	rjs		steph
208	rle	Robert Lee - MSU shift first engineer	ind	rjs		leero
209	rmc	Ron McClintic - MSU controls supervisor	ind	rgi		mccli
210	rne	Robert Nestle - MSU architectural manager	ind	rjs		nestl
211	roc	Report of contact	dty	rjs		repor
212	rof	Roofing	sub	rjs		roofi
213	rst	Resteel	sub	rjs		reste
214	rwe	Richard Wever - MSU construction superintendent	ind	rjs		wever
215	s	south	gen/tec	rjs		south
216	saa	comb. gases sampling & analysis	sys	b&v	.5201	combg
217	sac	steam cycle sampling & analysis	sys	b&v	.5203	steam
218	sad	circul. water sampling & analysis	sys	b&v	.5204	circw
219	sae	water supply sampling & analysis	sys	b&v	.5205	circw
220	saf	plant effluent sampling & analysis	sys	b&v	.5206	plane
221	saf	Safety	sub	rjs		safet
222	sax	sampling and analysis - generic	sys	b&v	.5200	sampl
223	sbm	Submittals	sub	rjs		submi
224	sca	gen. bldg. space conditioning	sys	b&v	.5601	gensp
225	sce	circ. water treatment bldg.	sys	b&v	.5605	circb
226	sch	Schedule	sub	rjs		sched
227	sco	Subject codes	gen	rjs		subje
228	scx	space conditioning - generic	sys	b&v	.5600	space
229	sew	Sewer	sub	rjs		sewer
230	sga	steam generator	sys	b&v	.5801	steam
231	sgb	combustion air	sys	b&v	.5802	comba
232	sge	igniter and auxiliary fuel	sys	b&v	.5805	ignit
233	sgf	boiler vents and drains	sys	b&v	.5806	boile
234	sgg	main steam	sys	b&v	.5807	mains
235	sgh	burner controls	sys	b&v	.5808	burne
236	sgi	soot blowing	sys	b&v	.5809	sootb
237	sgk	temporary blowout	sys	b&v	.5811	tempb
238	sgl	sncr system	sys	b&v	.5812	sncrs
239	sgx	steam generation - generic	sys	b&v	.5800	steam
240	shd	Shop drawings	sub/dty	rjs		shopd

	abb	meaning	type	source	b&v des	sort code
241	sme	Soils & Materials Engineers	org	org		soils
242	srd	Service road'	sub	rjs		servr
243	sst	Structural steel	sub	rjs		struc
244	sta	roads and parking	sys	b&v	.5401	roads
245	stf	grading, drainage, & landscaping	sys	b&v	.5406	gradi
246	stm	steam	tec	rjs		steam
247	stup	start up - 2nd choice	gen	rjs		start
248	stx	site - generic	sys	b&v	.5400	siteg
249	sup	start up	gen	rjs		start
250	tcd	Telephone conversation documentation	dty	rjs		telep
251	tdt	Thermal Dynamic Towers	org	rjs		therm
252	tea	extraction steam	sys	b&v	.6001	extrs
253	tec	extraction drains	sys	b&v	.6003	extrd
254	tec	technical abbreviation	typ	rjs		techn
255	ted	heater drains	sys	b&v	.6004	heatd
256	tef	heater vents & misc. drains	sys	b&v	.6006	heatv
257	tex	turbine extraction - generic	sys	b&v	.6000	turbe
258	tga	turbine	sys	b&v	.6201	turbi
259	tgb	generator and excitation	sys	b&v	.6202	genee
260	tgc	turbine seals and drains	sys	b&v	.6203	turbs
261	tgd	turbine lube oil	sys	b&v	.6204	turbl
262	tgf	turbine cntrl and instrumentation	sys	b&v	.6205	turbc
263	tgx	turbine generator - generic	sys	b&v	.6200	turbg
264	the	Temporary heat	sub	rjs		tempo
265	tpc	Tampella Power Corporation	org	rjs		tampe
266	trm	Transmittal	dty	rjs		trans
267	turb	turbine	equ	rjs		turbi
268	typ	type abbreviation	typ	rjs		typea
269	uex	United Excavators	org	rjs		unite
270	ups	uninterruptable power source	sys	rjs	.0409	unint
271	vlv	Valves	sub	rjs		valve
272	wes	Westinghouse	org	rjs		westi
273	wes	Westinghouse	org	rjs		westi
274	whp	Weather protection	sub	rjs		weath
275	wkj	Wayne Kjonaas - Director of Utilities - Purdue Univ.	ind	rjs		kjona
276	wpr	Water problems	sub	rjs		watep
277	wsc	service water	sys	b&v	.6603	servw
278	wsx	water supply and storage - generic	sys	b&v	.6600	water
279	wwc	wastewater collection & treatment	sys	b&v	.6403	wastc
280	wwd	oil spill prevention	sys	b&v	.6404	oilsp

	abb	meaning	type	source	b&v des	sort code
281	wwx	waste collection and treatment - generic	sys	b&v	.6400	waste

