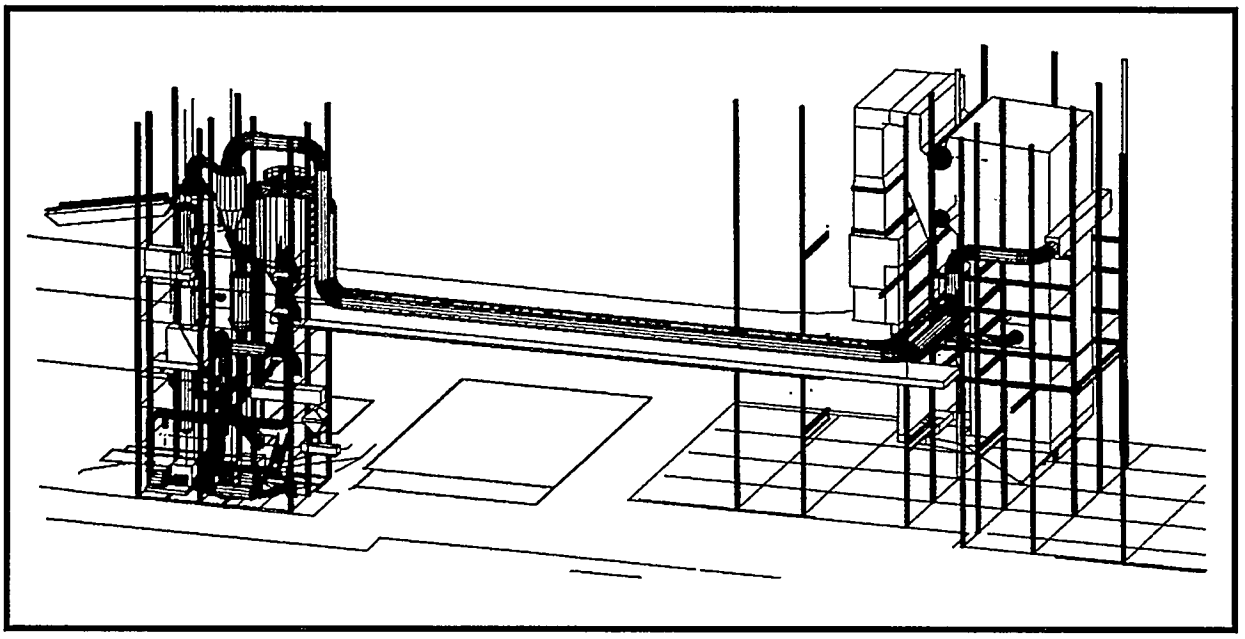
DOE/GO/10032--T1

VERMONT GASIFIER PROJECT

BURLINGTON, VERMONT

CONTRACT NO. 2064



FINAL REPORT – PHASE I

July 1995

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VIA UPS

August 9, 1995

Mr. Milton Farris
Future Energy Resources, Inc.
3350 Cumberland Circle, N.W.
Suite 1500
Atlanta, GA 30339-3363

Subject: Final Report - Phase 1
Vermont Gasification Project

Dear Glenn:

Attached are ten copies of the subject report. The results/minutes of the Safety Meeting were transmitted under separate cover. With the exception of closing out loose ends, this report concludes the Phase 1 effort. Invoice 64008 has been issued, invoicing for all of the Contract Value but $54,000. The $54,000 will be invoiced for next month.

Should you have any questions, please advise.

Very truly yours,

Joseph J. Sapp
Project Manager

JJS/ckw/64-PR

Attachment

cc: D. Butynski
J. Rohrer
W. Bell
G. Manry
C. Johnson
B. Slack

VERMONT GASIFIER PROJECT

FINAL REPORT - PHASE 1

JULY 1995

VERMONT GASIFIER PROJECT
BURLINGTON, VERMONT

FINAL REPORT - PHASE 1

JULY 1995

1.0 ENGINEERING STATUS

1.1 General

Phase 1 engineering accomplishments are shown below. Also shown below are engineering activities scheduled for Phase 2. During the July 17th Design Review Meeting the project was re-directed to design and install a scrubber. The scrubber design will be incorporated into Phase 2.

1.2 Civil/Structural

The following summarizes the Phase 1 accomplishments:

1.2.1 The site survey and geotechnical work has been completed. The geotechnical report prepared by Knight Consulting indicates that steel "H" piles will be required under the gasifier building only. All other foundations will consist of spread footings.

1.2.2 The pipe rack foundations between the gasifier building and the McNeil boiler have been completed, but must be verified after the final pipe refractory is selected.

1.2.3 The gasifier building foundations, including steel piles, have been designed and checked, but must be verified once building steel is completed and building loads are finalized. The current foundation design did not include the enclosure flare stack on top of the building.

1.2.4 The fuel handling foundations have been completed. These foundations will have to be verified once final vendor is selected. The foundation for the infeed fuel hopper has been designed, but put on hold on the drawing awaiting decision on final hopper size.

1.2.5 The gasifier building structural steel is in the process of re-design based on the enclosed flare arrangement and based on the latest General Arrangement drawing. A model has been developed to calculate steel member sizes using STAAD III program. Several more iterations with the model will be required before final design is completed. The output of the model will show final member sizes and building loads for foundation design.

1.2.6 The utility bridge has been completed, but must be verified after final refractory selection in the product gas and flue gas lines. Based on the expected upgrades in the refractory, there will be approximately one third (1/3) increase in load on the pipe bridge. This will require only a minor modification to the bridge in terms of upgrading a chord size and a vertical member size of the truss.

1.2.7 The site plan has been completed.

1.2.8 The following has been scheduled for Phase 2:

- Pipe rack, building and fuel handling foundations to be verified based upon final equipment selection and configuration.
- Final building steel member sizes to be finalized based on final equipment selection and configuration.
- Pipe rack steel member size to be verified after final refractory selection.
- Review vendor and shop drawings.
- Provide field support as needed for construction.
- Re-design as necessary for scrubber modification.

1.3 Mechanical/Process Design

The following summarizes the Phase 1 accomplishments:

1.3.1 The process flow diagrams, including Heat and Mass Balance, have been completed.

1.3.2 The P&IDs and line list have been generated. Since these documents continuously evolve through the life of the project, updates will be required as final equipment selection is made.

1.3.3 The following equipment has been specified with bid evaluations and requisitions completed:

- Cyclones
- Start-up Burners
- Product Gas Burner
- Blowers
- Flare

1.3.4 The following is the status of the balance of equipment:

- Sand and MgO Transport System - Equipment has been specified with a sand storage tank, MgO tank, and a common dense phase transporter. Due to the fact that it is not clear when and how much MgO will be required, it may make sense to consider using a bag unloading system for MgO with 2,000 lb. bags instead of a 330 cu. ft. tank. This may save capital and operating costs. Vendors have been asked to quote on a bag unloading system.

- Ash Handling System - The system was initially bid and evaluated. Continuous developments were made throughout the project life and incorporated into a revised specification. This revised specification was subsequently re-bid and is currently being evaluated. During the July 17th Design Review Meeting, the bottom ash system was deleted.

- Fuel Handling System - The system was initially bid and evaluated. Continuous developments were made throughout the project life and incorporated into a revised specification. This revised specification was subsequently re-bid and is currently being evaluated.

- Vessel Fabrication - This includes the specification and drawing package for the gasifier vessels. This has been bid and several potential fabricators have been selected. A final release of drawings will be required for an updated bid before final release to the manufacturer. The drawings have been finalized.

- Refractory Specification - Refractory to be field installed in the vessels and shop installed in the piping has been specified and initially evaluated. The refractory costs were significantly greater than initially estimated and all the bidders have been asked to re-bid. Bids are due on July 13, 1995.

- Rupture Disks - An adequate method of design and vent rupture disks has not been established. Pending the safety review, this task has been put on hold.

- HT Dampers - The dampers have been specified and bids have been evaluated. A requisition needs to be prepared.

- Expansion Joints - The expansion joints have been specified and bids evaluated. Requisition is awaiting final expansion plan configuration to pick up potential modifications in order to minimize change orders after release.

- Prepared preliminary drawings of modifications to the McNeil boiler for the product gas burner and the combustor flue gas penetration. Zurn Energy is to summarize with a final report regarding modifications and impact on boiler performance. Final report has not been completed.

- IGT has conducted a test with a 12 inch L-valve to determine whether an L-valve can adequately transport a heterogeneous mixture of sand and char to the combustor. The test was completed successfully, but we are still awaiting the results and final report.

