Exhibit No.:	
Issue:	Hawthorn 5 Generating Station Explosion
Witness:	Jerry N. Ward
Sponsoring Party:	GST Steel, Inc.
Type of Exhibit:	Surrebuttal Testimony
Case No.:	EC-99-553

Before the

Public Service Commission of the State of Missouri

Case No. EC-99-553

Surrebuttal Testimony of

JERRY N. WARD

On Behalf of

GS Technologies Operating Co., Inc.,

d/b/a GST STEEL COMPANY

Prepared by

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1850 Parkway Place, Suite 720
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April 6, 2000

LIST OF EXHIBITS

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS

A. My name is Jerry N. Ward. I am a consultant to GDS Associates, Inc., and in this capacity my business address is 1850 Parkway Place, Suite 720, Marietta, Georgia, 30067.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. This surrebuttal responds to the rebuttal testimony of staff and KCPL witnesses, and answer uncertainties posed by the testimony of the Staff. This testimony also reflects the considerable amount of additional information provided by KCPL since my direct testimony was filed on November 17, 1999.

Q. PLEASE SUMMARIZE YOUR SURREBUTTAL TESTIMONY?

A. Staff witness Lissik agreed that my direct testimony raised serious allegations regarding KCPL's actions with respect to both declining performance of KCPL generation units that parallels reduced KCPL capital and O&M expenditures, and the Hawthorn Unit 5 boiler explosion. She concludes without further substantive comment, however, that GST's case is "inconclusive". Mr. Norwood's surrebuttal addresses KCPL's power plant performance overall; I will address Dr. Lissik's testimony with respect to the boiler explosion and destruction of the Hawthorn unit. Moreover, whether KCPL acted in a reasonable and prudent manner with respect to its generation, transmission, and distribution facilities is a core issue with respect to the adequacy of service provided to GST and the reasonableness of the prices KCPL charges GST. I disagree with Mr. Giles' testimony that the Hawthorn incident is not relevant. Finally, in February and March of this year, KCPL disclosed additional information that GST had been seeking. This

information confirms my earlier findings and further demonstrates the imprudent behavior of KCPL.

Q. PLEASE RESPOND TO DR. LISSEK'S COMMENT THAT THE EVIDENCE OF KCPL'S IMPRUDENCE WAS "INCONCLUSIVE?

A. In short, KCPL's documents provide overwhelming evidence that the utility acted in an unreasonable, imprudent and unsafe manner. KCPL was extremely fortunate that no one was killed or injured in the boiler explosion, but there is nothing inconclusive about KCPL's mismanagement and the unsafe practices that precipitated the February 1999 boiler explosion. In fact, the evidence that KCPL's actions were unsafe and imprudent is *overwhelming.*

Power plant operators are supposed to establish and follow regular procedures to ensure safe operation. In particular, adherence to basic safe operating practices was required with respect to the flow of natural gas to the Hawthorn boiler. The procedures are designed to ensure that plant and worker safety are not left to chance with respect to combustible materials. They are explicit and mandatory to ensure that an explosive event cannot occur. In this case, KCPL had procedures for placing "holds" on safety related equipment, valves, and switches, but the company did not follow them.

Further, the boiler explosion was the product of a chain of unsafe and imprudent KCPL actions and omissions that transpired over nearly a twelve hour period. This is not a case of a single mistake or mechanical glitch producing a catastrophic result. KCPL's failure to follow its own procedures created an uncertain and unsafe environment. KCPL

had ample time to employ protective holds, that its own procedures require, throughout the day on February 16, 1999, but failed to do so.