	oen	system level 2	system level 3	discipline	discipline system	tgt turnover date to MSU (to be confirmed)	expected stup date or ok as of 11/11/92	√'ed dates ok - as of 11/11/92	notes	b & v p&id #
1	1.0	bsx/	dpa/	mechanical	building drains & vents	11/27/92 ✓	11/27/93 ✓	√		M2029
2	2.0	bsx/	wsc/	mechanical	service water	11/27/92 ✗	11/27/93	√	Changed to 1/22/93 by dmo	M2012
3	3.0	bsx/	fpu/	mechanical	fire protection	2/1/93 ✓	2/1/93	√		M2012
4	4.0	bsx/	tef/	mechanical	heater vents & miscellaneous drains	11/27/92 ✗ WK	11/27/93	√	" 12/24/92	M2016
5	5.0	tgx/	ted/	mechanical	heater drains	11/27/92 ✗ WK	3/8/93	√	12/24/92	M2016
6	6.0	bsx/	sca/	mechanical	steam unit heaters & air handling unit	11/27/92 ✗	11/27/93	√	for partial use only - phase 1 - see also SCA phase 2	M2016
7	7.0	bsx/	cab/	mechanical	control air	2/12/93 ✓	2/12/93	√	1/1/93	M2010
8	8.1	tgx/	hrf/ hra	mechanical	condensate	3/5/93 ✓	3/8/93	√	see PMA systems	M2003
9	8.2	sgx/	hrf/fwc/ hra/	mechanical	condensate	3/5/93 ✓	6/1/93	√	see PMA systems	M2003
10	9.0	tgx/	hrf/ hra	mechanical	condensate air extraction	3/5/93 ✓	3/8/93	√		M2003
11	10.1	tgx/	hra/fwc/	mechanical	condensate	3/5/93 ✓	3/8/93	√		M2003
12	10.2	sgx/	hra/fwc/	mechanical	condensate	3/5/93 ✓	6/1/93	√		M2003
13	11.0	hrx/	hre/	mechanical	circulating water chemical feed	1/8/93 ✗	3/4/93	√	2/8/93	M2005
14	12.0	sgx/	fwe/	mechanical	cycle chemical feed	1/15/93 ✗	6/1/93	√	2/8/93	M2005
15	13.0	hrx/	hrc/	mechanical	circulating water	1/29/93 ✗	3/4/93	√	2/8/93	M2007
16	14.0	hrx/	ecb/	mechanical	closed cycle cooling water	1/15/93 ✗	3/4/93	√	2/12/93	M2006
17	15.0	bsx/	caa/	mechanical	station air	2/12/93 ✓	2/12/93	√		M2010
18	16.0	sgx/	pma/	mechanical	chemical clean	1/29/93 ✓	6/1/93	√	pre boiler chem clean - FWC, FWA & FWG - from 01/15/93 to 01/29/93	M2013
19	17.0	sgx/	fwg/	mechanical	attemporator spray water	3/5/93 ✓	6/1/93	√	see PMA systems	M2028
20	18.0	sgx/	fwa/	mechanical	feed water	3/5/93 ✓	6/1/93	√	see PMA systems	M2002
21	19.0	tgx/	fwh/	mechanical	desuperheater water	3/5/93 ✓	3/8/93	√		M2002
22	20.1	tgx/	fwf/	mechanical	demineralized water	3/5/93 ✓	3/8/93	√		M2003

listed in oen sequence - 67% - data as revised on 11/11/93 ✓ - disk 332

Comments by dmo @ mfg on 12/15/92

Can we do without lagging on pipe for this phase 1. (yes. all said OK

update to i2 on 12/15/92

3

i 1 dated 11/11/92

	oen	system level 2	system level 3	discipline	discipline system	tgt turnover date to MSU (to be confirmed)	expected stup date or ok as of 11/11/92	√'ed dates ok - as of 11/11/92	notes	b & v p&id' #
23	20.2	sgx/	fwf/	mechanical	demineralized water	3/5/93 ✓	6/1/93	√		M2003
24	21.1	tgx/	sac/	mechanical	sampling & analysis	3/5/93 ✓	3/8/93	√		M2014
25	21.2	sgx/	sac/	mechanical	sampling & analysis	3/5/93 ✓	6/1/93	√		M2014
26	22.0	sgx/	sgf/	mechanical	boiler drains & vents	4/9/93 ✓	6/1/93	√		M2023
27	22.1	sgx/	sge/	mechanical	natural gas	4/9/93 ✓	6/1/93	√	Complete as of 12/15/92	?
28	24.1	tgx/	sgg/	mechanical	main steam	4/9/93 ✓	3/8/93 8/10/93?	√?	from issue #5, sht sg1. Date set by activity SG032 at pm of 08/09/93	M2001
29	24.2	sgx/	sgg/	mechanical	main steam	4/9/93 ✓	6/1/93	√		M2001
30	25.1	tgx/	sgk/	mechanical	steam blow piping	4/16/93 ✓	3/8/93 7/12/93?	√?	from issue #5, sht sg1. Date set by activity SG031 at am of 07/12/93	M2025
31	25.2	sgx/	sgk/	mechanical	steam blow piping	4/16/93 ✓	6/1/93	√		M2025
32	26.0	tgx/	tec/	mechanical	extraction traps & drains	4/16/93 ✓	3/8/93 8/10/93?	√?	from issue #5, sht tg1. Date set by activity TG053 at am of 08/10/93	M2016
33	27.0	tgx/	tea/	mechanical	extraction steam	4/16/93 ✓	3/8/93	√?	turbine ready to go. from issue #5, sht tg1. Date set by activity TG053	M2016
34	28.0	bsx/	sca/	mechanical	building space conditioning	4/30/93 ✓	4/30/93	√	for phase 2 - see other SCA for phase 1	M2015
35	29.0	sgx/	cac/	mechanical	soot blower air	2/12/93 ✓	6/1/93	√		M2010
36	30.0	sgx/	chd/	mechanical	coal handling system	6/1/93 ✓	6/1/93	√	requires CHC	M?
37	31.0	sgx/	bmd/	mechanical	limestone handling	6/1/93 ✓	6/1/93	√		M2009
38	32.0	sgx/	bme/	mechanical	sand handling (inert)	6/1/93 ✓	6/1/93	√		?
39	33.0	sgx/	asg/	mechanical	ash collection	6/1/93 ✓	6/1/93	√		M2008
40	34.0	sgx/	asf/	mechanical	combustion waste storage	6/1/93 ✓	6/1/93	√		M2008
41	35.0	bsx/	pmc/	mechanical	vacuum cleaning	6/1/93 ✓	6/1/93	√	bag house ready to come on line.	M4009