1.3.5 A Project Safety Review was completed during the week of July 17, 1995.

1.3.6 Provide permit support.

1.3.7 The following activities are scheduled for Phase 2:

- Prepare requisitions for the following equipment:

  - Sand & MgO Transport System
  - Ash Handling System
  - Fuel Handling System
  - Vessel Fabrication
  - Refractory System
  - HT Dampers
  - Expansion Joints

- Specify, evaluate bids, and requisition the following:

  - Fire Protection
  - Heating, Ventilation, and Air Conditioning
  - Sump Pump
  - Insulation

- Update process flow diagrams, P&IDs, line list and equipment list to final equipment configuration.

- Support safety review(s) and development of operating procedures.

- Address any design changes or modifications as a result of safety review.

- Review vendor drawings.

- Provide field support as needed for construction and start-up.

- Re-design system to include scrubber.

1.4 Electrical Design

The following summarizes the Phase 1 accomplishments:

1.4.1 The following equipment has been specified with bid evaluations and requisitions completed:

- Low Voltage MCCs
- Medium Voltage Switchgear
- Auxiliary Transformers

1.4.2 The closed circuit television system has been specified and issued for bid. Bid evaluations have not been completed.

1.4.3 The cable and raceway list was generated (power cable only).

1.4.4 The one-line diagram was generated.

1.4.5 The electrical underground layout was completed.

1.4.6 The following design activities have been scheduled for Phase 2:

- Lighting specification
- Ground resistivity testing specification
- Heat tracing specification
- Lighting and fire protection raceway design
- Instrumentation raceway design
- Detail wiring diagrams
- Review vendor drawings
- Provide field support as needed for construction and start-up
- Design interface with scrubber system

1.5 Instrumentation and Controls

The following summarizes the Phase 1 accomplishments:

1.5.1 The following equipment has been specified with bid evaluations and requisitions completed:

- Combustion Gas Analyzers
- Steam Conditioning Valves
- Pilot Tube Flow Elements
- Gas Chromatograph and Sample System

1.5.2 The following equipment has been specified and bids have been evaluated, but final requisitions have not been written. For these items we are awaiting final design configuration in order to minimize change orders after equipment release:

- Control System
- Control Valves
- Air Flow Dampers
- Intrinsic Safety Barriers
- Orifice Plates
- Level Transmitters
- Pressure Transmitters
- Pressure Switches
- Pressure Indicators
- Thermocouples
- Thermometers

1.5.3 The logic drawings and the control system description have been completed. The instrument location drawings have been generated. Final location drawings will be completed after final piping design in Phase 2.

1.5.4 Interfaced control system with existing McNeil Plant.

1.5.5 The following activities are scheduled for Phase 2:

- Final I/O count and DCS requisition
- Final valve count and control valve requisition
- Final instrument count and miscellaneous instrument requisitions
- Instrument installation details
- Instrument location diagram upgrade
- Logic diagram upgrade
- Support safety review and development of operating procedures
- Review vendor drawings
- Provide field support as needed for construction and start-up
- Design interface with scrubber system

1.6 Piping/Mechanical Design

The following summarizes the Phase 1 accomplishments:

1.6.1 General arrangement drawings have been completed.

1.6.2 Vessel drawings have been completed.

1.6.3 Refractory lined piping has been designed. The drawings still need a final check before final release.

1.6.4 Stiffeners and plate thicknesses for flat duct between vessels and cyclones have been designed, but have not been shown on the final drawings.

1.6.5 The utility bridge piping has been completed. Pipe design inside McNeil's building has been completed.

1.6.6 Initial routing of large bore piping (steam & water) has been developed, but drawings have not been generated.

1.6.7 Refractory lined piping has been stress analyzed. Pipe supports have been designed. Expansion plan has been designed, but final drawing has not been generated.

1.6.8 Preliminary stress analysis has been performed on large bore steam piping.

1.6.9 Preliminary pipe specification has been generated.

1.6.10 The following activities are scheduled for Phase 2:

- Finalize, check and issue for construction the refractory lined piping drawings.
- Finalize drawings for duct between vessels and the cyclones.
- Complete steam and water large bore pipe design, stress analysis, and pipe support design.
- Design small bore piping.
- Update general arrangement drawings for final equipment configuration.
- Check vessel manufacturer shop drawings and calculations.
- Review vendor drawings.
- Final pipe specification will be generated.
- Provide field support as needed for construction and start-up.
- Design interface for scrubber system.

2.0 TECHNICAL AREAS OF CONCERN

2.1 Agglomeration in Combustor and Dash Pots

Recent tests at the Battelle process research unit using wood feedstock from Burlington Electric's fuel supply showed ash agglomeration at temperatures above 1840°F which is the operating range of the Vermont unit. Agglomeration stops fluidization and solids circulation. Particles to basketball size were observed and it was necessary to shut down to clean out the combustor. During this short series of tests agglomeration was found to be controlled by adding magnesium oxide at a rate of approximately the wood dry ash rate. The ability to add MgO is being included in the gasifier design. The risk is that the fuel tested is not representative of all fuels. Agglomeration may additionally occur at temperatures lower than observed in the test, agglomeration may not be easily controlled, and the differences in operating dynamics between the process research unit (bubbling bed combustor) and the Vermont unit (entrained bed combustor) may result in severe agglomeration problems.

2.2 Nuclear Detectors

To assure that sand seal leg length remains constant between the gasifier and combustor and that the proper quantity of make-up sand is added, it is necessary to measure the level of sand and char in the gasifier and combustor dash pots. These closed vessels operate pressurized and at high temperatures and in the case of the gasifier dash pot, contain flammable gas. It is planned to take the solids level measurements with nuclear detectors. Technically this method is optimum for the application, but requires that Burlington Electric Company obtain nuclear source licenses for selected technicians and provide for training to maintain the licenses. To date Burlington Electric has stated they will consider taking on the licensing, but have not committed themselves.

2.3 Interruptible versus Firm Gas Supply

Presently the start-up of the gasifier plant is based upon using interruptible gas supply. This means that there will be periods of gas curtailment when the gasifier can not be brought on-line. This will occur primarily in the winter. From a safety perspective, the pilot for the flare must come from the firm gas supply which is not subject to curtailment.

2.4 Char Characteristics and Cyclone Efficiencies

2.4.1 Char Characteristics:

Reasonable char sizing distribution was predicted based on expected raw fuel sizing criteria and published char formation algorithms. These sizing predictions were then modified to reflect the anticipated size degradation due to the inherent abrasive environment associated with the gasifier process. An additional weighted factor was applied to the resulting size distribution to emphasize the production of smaller size char particles.

This was done to provide a slightly increased hardship on the cyclones, as smaller particles are harder to remove from a gas stream than larger size particles. In the end, the sizing distribution reflected in the cyclone specification was selected as being representative of what is anticipated at Burlington. However, it must be recognized that there is no existing empirical data upon which this is based and it is largely considered near impossible to attain and measure an actual piece of char. The design risk consideration here is that the char particles could be significantly different than identified in our documentation. This would affect the following items:

- Cyclone performance
- Possible sticking, jamming, or otherwise obstructing valve or other mechanical clearances.
- Possible adverse solid circulation affects. Specific consideration should be given to clogging in the Dip Legs between the cyclones and L-valves.
- Solids circulation ratio may change considerably. Char size and solids circulation ratio is related by virtue of the fact the sand may have to contact more or less char surface area in order to completely transfer an adequate quantity of heat to combust the char.

2.4.2 Cyclone Performance:

Cyclone performance is directly related to the char removal as discussed above. Presently, the cyclones being considered have a very high removal efficiency for all particulate loading. I some aspects this is potentially undesirable. An unanticipated quantity of ash is likely to be removed from the Gasifier and Combustor Cyclones. The conceptual design is based on all ash being removed from the system via the Secondary Combustor Cyclone. If significant ash is removed in the Gasifier and Combustor Primary Cyclones, this ash could promote agglomeration in the Dip Legs and L-valves. Sand is the third primary constituent to be removed from the gas streams via the cyclones. Once again, the efficiency is higher than originally expected. This will help minimize the sand loading ultimately deposited in the McNeil Station boiler. However, it should be recognized that a substantial amount will still ultimately find its way to the boiler regardless of increased cyclone efficiency. It is important to note that the sand and ash sizing characteristics were derived in largely the same manner as the char characteristics. Sizes were predicted based on input from other operating experience from conventional wood fired boilers. This is not to suggest that these sizes can't or won't change. The effect of size distribution changes from the anticipated will largely effect those items shown above under the Char Characteristics discussion above. In addition to these items listed above,

the quantity of ash loading exiting the Secondary Combustor Cyclone must be given due consideration if it is outside the operational removal parameters of the ash system presently scoped for that location. All in all, operational problems could occur with low cyclone efficiencies (no char collection, high solids carryover to boiler, high sand make-up rates) and excessively high efficiencies (accumulation of ash in gasifier and combustor).