The data provided by KCPL, including the statements of KCPL employees, all confirm the following facts:

1. Water from the overflowing sanitary sewer system damaged the computerized Boiler Management System (BMS) and Fuel Safety Subsystem (FSS). Those systems are responsible for monitoring and preventing unsafe conditions such as the accumulation of natural gas in the Hawthorn boiler. This accumulation was the cause of the explosion.
2. KCPL employees caused the flood by failing to place a hold on the operation of wastewater sump pumps while a clogged sewer line was being cleared.
3. KCPL did not de-energize the BMS system while its components were being dried out, repaired and retested. Through direct observation of the water damage, work performed to dry or repair various components, and erratic alarms (Exhibit__JNW-10), KCPL employees knew that the BMS was not functioning properly from the time of the flooding until the explosion occurred.
4. KCPL released holds placed on natural gas valves during the February forced outage early on the morning of February 16 in preparation for restart of the unit, but did not replace holds on those valves when the restart was aborted, when water damage to the BMS occurred, or when the BMS signaled a Master Fuel Trip alarm. Throughout the afternoon and evening of February 16, KCPL could not rely on any signals from the BMS system, and had no way of determining if

water or other damage could cause signals to open the gas valves to the Hawthorn boiler. Despite this widely known unsafe condition, KCPL failed to take the precaution to close the gas valves.

5. Observation of a fireball following the boiler explosion revealed the continued flow of substantial amounts of gas to the boiler. The gas flow ended only after KCPL employees manually closed main gas valves that should have been tagged closed in the afternoon of February 16.

6. Gas valves recovered from the wreckage (shown in Exhibit___JNW-22) indicate an open flow path to the Hawthorn boiler.

Staff witness Lissek expressed a preference in her testimony for waiting until KCPL issues its final report on the Hawthorn "incident" before staff issues its own conclusions on the prudence of KCPL's actions, and inactions, concerning the boiler explosion, but the above facts are not in dispute. Each confirms the conclusions in my direct testimony that KCPL imprudently caused the wastewater flood, and that its failure to tag close gas valves to the boiler following the decision to abort the restart or in response to the water damage to the BMS was unreasonable, imprudent and recklessly dangerous. KCPL has had an adequate opportunity in this case to offer any exculpatory facts or excuses it may believe to be pertinent. After all, its rebuttal was filed more than a year after the explosion occurred. The bottom line is that the utility has no excuse for failing to tag the gas valves closed under the conditions that existed at the time.

Q. PLEASE DESCRIBE THE ADDITIONAL INFORMATION RECEIVED FROM KCPL SINCE NOVEMBER 17, 1999?

A. The information KCPL provided after GST's direct testimony was filed included:

- Diskettes of data retrieved from the Ronan (Annunciator) system
- A partial printout of the Ronan information (KCPL Item #35)
- Diskette listing all valves in the Fuel Gas System, with incomplete information regarding the status of the valves as retrieved from the explosion scene (1 Finished Draft Valve Log)
- Printout of the Operators Half Hour Log (KCPL Item #34)
- Description of the Gas Combustion Control Change, dated 10/18/95 (KCPL Item #45)
- William's Gas Charts – Flow and Pressure (KCPL Item #53)
- H5 Data Acquisition System (DAS) Points (KCPL Item #94)
- Cause of Loss Team Meeting Minutes (March 11, 25, April 1, 8, 22, 29, 1999)
- Retrieved DAS Data (KCPL Item #133)
- Cause of Loss Team Summary Report, 4/15/99
- Forney Burner Management System Technical Manual (KCPL Item #1061)

Following receipt of the above additional information from KCPL, I performed further review of the following materials:

- Fuel Gas System P&IDs (KCPL Item #46)
- Statements of the Plant Staff (KCPL Item #6)
- BMS Theory of Operation (KCPL Item #49)

- Gas Pressure/Flow Information (KCPL Item #99)

I obtained much of this information by a return visit to the Hawthorn Plant document storage room. I obtained other information in response to document requests of KCPL.

Q. PLEASE DESCRIBE HOW THE ADDITIONAL INFORMATION CONFIRMS YOUR EARLIER TESTIMONY?

A. These additional materials provided more specific detail to the equipment, systems, piping and related information concerning normal control of gas flow to the boiler, the conditions that existed on February 16 and 17, and KCPL post-explosion discoveries.