DURATIONS SHOWN ASSUME NO RECYCLING OR TRACKING OF TURNOVER PACKET IS REQUIRED.

Beginning of start up is the point where the start up manager receives the initial turnover card (this is the card to be given to Roy Gies by Jim Simons that signifies all construction contract materials and equipment making up the system have been put in place in accordance with the construction contract requirements.)

NOTE:

Begining of dcs control systems start up determined by contract date for completion of ?. See list of contract dates.

•Mechanical construction

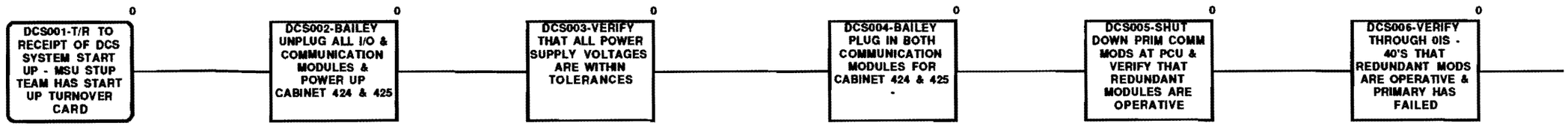
- **Closed cooling water system (HRX)**
- **Control air system (CAX)**
- **Controls (COX)**
- **House service air system (CAX)**
- **Soot blowing air system (CAX)**
- **Ash handling systems (ASX)**
- **Coal systems (CHX)**
- **Limestone systems (BMX)**
- **Inert bed systems (BMX)**
- **Natural gas systems (FGX)**
- **Sampling & analysis systems (SAX)**
- **Feed water systems (FWX)**
- **Mixed bed demineralizer (FWX)**
- **Building vents & drains (BSX)**
- **Boiler vents & drains (SGX)**

• Electrical construction

- **Primary power, 13.8 kv (PPX)**
- **High voltage systems, 4160 v (APX)**
- **Low voltage systems, 480 V (APX)**
- **Control systems, 120 v (COX)**
- **UPS systems, 120 v (APX)**
- **Direct current systems, 130 v (APX)**

Items to be installed or complete prior to beginning of start up operations for csx

- **dcs cabinet 424/425 set in position**
- **dcs cabinet 424/425 inputs & outputs terminated at both ends**
- **ups power available to cabinet**
- **cabinet tested to show no loops grounded to building steel**
- **dc ground terminated**
- **control room cables terminated to OIS - 40's**
- **communication loops identified & terminated**
- **OIS - 40's are operative for testing communications modules & graphic to configurations of each vendor's package (all construction)**



- DCS

- Software systems (COX)
- Hardware systems (COX)

- Controls

- Instrumentation piping & wiring (COX)

- Chemical

- Tanks, pumps, controls (COX, FWX, HRX)

- Boiler

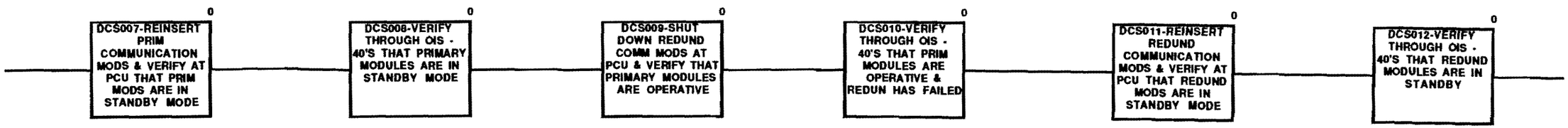
- Entire (SGX)

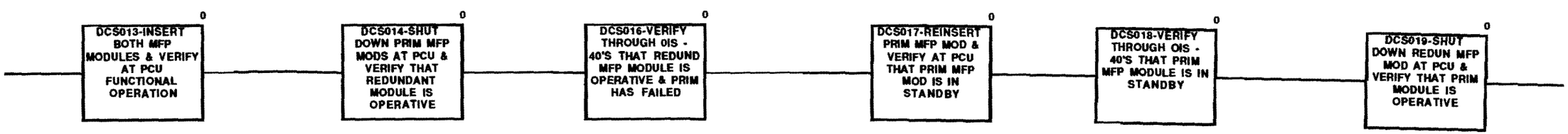
- Emissions

- Bag filter (CCX)
- ID fans (CCX)
- CEM system (COX)