2.5 Particulate Emissions/NOx Emissions Due to Fuel Bound Nitrogen

Safety vent flare - during periods when the safety vent flare is in use it will disperse particles of sand (silica), ash, and char to the atmosphere. Presently it is planned to use the safety vent flare for 80 hours over a 3 month period during plant initial start-up. Subsequently, the vent flare will only be used following gasifier trip for a few minutes following each incident. Note that during the period of facility initial commissioning, the allowed flare emissions are severely curtailed by the air quality permit. Thus, there is limited opportunity for fine tune controls associated with the flare and burner and it is possible that some variance may have to be required from this permit.

During gasifier start-up and normal operations the product gas burner will emit particles of sand, ash, and char into the McNeil boiler furnace. It is anticipated that this particulate will be substantially collected in the pollution control equipment on the back end of the McNeil boiler. Poor cyclone efficiencies, off-spec. fuel, sand, char, and ash, as well as off-design performance of the gasifier may lead to higher than expected particulate loadings to the McNeil boiler causing emission non-compliance and/or boiler fouling problems.

NOx emissions due to fuel bound nitrogen - during gasification, a portion of fuel bound nitrogen is expected to be converted to NH3 (ammonia). Battelle's work with the PRU indicates this is approximately 10%. When the ammonia reaches the product gas burner some of it will be converted to NOx. The quantity of ammonia converted to NOx has been predicted by COEN (burner manufacturer) to be approximately 90%. Based on the above assumptions and assuming that emissions from the char combustor will be comparable to typical wood fired CFB NOx emissions (0.18 lb/MMBtu), it is anticipated that total NOx emissions (product gas burner and char combustor) will be no greater than current McNeil allowed emissions. However, if the amount of fuel bound nitrogen converted to ammonia in the gasifier exceeds 10% or the conversion at the burner exceeds 90% or char combustor NOx emissions are greater than expected, the B.E.D. facility may be out of compliance for NOx emissions. The impact of fuel bound nitrogen on NOx emissions has not been addressed in the air permit modifications as the information was not available at the time. Although the net emissions impact should not be affected, the permit information should be straightened out.

2.6 Solids Circulation System

Solids circulation concerns include possible agglomeration, the impact of char characteristics on cyclone efficiency both discussed above, and:

- possible difficulties with circulation of sand, char, and ash
- possible loss of sand column seals

The solids in the circulation path from the gasifier cyclone to the dash pot and further through the L-valve to the combustor include sand, char, and ash. Conditions are similar in the circulation path from the combustor to the combustor cyclone through its dash pot and through its L-valve to the gasifier except there is no char. Due to density and size differences, it is possible that during flow the mixture may be stratified. The effect could be most pronounced at the L-valve where partial fluidization occurs.

The sand seal columns between the dash pots and the L-valves serve to isolate the reducing atmosphere in the gasifier from the oxidizing atmosphere in the combustor. The consequence of loss of either sand seal would mean mixing of product gas and combustion air which is expected to result in a rapid burn (deflagration), possibly an explosion (unlikely, but must be investigated), and rapid pressure increase in the system, requiring vessel external venting. Sand seal heights are to be normally maintained by the gasifier control system based on level measurements in the dash pots. Excepting difficulties with the control system, the most likely way of losing sand seals is by blowing them through a sand leg. Again, expert opinions vary, but a pressure differential between the vessels as low as 4 to 5 psi could possibly cause the problem (reference T. Knowlton fax 4/17/95). It should be noted that balancing pressure between the vessels by throttling system valves is an option, but it is limited as the addition of pressure drop results in increased blower pressure requirements and increased horsepower. Results from the L-valve test conducted at IGT will allow a more exact computation and review of the solids system design.

2.7 Valve Design and Sealing Problems

Maximum temperature and pressure for valves associated with the combustor and product gas is 1800°F and 15 psig. For valves associated with the combustor and flue gas maximums are 2000°F and 15 psig. These valves are the respective vessel design temperatures and pressures. At these temperatures and pressures allowable stresses for even the most costly high temperature metals are very low and valve design is based on material creep limitations. The most practical approach to valve design is to define the frequency and duration of service at the higher temperature and pressure conditions (it is worth noting that other gasifier designs surveyed do not subject valves to temperature and pressure combinations as difficult as these).

Valve sealing is most challenging for valves associated with the gasifier vessel and product gas lines as product gas leakage will ignite in contact with air so that even a small leakage results in destruction of the seals. Valves in this category include those at the product gas safety vent flare, the product gas shut-off to the product gas burner, and start-up air valves at the gasifier vessel.

To prevent seal leakage, a solution is to use double valves with a higher pressure sealing medium between so that leakage is always from the valve into the product

gas. Nitrogen is ideal for a seal gas as it is inert and commercially available. Unfortunately, even very tight clearances result in high consumption of nitrogen. For example, to seal two valves in the 24" inside diameter product gas line at the burner against 2 psig with a disk to seat clearance of .005" requires approximately 220 lb. of nitrogen per hour. If conditions were the same, but valve clearance was .015", the nitrogen requirement would be 650 lb/hr (.005" is approximately the diameter of a human hair). As the product gas line carries sand and a small amount of char in addition to product gas, it will be difficult to assure that these clearances will be maintained, especially in a high temperature, material creep environment. For that reason and as nitrogen costs $.05/lb, other gases are being investigated. A possibility is the use of steam which has the problem that the source is McNeil Station and following trip it will become unavailable. Another possible problem is that condensed steam may wet refractories with damage occurring when the refractory is heated during start-up.

2.8 Deflagration Venting

Should air come in contact with the product gas in the gasifier vessel or product gas lines, the possibility of very rapid burning or deflagration exists. See paragraphs on sand circulation concerns and valve sealing above and the section purging of the gasifier to prevent flame front entry below. In that case, the gasifier system pressures would rise throughout and the product gas safety vent and vessel rupture disks or other overpressure protection provisions could vent the contents of the gasifier vessels into the atmosphere. Some specific fire/safety considerations associated with such venting are given in Battelle's 4/25/95 letter. It appears there are personnel hazards as well as fire hazards to the McNeil Station and surrounding area in the event of a rupture disk relief. Reference Battelle's letter of 4/25/95.

The greatest deflagration of explosion hazard will be from a combustible mixture of air and natural gas that is allowed to build up inside the vessels sufficiently to cause uncontrolled combustion after being exposed to an ignition source. Se Walt Howard's report dated June 21, 1995. Deflagration or explosion venting cannot protect the vessels for pressure rise from this event. Currently there are no pressure relief disks or valves included in this vessel design. Standard industrial practice on boilers and other vessels is to protect overpressure from uncontrolled combustion with a flame safety and burner management system in accordance with NFPA. It must be determined whether this is an acceptable practice for the Burlington gasifier or whether some "other" means (pressure containment, indirect air heating) will be required. Costs have not been included for "other" means of protection.

2.9 Combustion and Gasifier Blower Surge Control

Due to characteristics inherent with centrifugal compressors, the gasifier and combustor blowers are capable of a turndown of between 2:1 and 3:1. The factor most limiting to turndown is the onset of the phenomenon known as surge. When the surge threshold is exceeded, flow reversals and pressure transients can cause machine damage. The use of variable inlet vanes to control throughput has the

effect of increasing this turndown, although in the case of the gasifier blower, it is still not sufficient for process requirements. The only way to prevent surge is to ensure suction flow never falls below the valve where surge occurs for a given inlet vane position. This will be accomplished by comparing blower differential pressure to inlet vane position. If differential pressure exceeds the maximum value allowed for the existing vane position, a blow-off valve will open to increase suction flow and decrease differential pressure.

2.10 Purging of Gasifier Piping

This is necessary to prevent flame front entry into the system. It is anticipated that purging will be required during gasifier start-up and shutdown to assure that burning does not occur within the gasifier vessel, cyclones, or the product gas piping. In addition to the usual purging to clear possible explosive gases prior to start-up, burner light-off purging will be necessary during:

- gasifier start when the atmosphere within the gasifier vessel changes from oxidizing to reducing.

- gasifier start-up or shutdown when the volume of gas generated is such that a flame front can move from the product gas burner or safety vent flare back down through the piping toward the gasifier vessel.