Q. PLEASE EXPLAIN.

A. Hawthorn 5 utilized a computerized Burner Management System (BMS) to control every aspect of fuel introduced into and consumed in the unit's boiler. The Fuel Safety System (FSS) is a component of the BMS whose basic function is to prevent unsafe conditions from developing, to detect unsafe conditions that may develop, to immediately alert KCPL's control operators of such conditions, and to initiate immediate corrective action. A brief description of the Burner Management System is helpful in understanding the events of February 16-17, 1999.

A document entitled *The Theory of Operation of the Burner Management System (BMS)* begins with this statement:

> "The Burner Management System (BMS) is a supervisory flame Safety System designed to prevent unsafe admission of fuel into the boiler. It is an interactive system designed to give the operator a large amount of information in a clear manner. In the event of an unsafe condition, the system will notify the operator of the fault through an audible and/or visual alarm. If the fault condition is serious enough, the system has the

> ability to cutoff the gas and coal supplies to the boiler diminishing the chances of an uncontrolled flame." (Exhibit___JNW-1)

This description of the basic purpose and function of the BMS system is echoed in the Forney Burner Management System Technical Manual (April 1995), Section 1.2.1, SYSTEM DESCRIPTION:

> "The BMS protects against the unsafe admission of fuel to the boiler by continuously monitoring all supervisory interlocks, valve positions, and flame status. If an out-of-tolerance condition exists, the system annunciates, audible and/or visually, which item has the problem and shuts down that fuel system, or the entire boiler, depending on the situation." (Exhibit___JNW-2)

In addition to performing the above-referenced safety functions, the BMS also controls the admission of fuel, both gas and coal, to the boiler.

Q. EXPLAIN HOW THE BMS FUNCTIONS DURING NORMAL OPERATING CONDITIONS

A. The BMS continually looks for developments that could lead to an unsafe condition. If any such conditions develop, a Master Fuel Trip (MFT) occurs, and the BMS stops all fuel flow to the boiler. The specific conditions that initiate an MFT are (Exhibit___JNW-3):

- Burner Lightoff Timer complete
- Loss of all fuel
- Loss of all flame
- Purge interrupted
- MFT Pushbutton

- Both forced draft (FD) fans off
- Both induced draft (ID) fans off
- Turbine Trip
- Airflow is less than 25%
- Drum Level not within range
- Furnace Pressure is greater than 13-inch WC
- Inadequate waterwall circulation
- Loss of common dc power for more than two seconds
- Low furnace pressure (less than 10-inch WC)

When an MFT signal is received, the following actions take place:

- Signals close the igniter warmup gas trip valve and main gas trip valve
- Signals close the igniter warmup gas valve and main gas valve
- All gas burners shut down
- Signal to start mills and feeders is removed
- Signal is sent to stop mills
- Post purge timer starts (5 minutes)
- System is tripped to "purge required" status

In sum, an explosive condition requires fuel, pressure, and flame. The BMS is designed to continually monitor for any aspect of equipment or operating practice error that could cause an abnormal condition to develop, and instantly communicate that information to the control operator. If the condition represents an immediate safety

hazard, the BMS does not wait for the operator to react; it automatically closes valves to cut off gas flow to the boiler (i.e., a master fuel trip).

Q. WHAT IS THE CONTROL OPERATOR'S RESPONSIBILITY WHEN AN MFT OCCURS?

A. The operator is supposed to resolve the unsafe condition and press a master reset push button or the master reset box on the screen of the T70 operator workstation. When the master reset is pushed, if the BMS is functioning properly, the system will reset and clear the MFT only if the problem or unsafe condition has been resolved.

Q. WHEN AN MFT IS RESET, DO SIGNALS FROM THE BMS REOPEN THE WARM UP GAS VALVE AND MAIN GAS VALVE?

A. Yes. If the unsafe condition has been resolved, and if the BMS is functioning normally.

Q. WHAT DOES "PURGE REQUIRED" STATUS MEAN?

A. The operating procedures assume that residual combustibles (gas, coal, dust, etc.) could be in the boiler at any time. Thus, operators must open vents and start fans to the boiler to remove, or "purge", all combustible materials from the boiler.