Major systems abbreviations from B & V design documents

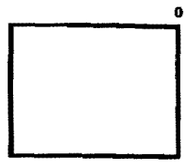
apx - auxiliary power supply
asx - ash handling sys
bmx - bulk materials (other than coal) sys
bsx - buildings and structures
cax - compressed air
ccx - combustion gas cleaning and exhaust
cem - continuous emissions monitoring
cfx - construction facilities
cgx - compressed gas storage
chx - coal handling
cmx - communication
cox - controls
denox - urea (sncr) system
dpx - drains & plumbing
ecx - equipment cooling
eex - electrical
fgx - fuel gas
fpx - fire protection
fwx - feed water
gtx - generator terminal
hrx - cycle heat rejection
inx - information
ltx - lighting
pmx - plant maintenance
ppx - primary power supply
sax - sampling & analysis
scx - space conditioning
sgx steam generation
stx - site
tex - turbine extraction
tgx - turbine generator
wsx - water supply & storage
wwx - waste collection & treatment




DCS013-INSERT BOTH MFP MODULES & VERIFY AT PCU FUNCTIONAL OPERATION
DCS014-SHUT DOWN PRIM MFP MODS AT PCU & VERIFY THAT REDUNDANT MODULE IS OPERATIVE
DCS016-VERIFY THROUGH OIS - 40'S THAT REDUND MFP MODULE IS OPERATIVE & PRIM HAS FAILED
DCS017-REINSERT PRIM MFP MOD & VERIFY AT PCU THAT PRIM MFP MOD IS IN STANDBY
DCS018-VERIFY THROUGH OIS - 40'S THAT PRIM MFP MODULE IS IN STANDBY
DCS019-SHUT DOWN REDUN MFP MOD AT PCU & VERIFY THAT PRIM MODULE IS OPERATIVE

Note: in systems id, letter x indicates system master id

SYSTEMS ID DURATION
EARLY START EARLY FINISH



LATE START LATE FINISH

Activity Key

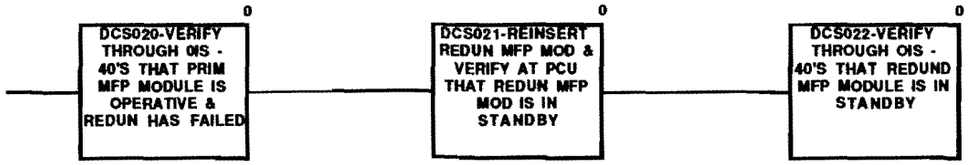
Reserved Activity Numbers

dcs041	dcs046
dcs042	dcs047
dcs043	dcs048
dcs044	dcs049
dcs045	dcs050

lan dcs001
han dcs

DCS START UP TEMPLATE

Issue #1, 2, 3 & 4 - not used
Issue #5 - November 23, 1992
i5 tgx stup - imw50% & stw60%lgl
disk 333



Network Model for T. B. Simon Power Plant Unit 4 Michigan State University East Lansing, Michigan

Robert Ellerhorst - Director of Utilities
Roy Gies - Start Up Manager
Ron McClintic -
Richard Wever - Construction Superintendent
Jim Simons - Construction Project Representative

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive
Mt. Pleasant, Michigan 48858
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Sheet #dcs1

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December 23, 1992

Subject: Monitoring Report #25

Project: Michigan State University
T. B. Simon Power Plant Unit 4 Addition
East Lansing, Michigan

To: Robert Nestle - MSU project manager
Richard Wever - MSU construction superintendent
Jim Simons - MSU project representative
Roy Gies - MSU operations supervisor & start up manager

From: Ralph J. Stephenson - Consultant

rjs project: 91:14

rjs disks: 253, 265, 281, 301, 303, 305, 308, 315, 318, 322, 323, 326, 329, 332, 333

Dates of meetings and monitorings:

Tuesday, December 15, 1992 (wd 500)
Monday, December 21, 1992 (wd 504)

• *112 working days remaining from am December 23, 1992 (wd 506) to pm June 1, 1993 (wd 618)*

Those attending meetings:

Note: Some listed below were in meetings part time only

Tuesday, December 15, 1992 (wd 500)

Bob Nestle - MSU project manager
Dick Wever - MSU construction
Jim Simons - MSU construction
Roy Gies - MSU utilities - start up manager
Dave Monroe - Alberici/Clark
John J. Hucul - Alberici/Clark
Ralph J. Stephenson - consultant

Monday, December 21, 1992 (wd 504)

Roy Gies - MSU utilities - start up manager
Ralph J. Stephenson - Consultant

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December 23, 1992

Documents used in discussions:

- Sheet #01, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #02, issue 6, dated July 20, 1992 (wd 396) - Boiler construction
- Sheet #03, issue 6, dated July 07, 1992 (wd 387) - Chemical/electrical building
- Sheet #04, issue 6, dated July 07, 1992 (wd 387) - Turbine generator, interior metal walls, roofing and exterior vertical close in
- Sheet #05, issue 6, dated July 07, 1992 (wd 387) - Coal conveyor, fire protection systems, and cooling tower
- Sheet #06, issue 6, dated July 14, 1992 (wd 392) - Electrical construction
- Sheet #07, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work
- Sheet #08, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #09, issue 6, dated July 14, 1992 (wd 392) - Electrical construction work - for information and reference only - not for construction
- Sheet #10, issue 6a dated August 25, 1992 (wd 421) - Fabric filter building - for issue
- Sheet #11, issue 6 dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
- Sheet #12, issue 6, dated September 2, 1992 (wd 428) - IMC mechanical construction - not yet issued. Being translated from A/C computer run #54, dated August 25, 1992.
- Sheet sm1, issue 3, dated October 9, 1992 (wd 454) - Start up master network summary plan - issued for information only
- Sheet #sg1, iss #5, dated November 4, 1992 (wd 472) - Steam Generator Startup
- Sheet #tg1, iss #5, dated November 4, 1992 (wd 472) - Turbine Generator Startup
- Sheet #tg2, iss #5, dated November 4, 1992 (wd 472) - Turbine Generator Startup
- Sheet #hr1, issue #5, dated November 5, 1992 (wd 473) - Heat Rejection System Startup
- Sheet #sm1, issue #5, dated November 5, 1992 (wd 473) - Summary Startup
- Issue #5, dated November 5, 1992 (wd 473) - Bar chart translation of startup models except sm1
- Sheet #dcs1, issue #5, dated November 23, 1992 (wd 485) - DCS startup template for reference and future use. For review & comment only by MSU staff.
- Sheet #sg1, issue #6, dated December 21, 1992 (wd 504) - Steam Generator Startup - For review & comment only by MSU staff.

Actions taken:

Tuesday, December 15,1992 (wd 500)

- Reviewed distributed control system (dcs) process sequence.
- Reviewed electrical construction contractor's role in the start up process.
- Reviewed steam generator dfi contractor's relation to controls installation.
- Defined construction steam blow.
- Updated information shown on master mechanical construction data base from A/C, attachment B to

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monitoring report #24, dated November 27, 1992 (wd 488).
- Monitored steam generator installation with Mr. Simons and Mr. Gies.
- Discussed contract date data with Mr. Nestle and Mr. Wever.

Monday, December 21, 1992 (wd 504)

- Updated master mechanical construction data base from A/C with Mr. Gies.
- Reviewed startup assumptions.
- Reviewed comments on start up network models received from contractors per request by Mr. Gies in our meeting of Friday, November 6, 1992 (wd 474).
- Updated steam generator startup network model, sht sg1 to issue #6, dated December 21, 1992 (wd 504) for internal MSU review and comments.

Summary:

Tuesday, December 15, 1992 (wd 50)

This meeting was primarily to discuss the start up processes as shown in the issue #5 startup network models issued at our meeting on Friday, November 6, 1992 (wd 474). Very few comments were received from the principal contractors on the work plans. Mr. Gies and I will assume there are no additional comments.

We reviewed the A/C mechanical systems turnover data listing and updated the material from data available at the meeting. There appear to be some important differences in dates the systems will be available, and the dates by which the start up logic plan shows the systems are needed. This material is to be reviewed as the start up networks are updated and additional data is available from A/C and IMC.

The start up team will also need similar system complete information from other dfi contractors to make a comparison of start up dates and systems complete dates. A/C apparently is to provide this information to the MSU project staff. We shall continue to incorporate the dfi information in the master start up sheets as it is obtained.

During our meeting we agreed on a definition of steam blow for the steam generator. Mr. Monroe of A/C suggested the following:

> **Construction steam blow is when live steam is moved through the main steam and temporary steam blow lines, and past a highly polished metal disk face (target) used to measure the degree of disfigurement from the steam. The steam is then exhausted to the atmosphere. Steam blow continues until the turbine manufacturer approves steam quality based on the degree of target disfigurement.**

During our meeting some of those participating expressed concern about the progress and integration of

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dcs, control and electrical construction work. The matter is to be addressed in near future regular and special construction meetings. I recommend Mr. Gies and Mr. McClintic obtain from the appropriate contractors similar electrical data to the mechanical systems completion information A/C has provided in the mechanical systems data file.

At the afternoon meeting with Mr. Nestle, Mr. Wever and I, the basic topic was how all concerned could best knit their information, skills and plans of work to effectively work through the start up process. It was generally decided that the mechanical systems format being used now clearly shows most date information needed.

It was also agreed that the turnover packet for all dfi contractors was to be provided to Mr. Simons by Alberici Clark. We are getting very close to the time for the early turnover packets to be assembled and given to MSU construction. Therefore the content and the submittal schedule of these turnover packets should be defined as quickly as possible.

Mr. Simons, Mr. Gies and I monitored steam generator construction from Sheet #01, issue #6, dated July 20, 1992 (wd 396) and color coded the model to reflect current status. In general boiler work is currently meeting most major dates between the early and late starts and finishes. Some work on the superheater has extended past late starts and finishes, and Mr. Simons and Mr. Gies will more closely evaluate these to determine their impact on the project.

Key dates coming up in the installation of the boiler appear to be the hydrostatic test, activity 140378, shown as starting on January 22, 1993 (wd 526), and the air test, activity 140400, shown as starting on a late start of March 10, 1993 (wd 559). The key contract date shown on this network is activity 140410, TAM complete, presently set at the pm of June 1, 1993 (wd 618). Activity 140401 is shown in the work plan by Tampella at a desired dates of the pm of April 30, 1993 (wd 597).

I recommend that Mr. Simons and Mr. Gies review this status material in relation to the current startup requirements tabulated in columns G and H of Attachment A accompanying this report.