The gasifier start-up sequence includes burning wood in the gasifier vessel to heat the refractory. When the refractory is sufficiently heated, the excess air provided for combustion will be reduced. As the airflow is reduced, the oxygen for combustion goes from excess to stoichiometric to substoichiometric and instead of being combusted, the wood fuel feed transitions will be gasified. The transition means that air and product gas will exist as a combustible at relatively high temperatures. An explosive mixture may be possible as air is decreased and more product gas is produced. During this period steam will be added to the gasifier vessel both as fluidizing steam through the distribution plate and as dilution steam at the top of the vessel to prevent combustion by dilution of the mixture. The exact quantities of steam must be determined by gas composition calculations (expert assistance will be required with this determination) as details of the start-up procedure are developed.

A somewhat similar situation develops during orderly shutdown or following gasifier trip. Normally gas velocities through the product gas piping to the product gas flare or the product gas burner are sufficient to preclude a flame front from burning from the outside atmosphere (or the oxygen rich boiler furnace in the case of the product gas burner). However, as less gas is generated during shutdown, the possibility exists of a flame front traveling down the piping towards the gasifier entraining its own air supply and potentially causing high pressures, overheating the refractory and possibly explosion/deflagration. To preclude such an occurrence, steam will be added to the gasifier vessel during shutdown and immediately following trip to maintain gas velocities, purge the piping and dilute the product gas. Provision is also being made to add steam to the product gas line near the product gas burner to purge that line back towards

the product gas flare. Details of the necessary controls are to be developed. One area of concern is that following trip of the McNeil Station, the steam supply from the station may not be adequate and the possibility exists that Nitrogen gas may have to be utilized in that situation in lieu of steam.

2.11 Char Burnout

Based on tests that Battelle has done with a small (six inch) CFB, complete burnout of char in the combustor will occur at lengths of approximately 10 feet. Since the Burlington char combustor is much different than the test CFB, direct use of the data in terms of complete char burnout cannot be made. The Burlington combustor has 50 ft. of length. This gives a residence time in excess of 1 second in the combustor. Depending on the char size, this may not be adequate for complete combustion. The risk of incomplete burnout is that char overloading could occur, causing excessive or inconsistent combustor temperatures, agglomeration, and carryover through the cyclones. Test ports have been included in the vessel to help determine where char burnout occurs.

2.12 Repair of Refractory

The refractory throughout this project will require continuous monitoring and maintenance. The highly abrasive environment coupled with thermal cycling (as the plant is brought off and on-line) will lead to cracks, erosion, and refractory failures with time. Certain areas such as the cyclone target area will be particularly subject to erosion.

2.13 On-Line Capabilities

The project direction has been given to delete the on-line capabilities to remove tramp bed material from the vessels. With poor quality fuel this could lead to increased pressure drop across the distributor and lead to increased shutdowns for cleaning.

2.14 Retractable Burner

For the retractable burner located inside the vessel the actual flame could cause local hot spots and agglomeration inside the combustor.

2.15 Air and Product Gas Mixture

A combustible mixture of air and product gas could enter the fuel system due to equipment or controls malfunction and create a deflagration or explosion situation.

VERMONT GASIFIER PROJECT

FINAL REPORT - PHASE 1

JULY 1994

ATTACHMENTS

A - DRAWING AND SPECIFICATION REGISTER

ATTACHMENT A

DRAWING AND SPECIFICATION REGISTER

FERCO – VERMONT GASIFICATION PROJECT

DWG STATUS LEGEND : 1 = CONCEPTUAL ENGINEERING AT 30% COMPLETE
2 = DESIGN AND DRAFTING AT 70% COMPLETE
3 = 95% COMPLETE (FOR PROGRESS PURPOSES)
4 = PHASE 1 ENGINEERING COMPLETE

DWG/ SPEC NO.	LAT REV	EST DATE	TITLE	DWG STATUS	COST CODE	ACTUAL IFC/ IFB DATE	PLANNED IFC/ IFB DATE	PROJ'T'D IFC/ IFB DATE	COMMENTS
100.0	2	01/19/95	EQUIPMENT LIST	4	4S7410	01/19/95	01/05/95	01/13/95	PHASE 1 COMPLETE
101.2.1	A	03/08/95	CYCLONE SPECIFICATION	4	4S7340	03/08/95	12/16/94	03/10/95	PHASE 1 COMPLETE
102.2	B	06/12/95	ASH HANDLING SYSTEM	4	4U7300	01/12/95	12/22/94	01/13/95	NEEDS REQUISITION
103.3	B	06/12/95	START-UP BURNER	4	4S7300	02/27/95	12/19/94	03/01/95	PHASE 1 COMPLETE
103.31	A	11/23/94	PRODUCT GAS BURNER	4	4S7300	11/23/94	11/25/94		PHASE 1 COMPLETE
107.3	A	04/11/95	SAND AND MAGNESIUM OXIDE TRANSPORT SYSTE	4	4S7370	04/12/95	04/07/95		NEEDS REQUISITION
108.1.1	A	02/09/95	BLOWERS	4	4S7350	02/15/95	01/02/95	02/17/95	PHASE 1 COMPLETE
109.6			FIRE PROTECTION ALARM & SPRINKLER SYSTEMS		4S7370-2		03/01/95	03/16/95	PHASE 2
110.1			HEATING, VENTILATING & AIR CONDITIONING		4S7370-2		02/17/95	03/15/95	PHASE 2
111.5			SUMP PUMP		4S7370-2		02/06/95	03/15/95	PHASE 2
115.1	PREL	01/16/95	PIPE SPECIFICATION	4	4K7380	01/18/95	04/03/95		PHASE 1 COMPLETE
115.2.1	A	04/24/95	REFRACTORY LINED PIPE AND DUCT FOR TEMP. SE	4	4K7380	04/26/95			NEEDS DRAWINGS CHECKED
115.7			STRESS ANALYSIS	4	4K7360		04/16/95	07/14/95	NEEDS CHECKING
115.8	A	07/11/95	LINE LIST	4	4S7400	04/26/95	03/30/95		PHASE 1 COMPLETE
115.9.1			RUPTURE DISKS	4	4K7380		04/14/95		SUBJECT TO SAFETY REVIEW
115.12.1	B	04/26/95	REFRACTORY LINED EXPANSION JOINTS	4	4K7380	02/09/95	02/15/95		PHASE 1 COMPLETE
115.12.2	B	07/11/95	DAMPERS FOR HIGH TEMPERATURE SERVICE	4	4K7380	02/27/95	02/15/95		PHASE 1 COMPLETE
115.30	A	03/28/95	VESSEL FABRICATION SPEC.	4	4S7340	03/28/95	01/09/95	03/17/95	PHASE 1 COMPLETE
117.0	B	06/12/95	FUEL HANDLING SYSTEM SPEC.	4	4U7320	11/21/94	11/17/95		NEEDS REQUISITION
117.11	A	11/21/94	GENERAL MACHINERY SPEC.	4	4U7320	11/21/94	11/17/95		PHASE 1 COMPLETE
118.2	A	04/20/95	REFRACTORY SPEC.	4	4S7420	04/26/95	12/23/94	04/18/95	NEEDS REQUISITION
118.3			INSULATION SPEC.		4S7420-2		12/23/94	02/28/95	PHASE 2
119.6	A	01/25/95	PRODUCT GAS SAFETY VENT STACK & FLARE	4	4K7340	01/30/94	12/16/94	01/16/95	PHASE 1 COMPLETE
127.5	A	01/06/95	NITROGEN GAS GENERATING SYSTEM	4	4S7320	01/06/95	01/16/94		PHASE 1 COMPLETE
202.3	A	11/21/94	ELECTRIC MOTOR SPEC.	4	4L7410	11/21/94	11/17/94		PHASE 1 COMPLETE
203.1	B	06/19/95	LOW VOLTAGE MOTOR CONTROL CENTERS	4	4L7410	03/06/95	02/13/95	03/10/95	PHASE 1 COMPLETE
203.2	B	06/20/95	MEDIUM VOLTAGE CONTROLLER GEAR	4	4L7410	03/06/95			PHASE 1 COMPLETE
204.2			LIGHTING FIXTURES, POLES AND ACCESSORIES		4L7410-2		03/13/95	04/17/95	PHASE 2