Monday, December 21, 1992 (wd 504)

Mr. Gies and I continued planning from the issue #5 network models for start up of the steam generator, turbine generator, heat rejection, and dsc systems.

The principal contractors on the project had very few comments on the start up network models provided to them on Friday, November 6, 1992 (wd 474). Therefore Mr. Gies and I concentrated on updating the master mechanical systems data sheets from information he had obtained subsequent to that meeting from a variety of sources. His main data came through Alberici Clark from IMC and Tampella.

A copy of the updated data list is included with this report as Attachment A. It corresponds to the list sent with monitoring report #24, dated November 27, 1992 (wd 488), and labeled attachment B in that report. The current list is labeled i2 and dated 12/21/92 (wd 504). This identification is shown at the

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bottom of the data printout, near the right end.

The information of high interest in the listing is shown in the following columns identified on Attachment A with a red asterisk:

- A - *rgi system #*

A permanent reference number assigned by Mr. Gies. We will use the rgi number in future updates and additions to this list.

- B - *Contract date - interpretation - should be confirmed.*

These are the dates, as interpreted by Mr. Gies, that the discipline system is needed on line to meet the contract dates shown in the dfi and general construction specifications.

- C - *A/C turnover update as of 12/16/92 (wd 501).*

This set of dates was provided by IMC and Alberici Clark to Mr. Gies in recent memos subsequent to our meeting on Tuesday, December 15, 1992 (wd 500). There are differences between these current dates and those provided by A/C in previous meetings on November 11, 1992 (wd 477), and on December 15, 1992 (wd 500). It was understood at these earlier meetings that the information on mechanical system delivery was yet to be confirmed.

- D - *MSU expected startup es date as of 12/21/92 (wd 504).*

The MSU expected early start dates have been taken from the startup networks prepared and updated as the startup process has been established. The information in this column was derived from the updated steam generator startup network, sheet sg1, issue #6, dated December 21, 1992 (wd 504). This network model is currently being reviewed.

- E - *√'ed dates ok as of 12/21/92 (wd 504)*

This column contains a "√" mark for all system line items that seem to meet startup date requirements. Those that do not appear to meet these requirements are show with an "x". System line items for which information is not available are left blank.

- F - *Act #'s & late date*

This data shows the activity number from which the MSU expected startup dates as of 12/21/92 (wd 504) were derived. The late date is the late start or finish as currently shown in on the sheet #sg1 network.

In the issue #5 network model, sheet sg1, dated November 4, 1992 (wd 472), the dates derived were

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based on a preliminary set of assumptions by the startup team. In the updated issue #6 network model the pivot point used is the contract date of June 1, 1993 (wd 617) for start of steam blow. Using this steam blow date has produced some system completion requirements that must be restudied.

At our meeting Mr. Gies and I completed updating the Sheet #sg1 network model to issue #6, dated December 21, 1992 (wd 504) and printed it for use by Mr. Gies in his discussions with the MSU startup staff.

Those wishing a copy of the updated network model should contact Mr. Gies. I shall not make further distribution of the work plan until instructed by the MSU staff.

Two other columns G and H, are shown in the mechanical systems list, issue #2, dated 12/21/92 and entitled "tam startup requirements - early finish - as of 12/17/92", and "tam startup requirements - late finish as of 12/17/92". These dates were provided to Mr. Gies by Alberici Clark, who were apparently given the dates by Tampella.

There is no indication as to the documents from which this start up data was derived.

General:

We are now moving into the last 8 months of the project and must concentrate on making a smooth transition from the construction work to the start up work. I suggest the following items, listed in random order, be made high priority planning work over the next two months:

- Establish the procedures, staff requirements, and time table for training.
- Complete dcs systems planning. It may be desirable that this information should be integrated with the major systems startup network models.
- Complete the continuous emissions monitoring systems planning.
- Review and integrate software & hardware design into start up plans.
- Complete Bailey work plans.
- Complete planning the turbine, heat rejection and fabric filter start up.
- Establish an authentic timetable for turnover and processing the turnover packets from the contractors, to the project construction manager, to MSU construction to the MSU startup team. This process appears to be due to begin in about two months or less.

I shall be in touch with Mr. Simons and Mr. Gies shortly to set our next planning and monitoring meeting. Happy holidays to all!

Attachments:
A • Start up date check, issue #2

Ralph J. Stephenson, P. E.