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206.2	A	12/22/94	ELECTRICAL GROUNDING INSTALLATION	4	4L7410	12/22/94	03/06/95		PHASE 1 COMPLETE
206.3			GROUND RESISTIVITY TESTING	4	4L7410.2		03/06/95	04/17/95	PHASE 2
207.1	B	06/20/95	MEDIUM VOLTAGE SWITCHGEAR	4	4L7410	03/06/95			PHASE 1 COMPLETE
208.2	B	06/20/95	AUXILIARY TRANSFORMERS	4	4L7410	03/13/95	02/06/95	03/03/95	PHASE 1 COMPLETE
209.1	A	12/22/94	FURNISHING & INSTALLATION OF ELECTRICAL RA	4	4L7410	12/22/94	03/16/95		PHASE 1 COMPLETE
209.4	A	12/22/94	FURNISHING OF ELECTRICAL WIRE & CABLE	4	4L7410	12/22/94	03/16/95		PHASE 1 COMPLETE
209.5	A	12/22/94	WIRING INSTALLATION METHODS	4	4L7410	12/22/94	03/06/95		PHASE 1 COMPLETE
209.6	2	04/25/95	CABLE AND RACEWAY LIST & LOAD LIST	4	4L7330	03/21/95	04/19/95		PHASE 1 COMPLETE
210.1	A	05/24/95	CLOSED CIRCUIT TELEVISION SYSTEM	4	4L7410	06/05/95	05/26/95		PHASE 1 COMPLETE
210.2			INSTALLATION OF ELECTRICAL HEAT TRACING SYSTEM		4L7410.2		03/16/95		PHASE 2
216.2	A	12/22/94	ELECTRICAL FIELD TESTING	4	4L7410	12/22/94	03/23/95		PHASE 1 COMPLETE
220.1	A	12/22/94	ABOVE GROUND ELECTRICAL INSTALLATION	4	4L7410	12/22/94	03/06/95		PHASE 1 COMPLETE
302.4	B	04/04/95	GAS CHROMATOGRAPH	4	4M7400	01/17/95	01/23/95		PHASE 1 COMPLETE
302.5	A	04/04/95	PRIMARY GAS SAMPLING SYSTEM	4	4M7400	04/06/95			PHASE 1 COMPLETE
304.1	A	01/30/95	CONTROL SYSTEM	4	4M7400	01/31/95	01/23/95		PHASE 1 COMPLETE
305.1	A	01/30/95	COMBUSTION GAS ANALYZERS	4	4M7400	01/31/95	01/23/95		PHASE 1 COMPLETE
307.1	A	04/04/95	CONTROL VALVES AND ACTUATORS	4	4M7400	04/05/95	02/10/95	03/31/95	PHASE 1 COMPLETE
307.2	A	03/09/95	STEAM CONDITIONING VALVES	4	4M7400	03/13/95	02/10/95	03/15/95	PHASE 1 COMPLETE
307.5	A	04/04/95	AIR FLOW CONTROL DAMPERS	4	4M7400	04/05/95	03/31/95		PHASE 1 COMPLETE
309.1	A	04/12/95	INTRINSIC SAFETY BARRIERS	4	4M7400	04/12/95			PHASE 1 COMPLETE
310.1	A	03/09/95	FLOW ORIFICE PLATES WITH FLANGES	4	4M7400	03/13/95	02/10/95	03/15/95	PHASE 1 COMPLETE
310.7	A	02/20/94	PITOT TUBE FLOW ELEMENTS	4	4M7400	02/21/95	02/27/95		PHASE 1 COMPLETE
312.2	A	03/07/95	LEVEL TRANSMITTERS	4	4M7400	03/21/95	02/27/95	03/31/95	PHASE 1 COMPLETE
313.3	A	06/15/95	LOAD CELL WEIGHING SYSTEM	4	4M7400	06/15/95			PHASE 1 COMPLETE
314.1	A	02/16/95	PRESSURE TRANSMITTERS	4	4M7400	02/17/95	02/27/95		PHASE 1 COMPLETE
314.2	A	02/15/95	PRESSURE SWITCHES	4	4M7400	02/17/95	02/27/95		PHASE 1 COMPLETE
315.1	A	02/16/95	PRESSURE INDICATORS	4	4M7400	02/21/95	02/27/95		PHASE 1 COMPLETE
316.1	A	03/10/95	THERMOCOUPLES AND THERMOWELLS	4	4M7400	03/13/95	02/27/95	03/15/95	PHASE 1 COMPLETE
317.1	A	03/03/95	DIAL THERMOMETERS AND THERMOWELLS	4	4M7400	03/06/95	02/27/95	03/15/95	PHASE 1 COMPLETE

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322	A	02/08/95	INSTRUMENT INSTALLATION SPEC	4	4M7340	02/08/95	04/12/95		PHASE 1 COMPLETE
324	A	07/07/95	INSTRUMENT INDEX/LIST	4	4M7310	01/19/95	03/17/95		PHASE 1 COMPLETE
326	A	05/17/94	CONTROL SYSTEM DESCRIPTION	4	4M7320	05/23/95	04/21/95		PHASE 1 COMPLETE
402.1	A	10/12/94	SUBSURFACE INVESTIGATION	4	4C7310	10/12/94			PHASE 1 COMPLETE
402.4.1	A	03/30/95	EARTHWORK SITE IMPROVEMENTS	4	4C7310	03/30/95	03/01/95	03/17/95	PHASE 1 COMPLETE
403.18	A	03/15/95	CONCRETE SPECIFICATION	4	4F7330	03/16/95	02/01/95	03/17/95	PHASE 1 COMPLETE
404.9	A	02/24/95	STRUCTURAL AND MISCELLANEOUS STEEL SPEC.	4	4H7340	02/27/95	02/01/95	02/23/95	PHASE 1 COMPLETE
405.2			METAL BUILDING ENCLOSURE		4I7300-2		03/01/95	02/23/95	PHASE 2
405.3			ARCHITECTURAL BUILDING FINISHES		4I7300-2		03/01/95	02/23/95	PHASE 2
A001,SH.1			GASIFIER BUILDING ELEVATIONS & DETAILS		4I7300-2		03/01/95		PHASE 2
A001,SH.2			GASIFIER BUILDING ELEVATIONS & DETAILS		4I7300-2		03/01/95		PHASE 2
A004	1	01/17/95	CONTROL BUILDING PLANS AND ELEVATIONS	4	4I7300	01/17/95	03/01/95		PHASE 1 COMPLETE
A006			BUILDING WALL DETAILS		4I7300-2		03/01/95		PHASE 2
C001	3	05/19/95	SITE PLAN	4	4C7300	12/22/94	12/13/94		PHASE 1 COMPLETE
C002	1	02/13/95	UNDERGROUND PIPING PLAN	4	4E7300	02/13/95	02/11/95		PHASE 1 COMPLETE
E001	3	06/20/95	ONE LINE DIAGRAM	4	4L7300	01/19/95	01/09/95		PHASE 1 COMPLETE
E020	1	02/23/95	ELECTRIC UNDERGROUND LAYOUT	4	4L7310	02/21/95	02/06/95	02/20/95	PHASE 1 COMPLETE
E021	1	02/23/95	ELECTRIC UNDERGROUND DETAILS	4	4L7310	02/21/95	02/06/95	02/20/95	PHASE 1 COMPLETE
E030			LIGHTING & FIRE PROTECTION - LEVELS 1 AND 2		4L7370-2		04/19/95		PHASE 2
E031			LIGHTING & FIRE PROTECTION - LEVELS 3 AND 4		4L7370-2		04/19/95		PHASE 2
E032			LIGHTING & FIRE PROTECTION - LEVELS 5 AND DETAILS		4L7370-2		04/19/95		PHASE 2
E033			LIGHTING PANEL SCHEDULES		4L7370-2		04/19/95		PHASE 2
E040			OVERALL ELECTRICAL LAYOUT	4	4L7320		06/15/95		CONCEPTUAL DESIGN
E042	1	04/25/95	GASIFIER RACEWAY - LEVELS 1 AND 2	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E043	1	04/25/95	GASIFIER RACEWAY - LEVELS 3 AND 4	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E044	1	04/25/95	GASIFIER RACEWAY - LEVELS 5 AND 6	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E045	1	04/25/95	GASIFIER RACEWAY - LEVELS 7 AND 8	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E046,SH.1	1	04/25/95	SITE RACEWAY & LIGHTING	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E046,SH.2	1	04/25/95	SITE RACEWAY & LIGHTING	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE

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E046,SH.3	1	04/25/95	SITE RACEWAY & LIGHTING	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E046,SH.4	1	04/25/95	SITE RACEWAY & LIGHTING	4	4L7320	05/01/95	04/19/95		PHASE 1 COMPLETE
E048			CONTROL ROOM RACEWAY	4	4L7320		04/19/95		CONCEPTUAL DESIGN
E050-A			480V MCC COVER SHEET		4L7380-2		04/19/95		PHASE 2
E050-1			FUEL RECEIVING HOPPER FEEDER - WD		4L7380-2		04/19/95		PHASE 2
E050-3			FUEL CONVEYOR - WD		4L7380-2		04/19/95		PHASE 2
E050-4			LOCK HOPPER VALVE 1 - WD		4L7380-2		04/19/95		PHASE 2
E050-5			LOCK HOPPER VALVE 2 - WD		4L7380-2		04/19/95		PHASE 2
E050-6			FUEL AUGER 1 - WD		4L7380-2		04/19/95		PHASE 2
E050-7			FUEL AUGER 2 - WD		4L7380-2		04/19/95		PHASE 2
E050-8			COMBUSTION AIR FAN 1-WD (COMBUSTOR START-UP)		4L7380-2		04/19/95		PHASE 2
E050-9			COMBUSTION AIR FAN 2-WD (COMBUSTOR AUX FUEL)		4L7380-2		04/19/95		PHASE 2
E050-10			COMBUSTION AIR FAN 3-WD (BOILER)		4L7380-2		04/19/95		PHASE 2
E050-11			LIGHTING TRANSFORMERS LT-1 FEEDER		4L7380-2		04/19/95		PHASE 2
E050-12			MISC POWER TRANSFORMER DT-1 FEEDER		4L7380-2		04/19/95		PHASE 2
E050-13			UPS POWER FEED		4L7380-2		04/19/95		PHASE 2
E050-14			CONTROL ROOM HVAC FEED		4L7380-2		04/19/95		PHASE 2
E050-15			BUILDING EXHAUST FANS - WD		4L7380-2		04/19/95		PHASE 2
E050-16			480V WELDING RECEPTACLE FEED		4L7380-2		04/19/95		PHASE 2
E060-A			MISC EQUIPMENT WIRING COVER SHEET		4L7340-2		04/19/95		PHASE 2
E060-1			STARTUP BURNER - WD		4L7340-2		04/19/95		PHASE 2
E060-2			FIRE PROTECTION PANEL - WD		4L7340-2		04/19/95		PHASE 2
E060-8			ASH SYSTEM WD - SHEET 1		4L7340-2		04/19/95		PHASE 2
E060-9			ASH SYSTEM WD - SHEET 2		4L7340-2		04/19/95		PHASE 2
E060-10			PRODUCT GAS SAMPLER - WD		4L7340-2		04/19/95		PHASE 2
E070-A			INSTRUMENT WIRING COVER SHEET		4L7340-2		04/19/95		PHASE 2
E070-1			INST. JUNCTION BOX 1 - WIRING		4L7340-2		04/19/95		PHASE 2
E070-2			INST. JUNCTION BOX 2 - WIRING		4L7340-2		04/19/95		PHASE 2
E070-3			MISC. INST. WIRING - 1		4L7340-2		04/19/95		PHASE 2

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E070-4			MISC. INST. WIRING - 2		4L7340-2		04/19/95		PHASE 2
E070-5			MISC. INST. WIRING - 3		4L7340-2		04/19/95		PHASE 2
E070-6			MISC. INST. WIRING - 4		4L7340-2		04/19/95		PHASE 2
F001	1	01/17/95	STRUCTUAL DESIGN NOTES	4	4F7300	01/17/95	02/01/95		PHASE 1 COMPLETE
F002	1	01/17/95	TYPICAL CONCRETE DETAILS	4	4F7300	01/17/95	02/01/95		PHASE 1 COMPLETE
F005,SH.1	1	05/05/95	GASIFIER BUILDING PILE PLAN	4	4F7340	05/08/95	02/24/95	05/08/95	NEEDS FINAL LOADS/ FLARE VERIFICATION
F005,SH.2	1	05/05/95	GASIFIER BUILDING FOUNDATION PLAN	4	4F7340	05/08/95	02/24/95	05/08/95	NEEDS FINAL LOADS/ FLARE VERIFICATION
F005,SH.3	1	05/05/95	GASIFIER BUILDING FOUNDATION SECTION & DET	4	4F7340	05/08/95	02/24/95	05/08/95	NEEDS FINAL LOADS/ FLARE VERIFICATION
F005,SH.4	1	05/05/95	GASIFER BUILDING FOUNDATION SECTIONS & DET	4	4F7340	05/08/95	02/24/95	05/08/95	NEEDS FINAL LOADS/ FLARE VERIFICATION
F005,SH.5	1	05/05/95	GASIFIER BUILDING SLAB PLAN	4	4F7340	05/08/95	02/24/95	05/08/95	NEEDS FINAL LOADS/ FLARE VERIFICATION
F006	1	01/17/95	CONTROL BLDG. FNDN. PLANS & SECTIONS	4	4F7320	01/17/95			PHASE 1 COMPLETE
F010,SH.1	1	05/05/95	FUEL HANDLING FOUNDATION PLAN & SECTIONS	4	4F7350	05/08/95	02/28/95	05/08/95	NEEDS FINAL EQUIP. VERIF.
F010,SH.2	1	05/05/95	FUEL HANDLING FOUNDATION PLANS, SEC. & DET	4	4F7350	05/08/95	02/28/95	05/08/95	NEEDS FINAL EQUIP. VERIF.
F015	1	05/05/95	UTILITY BRIDGE FOUNDATION	4	4F7430	05/08/95	04/19/95		NEEDS FINAL REFRACT. VERIF.
FD001,SH1	4	07/07/95	MASS/HEAT BALANCE GEN. DIAGRAM	4	4S7390	02/08/95	11/18/95	03/17/95	PHASE 1 COMPLETE
FD001,SH2	3	03/14/95	MASS/HEAT BALANCE 20% MOISTURE CASE	4	4S7390	02/08/95	12/05/94	03/17/95	PHASE 1 COMPLETE
FD001,SH3	2	03/14/95	MASS/HEAT BALANCE 45% MOISTURE CASE	4	4S7390	02/08/95	12/05/94	03/17/95	PHASE 1 COMPLETE
FD010	1	11/17/94	FUEL HANDLING FLOW DIAGRAM	4	4S7390	11/21/94	12/05/94		PHASE 1 COMPLETE
FD011	1	01/11/95	ASH HANDLING SYSTEM	4	4S7390	01/12/95			PHASE 1 COMPLETE
GA01	A	06/15/95	GENERAL ARRANGEMENT, LEVEL 1 & 2	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA02	A	06/15/95	GENERAL ARRANGEMENT, LEVEL 3 & 4	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA03	A	06/15/95	GENERAL ARRANGEMENT, LEVEL 5 & 6	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA04	A	06/15/95	GENERAL ARRANGEMENT, LEVEL 7 & 8	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA05	A	06/15/95	SOUTH GASIFIER BUILDING ELEV.	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE

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GA06	A	06/15/95	NORTH GASIFIER BUILDING ELEV.	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA07,SH.1	A	06/15/95	WEST GASIFIER BLDG. ELEV. (LOWER)	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA07,SH.2	A	06/15/95	WEST GASIFIER BLDG. ELEV. (UPPER)	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
G008,SH.1	A	06/15/95	EAST GASIFIER BLDG. ELEV. (LOWER)	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
G008,SH.2	A	06/15/95	EAST GASIFIER BLDG. ELEV. (UPPER)	4	4K7300	03/20/95	04/03/95		PHASE 1 COMPLETE
GA010	1	01/13/95	GENERAL ARRANGEMENT CONTROL BUILDING (PL	4	4U7330	01/17/95			PHASE 1 COMPLETE
GA020	1	05/05/95	GENERAL ARRANGEMENT FUEL HANDLING	4	4U7330	05/08/95			PHASE 1 COMPLETE
I000	1	05/17/95	INDEX - LOGIC DRAWINGS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I001	1	05/18/95	CONTROL LOGIC LEGEND	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I002	1	05/18/95	STEAM SUPPLY LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I003	1	05/18/95	GASIFIER COMBUSTION LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I004	1	05/18/95	GASIFIER BURNER COMB. CONTROL	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I005	1	05/18/95	GAS FLOW MEASUREMENT LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I006	1	05/18/95	COMBUSTOR COMBUSTION CONTROL	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I007	1	05/18/95	START-UP BURNER COMBUSTION CONTROL	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I008	1	05/18/95	GASIFIER INTERLOCKS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I009	1	05/18/95	SOLIDS CIRCULATING CONTROLS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I010	1	05/18/95	WOOD FUEL HANDLING LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I011	1	05/18/95	WOOD FUEL HANDLING LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I012	1	05/18/95	COMB. OVERBED BURNER CONTROL	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I013	1	05/18/95	MISC. MOTOR LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I014	1	05/18/95	REFRACTORY TEMPERATURES	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I015	1	05/18/95	GASIFIER CONTROLS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I016	1	05/18/95	COMBUSTOR CONTROLS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I017	1	05/18/95	COMBUSTOR BLOWER	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I018	1	05/18/95	GASIFIER BLOWER	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I020	1	05/18/95	PRODUCT GAS LOGIC	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I021	1	05/18/95	ANALOG INDICATORS SHEET 1	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I022	1	05/18/95	ANALOG INDICATORS SHEET 2	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE

FERCO – VERMONT GASIFICATION PROJECT

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4 = PHASE 1 ENGINEERING COMPLETE

DWG/ SPEC NO.	LAT REV	EST DATE	TITLE	DWG STATUS	COST CODE	ACTUAL IFC/ IFB DATE	PLANNED IFC/ IFB DATE	PROJCT'D IFC/ IFB DATE	COMMENTS
I025	1	05/18/95	ASH HANDLING	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I026	1	05/18/95	ASH HANDLING	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I027	1	05/18/95	ASH HANDLING	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I028	1	05/18/95	ASH HANDLING	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I030	1	05/18/95	DIGITAL INDICATORS SHEET 1	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I031	1	05/18/95	DIGITAL INDICATORS SHEET 2	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I032	1	05/18/95	DIGITAL OUTPUTS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I033	1	05/18/95	GASIFIER TRIPS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I034	1	05/18/95	COMBUSTOR TRIPS	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I035	1	05/18/95	FUEL FEEDER TEMPERATURE	4	4M7320	05/23/95	04/12/95	05/12/95	PHASE 1 COMPLETE
I100	1	05/01/95	INSTRUMENT LOCATION DIAGRAM, LEVEL 1 & 2	4	4M7330	05/02/95	03/01/95	05/15/95	PHASE 1 COMPLETE
I101	1	05/01/95	INSTRUMENT LOCATION DIAGRAM, LEVEL 3 & 4	4	4M7330	05/02/95	03/01/95	05/15/95	PHASE 1 COMPLETE
I102	1	05/01/95	INSTRUMENT LOCATION DIAGRAM, LEVEL 5 & 6	4	4M7330	05/02/95	03/01/95	05/15/95	PHASE 1 COMPLETE
I103	1	05/01/95	INSTRUMENT LOCATION DIAGRAM, LEVEL 7 & 8	4	4M7330	05/02/95	03/01/95	05/15/95	PHASE 1 COMPLETE
I104	1	05/01/95	INSTRUMENT LOCATION DIAGRAM, FUEL HANDLI	4	4M7330	05/02/95	03/01/95	05/15/95	PHASE 1 COMPLETE
I300-00			INSTRUMENT INSTALLATION DETAILS INDEX	1	4M7340-2		04/19/95		PHASE 2
I300-01			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-02			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-03			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-04			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-05			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-06			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-07			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-08			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-09			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-10			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-11			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-12			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-13			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2

FERCO – VERMONT GASIFICATION PROJECT

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DWG/ SPEC NO.	LAT REV	EST DATE	TITLE	DWG STATUS	COST CODE	ACTUAL IFC/ IFB DATE	PLANNED IFC/A IFB DATE	PROJCT'D IFC/ IFB DATE	COMMENTS
I300-14			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-15			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-16			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-17			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-18			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-19			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-20			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-21			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-22			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-23			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-24			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
I300-25			INSTRUMENT INSTALLATION DETAIL	1	4M7340-2		04/19/95		PHASE 2
M001	A	06/26/95	GASIFIER VESSEL	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M002,SH.1	A	06/26/95	GASIFIER SECTIONS & DETAILS	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M002,SH.2	A	06/26/95	GASIFIER SECTIONS & DETAILS	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M002,SH.3	A	06/26/95	GASIFIER SECTIONS & DETAILS	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M003	A	06/26/95	COMBUSTOR VESSELS	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M004,SH.1	A	06/26/95	COMBUSTOR SECTIONS & DETAILS	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M004,SH.2	A	06/26/95	COMBUSTOR SECTIONS & DETAILS	4	4K7300	03/17/95	03/01/95	03/17/95	PHASE 1 COMPLETE
M004,SH.3	A	06/26/95	COMBUSTOR SECTIONS & DETAILS	4	4K7300	07/13/95			PHASE 1 COMPLETE
M005	1	03/13/95	GASIFIER CYCLONE	4	4K7300	03/17/95	03/01/95	03/17/95	DELETE - VENDOR DRAWING
M006	1	03/13/95	COMBUSTOR CYCLONE	4	4K7300	03/17/95	03/01/95	03/17/95	DELETE - VENDOR DRAWING
M007	1	03/13/95	SECONDARY CYCLONE	4	4K7300	03/17/95	03/01/95	03/17/95	DELETE - VENDOR DRAWING
M008	2	04/17/95	CYCLONE DASH POTS	4	4K7300	03/17/95	03/01/95	03/17/95	DELETE - VENDOR DRAWING
M009	1	03/13/95	MAKE-UP SAND HOPPER	4	4K7300	03/17/95	03/01/95	03/17/95	DELETE - VENDOR DRAWING
M010	2	04/17/95	MISCELLANEOUS DUCTING	4	4K7300		03/01/95	05/12/95	NEEDS ADDITIONAL DESIGN/DRAFTING
M011	A	06/26/95	L-VALVE DETAILS	4	4K7300	07/13/95	03/01/95	05/12/95	PHASE 1 COMPLETE
M012	2	04/17/95	GASIFIER TO COMBUSTOR FEED LINE	4	4K7300		03/01/95	05/12/95	DELETE - NOT APPLICABLE
M013			SAND SILO TO COMBUSTOR	4	4K7300		03/01/95	05/12/95	DELETE - VENDOR DRAWING

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M020	A	06/30/95	VESSEL PLAN	4	4K7300	03/17/95			PHASE 1 COMPLETE
M023	A	06/30/95	SECTIONS A-A, BB	4	4K7300	03/17/95			PHASE 1 COMPLETE
M024	A	06/30/95	SECTIONS C-C, DD	4	4K7300	03/17/95			PHASE 1 COMPLETE
M025	A	06/30/95	VESSEL SECTIONS E-E, F-F	4	4K7300	03/17/95			PHASE 1 COMPLETE
P001,SH1	3	07/07/95	PIPING & INSTRUMENT SYMBOLS	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P001,SH2	2	07/07/95	PIPING & INSTRUMENT SYMBOLS	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P002,SH1	3	07/07/95	PIPING STANDARDS P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P002,SH2	2	07/07/95	PIPING STANDARDS P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P003	3	03/16/95	COMBUSTER AIR AND NATURAL GAS P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P004,SH.1	3	03/16/95	GASIFIER AND COMBUSTER P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P004,SH.1	1	07/07/94	GASIFIER AND COMBUSTER P&ID	4	4S7380	07/11/95	04/17/95		PHASE 1 COMPLETE
P005	3	07/07/95	PRODUCT GAS BURNER P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P006	3	07/07/95	SEAL STEAM P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P007	3	07/07/95	INSTRUMENT & SERVICE AIR P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P008	3	07/07/95	ASH SYSTEM P&ID	4	4U7330	01/18/95	04/17/95		PHASE 1 COMPLETE
P009	3	03/16/95	FUEL HANDLING P&ID	4	4U7330	01/18/95	04/17/95		PHASE 1 COMPLETE
P010	3	03/16/95	SERVICE SYSTEMS P&ID	4	4S7380	01/18/95	04/17/95		PHASE 1 COMPLETE
P011	1	07/07/95	INERT GAS P&ID	4	4S7380	07/11/95	04/17/95		PHASE 1 COMPLETE
P100			PIPING PLAN - LOWER LEVEL & LEVEL 2	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P101			PIPING PLAN - LEVEL 3 & 4	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P102			PIPING PLAN - LEVEL 5 & 6	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P103			PIPING ELEVATION - FRONT	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P104			PIPING ELEVATION - RIGHT SIDE	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P105			PIPING ELEVATION - LEFT SIDE	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P106			PIPING ELEVATION - REAR	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P107			PIPING SECTIONS & DETAILS	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P108			PIPING SECTIONS & DETAILS	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P109			PIPING SECTIONS & DETAILS	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P110	1	05/02/95	PIPING PLAN - UTILITY BRIDGE	4	4K7320	05/02/95	04/19/95	05/01/95	PHASE 1 COMPLETE