12/23/92

master mech construction data base from a/c for msu pp4

• A rgi sy #	system level 2	system level 3	discipline system	A/C tgt turnover date as of 09/14/92 (to be confirmed)	msu expctd stup date as of 11/11/92	√'ed dates ok - as of 11/11/92	A/C turnover update as of 12/15/92	msu expctd stup date as of 12/21/93	√'ed dates ok as of 12/21/92	• B contract date - interp - should be confirmed	• C A/C turnover update as of 12/16/92	• D msu expctd stup es date as of 12/21/92	• E √'ed dates ok as of 12/21/92	• F act #'s & late date	• G tam stup reqmts - early fin - as of 12/17/92	• H tam stup reqmts - late fin - as of 12/17/92	notes	b & v p&id #	oen
01	bsx/	dpa/	building drains & vents	11/27/92	11/27/93	√	11/27/92				1/22/93	2/22/93	√	sg 010 - 3/1/93			no contract date available - assume desired comp at 11/27/92	M2029	1.0
02	bsx/	wsc/	service water	11/27/92	11/27/93	√	1/22/93				3/12/93				1/4/93	1/25/93		M2012	2.0
03	bsx/	fpu/	fire protection	2/1/93	2/1/93	√	2/1/93			3/1/93							as of 12/16/93 rgi requested response from A/C	M2012	3.0
04	bsx/	tef/	heater vents & miscellaneous drains	11/27/92	11/27/93	√	12/24/92			7/23/93	2/6/93					5/3/93		M2016	4.0
05	tgx/	ted/	heater drains	11/27/92	3/8/93	√	12/24/92			7/23/93	2/28/93					5/3/93		M2016	5.0
06	bsx/	sca/	steam unit heaters & air handling unit	11/27/92	11/27/93	√	1/1/93				1/22/93						for partial use only - phase 1 - see also SCA phase 2 - insul only, no lagging okd 12/15/92	M2015	6.0
07	bsx/	cab/	control air	2/12/93	2/12/93	√	2/12/93			3/1/93	3/12/93				1/15/93	1/25/93		M2010	7.0
08	tgx/	hra/	condensate	3/5/93	3/8/93	√	3/5/93			7/23/93	3/15/93				3/15/93	5/3/93	see PMA systems	M2003	8.1
10	tgx/	hra/	condensate air extraction	3/5/93	3/8/93	√	3/5/93			7/23/93	2/15/93							M2003	9.0
11	tgx/	hra/fwc/	condensate	3/5/93	3/8/93	√	3/5/93			7/23/93	4/1/93				3/15/93	5/3/93		M2003	10.1
13	hrx/	hre/	circulating water chemical feed	1/8/93	3/4/93	√	2/8/93			8/23/93	2/8/93							M2005	11.0

• A rgi sy #	system level 2	system level 3	discipline system	A/C tgt turnover date as of 09/14/92 (to be confirmed)	msu expctd stup date as of 11/11/92	√'ed dates ok - as of 11/11/92	A/C turnover update as of 12/15/92	msu expctd stup date as of 12/21/93	√'ed dates ok as of 12/21/92	• B contract date - interp - should be confirmed	• C A/C turnover update as of 12/16/92	• D msu expctd stup es date as of 12/21/92	• E √'ed dates ok as of 12/21/92	• F act #'s & late date	• G tam stup reqmts - early fin - as of 12/17/92	• H tam stup reqmts - late fin - as of 12/17/92	notes	b & v p&id #	oen
14	sgx/	fwe/	cycle chemical feed	1/15/93	6/1/93	√	2/8/93			6/1/93	2/8/93	2/25/93	√	sg 018 - 3/3/93	4/1/93	6/1/93		M2005	12.0
15	hrx/	hrc/	circulating water	1/29/93	3/4/93	√	2/8/93			3/1/93	5/15/93							M2007	13.0
16	hrx/	ecb/	closed cycle cooling water	1/15/93	3/4/93	√	2/12/93			3/1/93	3/5/93				1/15/93	1/25/93		M2006	14.0
17	bsx/	caa/	station air	2/12/93	2/12/93	√	2/12/93			3/1/93	2/15/93				5/1/93	6/1/93		M2010	15.0
18	sgx/	pma/	chemical clean	1/29/93	6/1/93	√	1/29/93			4/5/93	4/15/93	3/23/93	x	sg 041 - 3/23/93	3/20/93	4/5/93	pre boiler chem clean - FWC, FWA & FWG - from 01/15/93 to 01/29/93	M2013	16.0
19	sgx/	fwg/	attemporator spray water	3/5/93	6/1/93	√	3/5/93			8/2/93	3/12/93	8/2/93	√	sg 061 - 8/2/93	6/1/93	7/2/93	see PMA systems - tam says stup can begin at 100% of maximum capacity rating (mcr)	M2028	17.0
20	sgx/	fwa/	feed water	3/5/93	6/1/93	√	3/5/93			4/5/93	3/12/93	2/22/93	x	sg 014 - 2/26/93	1/15/93	2/5/93	see PMA systems	M2002	18.0
21	tgx/	fwh/	desuperheater water	3/5/93	3/8/93	√	3/5/93			8/2/93	5/1/93				6/1/93	7/2/93		M2002	19.0
22	tgx/	fwf/	demineralized water	3/5/93	3/8/93	√	3/5/93			7/23/93	5/1/93				1/15/93	4/5/93		M2003	20.1
24	tgx/	sac/	sampling & analysis	3/5/93	3/8/93	√	3/5/93			7/23/93	4/5/93				8/2/93	8/2/93		M2014	21.1
26	sgx/	sgf/	boiler drains & vents	4/9/93	6/1/93	√	4/9/93			4/5/93	2/15/93	2/22/93	√	sg 010 - 3/1/93	3/15/93	4/5/93		M2023	22.0