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P112,SH.1	1	05/02/95	BLR. BLDG. PIPING PLAN GROUND FLOOR TO EL. 14	4	4K7320	05/02/95	04/19/95	05/01/95	PHASE 1 COMPLETE
P112,SH.2	1	05/02/95	BLR. BLDG. PIPING PLAN EL 141'-0" AND UP - SOUT	4	4K7320	05/02/95	04/19/95	05/01/95	PHASE 1 COMPLETE
P112,SH.3	1	05/02/95	BLR. BLDG. PIPING PLAN EL 141'-0" AND UP - NORT	4	4K7320	05/02/95	04/19/95	05/01/95	PHASE 1 COMPLETE
P115			PIPING SECTIONS & DETAILS	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P116			PIPING SECTIONS & DETAILS	4	4K7320		04/19/95	06/15/95	PRELIM ROUTING ONLY
P120			VESSEL ASSEMBLY - EXPANSION RECORD	4	4K7320		02/01/95	06/15/95	NEEDS FINAL DRAFTING
PDS-00	A	01/09/95	PIPING STANDARDS INDEX	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.1.1	A	01/09/95	PIPE SUPPORTS SCOPE	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.1.2	A	01/09/95	PIPE SUPPORTS SCOPE	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.1.3	A	01/09/95	PIPE SUPPORTS SCOPE	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.2	A	01/09/95	PIPE SUPPORTS SPACING TABLE	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.3	A	01/09/95	PIPE SUPPORT CALL-OUT	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.01	A	01/09/95	PIPE SUPPORT ADJ. CLEVIS HANGER	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.02	A	01/09/95	PIPE SUPPORT MED. CLAMP WITH T.B.	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.03	A	01/09/95	PIPE SUPPORT DOUBLE BOLT CLAMP WITH T.B.	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.04	A	01/09/95	PIPING SUPPORT LUG ATTACHMENT WITH T.B.	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.20	A	01/09/95	WEAR SHOE FOR UNINSULATED PIPE	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.21	A	01/09/95	WEAR SHOE FOR UNINSULATED PIPE (4" MAX. INS	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.22	A	01/09/95	WEAR SHOE FOR UNINSULATED PIPE (6" MAX. INS	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.40	A	01/09/95	RIGID PIPE STANCHION TO FLOOR	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-10.4.41	A	01/09/95	ADJUSTABLE GLIDING SUPPORT	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-11	A	01/09/95	HOSE STATION COLUMN MOUNTED	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-13.1	A	01/09/95	SAFETY VALVE DRIP PAN ASSEMBLY	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-13.2	A	01/09/95	SAFETY VALVE DRIP PAN ASSEMBLY FOR CON. 270	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-15.1	A	01/09/95	PERSONNEL PROTECTION LAGGING	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PDS-15.2	A	01/09/95	PERSONNEL PROTECTION PERFORATED METAL GU	4	4K7370	01/09/95	01/06/95		PHASE 1 COMPLETE
PS300			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS301			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS302			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE

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DWG/ SPEC NO.	LAT REV	EST DATE	TITLE	DWG STATUS	COST CODE	ACTUAL IFC/ IFB DATE	PLANNED IFC/ IFB DATE	PROJ'D IFC/ IFB DATE	COMMENTS
PS303			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS304			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS305			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS306			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS307			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS308			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS309			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS310			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS311			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS312			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS313			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS314			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PS315			PIPE SUPPORT DETAIL	1	4K7370		04/19/95	07/15/95	DELETE - NOT APPLICABLE
PSCA002	PREL	06/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS ADDITIONAL ANALYSIS
PSCA003			PIPE SUPPORT DETAIL LOG	4	4K7370				NEEDS ADDITIONAL ANALYSIS
PSCA005	PREL	06/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS ADDITIONAL ANALYSIS
PSFG003	PREL	05/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS CHECK FINAL CONFIG.
PSLPS001	PREL	07/15/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS FINAL ROUTING
PSPG002	PREL	05/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS CHECK FINAL CONFIG.
PSPG004	PREL	06/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS ADDITIONAL ANALYSIS
PSSC001	PREL	06/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS ADDITIONAL ANALYSIS
PSSC002	PREL	06/25/95	PIPE SUPPORT DETAIL LOG	4	4K7370	07/13/95			NEEDS ADDITIONAL ANALYSIS
S001	1	01/17/95	STANDARD STEEL DETAILS	4	4H7300	01/17/95	01/10/95		PHASE 1 COMPLETE
S002	1	01/17/95	STANDARD GRATING DETAILS	4	4H7310	01/17/95	01/10/95		PHASE 1 COMPLETE
S003	1	01/17/95	STANDARD FLOORPLATE DETAILS	4	4H7310	01/17/95	01/10/95		PHASE 1 COMPLETE
S004,SH.1	1	01/17/95	STANDARD LADDER DETAILS	4	4H7310	01/17/95	01/10/95		PHASE 1 COMPLETE
S004,SH.2	1	01/17/95	STANDARD LADDER DETAILS	4	4H7310	01/17/95	01/10/95		PHASE 1 COMPLETE
S005,SH.1	1	01/17/95	STANDARD HANDRAIL DETAILS	4	4H7310	01/17/95	01/10/95		PHASE 1 COMPLETE
S005,SH.2	1	01/17/95	STANDARD HANDRAIL DETAILS	4	4H7310	01/17/95			PHASE 1 COMPLETE

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3 = 95% COMPLETE (FOR PROGRESS PURPOSES)
4 = PHASE 1 ENGINEERING COMPLETE

DWG/ SPEC NO.	LAT REV	EST DATE	TITLE	DWG STATUS	COST CODE	ACTUAL IFC/ IFB DATE	PLANNED PROJCT'D IFC/ IFB DATE	IFC/ IFB DATE	COMMENTS
S006,SH.1	1	01/17/95	STANDARD STAIR DETAILS	4	4H7310	01/17/95	01/10/95		PHASE 1 COMPLETE
S006,SH.2	1	01/17/95	STANDARD STAIR DETAILS	4	4H7310	01/17/95			PHASE 1 COMPLETE
S010,SH.1	1	04/17/95	ROOF PLAN	4	4H7340		03/24/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.2	1	04/17/95	FRAMING PLAN T.O.S. EL. 215'-0"	4	4H7340		03/24/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.3	1	04/17/95	FRAMING TOS EL. 203'-6"/203'-2"	4	4H7340		03/24/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.4	1	04/17/95	FRAMING PLAN TOS EL. 189'-5 1/2"	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.5	1	04/17/95	FRAMING PLAN TOS EL. 177'-4 3/4"	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.6	1	04/17/95	PLAN TOS EL. 166'-4 1/2" & 163'-9 1/2"	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.7	1	04/17/95	PLAN FRAMING TOS EL. 151'-7 3/4"	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.8	1	04/17/95	FRAMING PLAN TOS EL. 142'-7 3/4"	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH.9	1	04/17/95	FRAMING PLAN TOS EL. 130'-11 3/4"	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH10	1	04/17/95	ELEVATION COL. LINE B, E & 1	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH11	1	04/17/95	ELEVATION COL. LINE 4, 5, C.3,3 & F	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH12	1	04/17/95	STAIR SECTIONS	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH13	1	04/17/95	SECTIONS COL. LINES C AND D	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH14	1	04/17/95	SECTIONS COL. LINES 2 AND 3	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S010,SH15	1	04/17/95	TRUSS, SWAY BRACE AND MISC. DETAILS	4	4H7340		04/14/95	04/14/95	NEEDS FINAL CALC. & CHECK
S019,SH.1	1	04/21/95	UTILITY BRIDGE PLANS	4	4H7340		02/24/95	04/14/95	NEEDS REFRACTORY VERIF.
S019,SH.2	1	04/21/95	UTILITY BRIDGE SECTIONS AND DETAILS	4	4H7340		02/24/95	04/14/95	NEEDS REFRACTORY VERIF.
S019,SH.3	1	04/21/95	UTILITY BRIDGE SECTIONS AND DETAILS	4	4H7340		02/24/95	04/14/95	NEEDS REFRACTORY VERIF.
S019,SH.4	1	04/21/95	UTILITY BRIDGE SECTIONS AND DETAILS	4	4H7340		02/24/95	04/14/95	NEEDS REFRACTORY VERIF.