master mech construction data base from a/c for msu pp4

• A rgi sy #	system level 2	system level 3	discipline system	A/C tgt turnover date as of 09/14/92 (to be confirmed)	msu expctd stup date as of 11/11/92	√'ed dates ok - as of 11/11/92	A/C turnover update as of 12/15/92	msu expctd stup date as of 12/21/93	√'ed dates ok as of 12/21/92	• B contract date - interp - should be confirmed	• C A/C turnover update as of 12/16/92	• D msu expctd stup es date as of 12/21/92	• E √'ed dates ok as of 12/21/92	• F act #'s & late date	• G tam stup reqmts - early fin - as of 12/17/92	• H tam stup reqmts - late fin - as of 12/17/92	notes	b & v p&id #	oen
27	sgx/	sge/	natural gas	4/9/93	6/1/93	√	4/9/93			4/5/93					3/1/93	4/5/93	a/c says complete as of 12/15/92 (to be checked) - as of 12/16/93 rgi requested response from A/C	?	22.1
28	tgx/	sgg/	main steam	4/9/93	3/8/93	√? to be checked & revised as needed	4/9/93			4/5/93	4/26/93				5/1/93	6/1/93	from issue #5, sht sg1. Date set by activity SG032 at pm of 08/09/93	M2001	24.1
30	tgx/	sgk/	steam blow piping	4/16/93	3/8/93	√?to be checked & revised as needed	4/16/93			4/5/93	4/26/93				5/1/93	6/1/93	from issue #5, sht sg1. Date set by activity SG031 at am of 07/12/93	M2025	25.1
32	tgx/	tec/	extraction traps & drains	4/16/93	3/8/93	√?to be checked & revised as needed	4/16/93			7/23/93	4/26/93				4/15/93	5/3/93	from issue #5, sht tg1. Date set by activity TG053 at am of 08/10/93	M2016	26.0
33	tgx/	tea/	extraction steam	4/16/93	3/8/93	√?to be checked & revised as needed	4/16/93			7/23/93	4/26/93				4/15/93	5/3/93	turbine ready to go. from issue #5, sht tg1. Date set by activity TG053 at am of 08/10/93	M2016	27.0
34	bsx/	sca/	building space conditioning	4/30/93	4/30/93	√	4/30/93										for phase 2 - see other SCA for phase 1	M2015	28.0
35	sgx/	cac/	soot blower air	2/12/93	6/1/93	√	2/12/93			8/2/93	4/26/93	8/2/93	√	sg 055 - 8/2/93	6/2/93	6/2/93		M2010	29.0
36	sgx/	chd/	coal handling system	6/1/93	6/1/93	√	6/1/93			8/2/93					6/2/93	6/2/93	requires CHC - as of 12/16/93 rgi requested response from A/C	M?	30.0
37	sgx/	bmd/	limestone handling	6/1/93	6/1/93	√	6/1/93			8/2/93	6/1/93	3/10/93	√	sg 023 - 7/7/93	3/1/93	4/5/93		M2009	31.0
38	sgx/	bme/	sand handling (inert)	6/1/93	6/1/93	√	6/1/93			4/5/93	6/1/93	3/10/93	x	sg 022 - 5/25/93	3/1/93	4/5/93		?	32.0
39	sgx/	asg/	ash collection	6/1/93	6/1/93	√	6/1/93			8/2/93	6/1/93	4/5/93	x	sg 066 - 5/27/93	6/2/93	6/2/93		M2008	33.0

• A rgi sy #	system level 2	system level 3	discipline system	A/C tgt turnover date as of 09/14/92 (to be confirmed)	msu expctd stup date as of 11/11/92	√'ed dates ok - as of 11/11/92	A/C turnover update as of 12/15/92	msu expctd stup date as of 12/21/93	√'ed dates ok as of 12/21/92	• B contract date - interp - should be confirmed	• C A/C turnover update as of 12/16/92	• D msu expctd stup es date as of 12/21/92	• E √'ed dates ok as of 12/21/92	• F act #'s & late date	• G tam stup reqmts - early fin - as of 12/17/92	• H tam stup reqmts - late fin - as of 12/17/92	notes	b & v p&id #	oen
40	sgx/	asf/	combustion waste storage	6/1/93	6/1/93	√	6/1/93			8/2/93	6/1/93	4/5/93	x	sg 066 - 5/27/93	6/2/93	6/2/93		M2008	34.0
41	bsx/	pmc/	vacuum cleaning	6/1/93	6/1/93	√	6/1/93				6/1/93						bag house ready to come on line.	M4009	35.0
09	sgx/	hrc/fwc/	condensate	3/5/93	6/1/93	√	3/5/93			4/5/93	3/15/93	2/22/93	x	sg 002 - 2/26/93	3/15/93	5/3/93	see PMA systems	M2003	8.2
12	sgx/	hra/fwc/	condensate	3/5/93	6/1/93	√	3/5/93			4/5/93	4/1/93	2/22/93	x	sg 002 - 2/26/93	3/15/93	5/3/93		M2003	10.2
23	sgx/	fwf/	demineralized water	3/5/93	6/1/93	√	3/5/93			8/2/93	5/1/93	8/2/93	√	sg 061 - 8/2/93	1/15/93	4/5/93		M2003	20.2
25	sgx/	sac/	sampling & analysis	3/5/93	6/1/93	√	3/5/93			5/3/93	4/5/93	2/25/93	x	sg 018 - 3/3/93	8/2/93	8/2/93		M2014	21.2
29	sgx/	sgg/	main steam	4/9/93	6/1/93	√	4/9/93			4/5/93	4/26/93	6/29/93	√	sg 033 - 7/9/93	5/1/93	6/1/93		M2001	24.2
31	sgx/	sgk/	steam blow piping	4/16/93	6/1/93	√	4/16/93			4/5/93	4/26/93	6/1/93	√	sg 031 - 6/1/93	5/1/93	6/1/93		M2025	25.2