Q. IS THERE AN EMERGENCY OPERATING PROCEDURE FOR THE FUEL SAFETY SYSTEM?

A. No. Operational Guide 5-4-5A for Hawthorn Station states:

Emergency Operation

> "No emergency operating procedure is recommended for the Fuel Safety System. If the system does not work properly, have it repaired." (Exhibit___JNW-4)

Q. WHAT FUEL SAFETY PROCEDURES SHOULD APPLY WHEN THE BMS SYSTEM IS NOT OPERATING OR IS MALFUNCTIONING?

A. KCPL employs a "hold" procedure for this purpose. As described in its safety manual (Exhibit___JNW-12), KCPL should have established either "blue" or "red" holds to prevent spurious signals from the damaged BMS system from causing any gas valves to open unintentionally or to cause any other safe condition to develop. As shown on Exhibit___JNW-13, KCPL used red holds to close and tag the main Williams gas valve to the site. This exhibit shows that such a red tag was placed on the Williams valve during the February forced outage. The hold was released early on the morning of February 16 (00:10 a.m.) as the plant was prepared for restart. There is no documentation that this valve was re-tagged and protectively held closed either after the restart was aborted on the afternoon of February 16, or after the wastewater damage to the BMS was discovered shortly thereafter. This is a clear violation of the Safety Manual.

Q. WERE KCPL'S CONTROL ROOM EMPLOYEES AWARE OF THE CLOGGED SEWAGE LINE ON FEBRUARY 16, 1999?

A. Yes. The control room operator logs contain a notation that employees should not flush the toilets, and a plumbing repairman was on-site to clear the clogged pipes.

Q. WERE HOLDS PLACED ON THE WASTE WATER SUMP PUMPS TO PREVENT THEM FROM CYCLING UNTIL THIS CONDITION WAS REPAIRED?

A. No. The documents provided by KCPL do not show holds being placed on the sump pumps. KCPL's failure to follow its procedures thus allowed the waste water flood to occur.

Q. WAS THE HAWTHORN 5 BOILER IN NORMAL OPERATING CONDITION ON FEBRUARY 16 AND 17, 1999?

A. No. As described in my direct testimony, the unit was out of service for a forced outage. An attempt to restart the unit on February 16 was aborted and the overflow of the control room toilet and subsequent flooding of the control room caused substantial water damage to the BMS and FSS systems.

Q. WERE THE HAWTHORN PLANT OPERATORS AWARE OF THE CONDITION OF THE BMS ON FEBRUARY 16, 1999?

A. Absolutely. The statements of the operators show that they were aware of the water intrusion into the BMS computer cabinets.

- Mr. McLin, Control Operator – "It is known that circuit boards had shorted out and had to be replaced. The fuel safety system (a subsystem of the BMS) was entrained in water. Daryl Helsley (sic) the maintenance foreman was supervising a crew of technicians on the 16th on replacing and drying out the equipment on the fuel safety cabinet in the computer room, which is three levels below the control room. They had completed their work by 22:00" (Exhibit___JNW-5).
- Mr. Steve Cox – "When we arrived in the control room there was a terrible stench and the floor was covered with waste." "At some time during the cleanup, I had heard that water was running down into the computer room. I went down to

see how bad it was. Water was raining through cable trays and was starting to accumulate on the floor. I opened a cabinet that I knew has been stripped of live equipment and could see traces of the water running down the inside back wall of the cabinet." "After I cleaned up, I called Jim Teaney, the Plant Manager, at his home. I reported the status of the Low-Pressure Heat Exchanger repair, the wastewater spill, and the fact that the spill had triggered some BMS alarms. I told him that the Technicians were cleaning up the cabinets, drying the boards, and basically correcting the conditions that had triggered the alarms. I believe that it was just a little after 6:00 p.m. when I left for home." (Exhibit___JNW-6)

- Mr. Irwin – "I also spent 1 or 2 hours in the #5 computer room with misters Hensley, Long and Tyrrell. Though I did not get involved in the technical work on the control problems, I was there to assist in any way possible. I accompanied Mr. Long and Mr. Tyrrell to the storeroom for parts on two occasions." (Exhibit___JNW-7)

Additional statements by KCPL employees Lunsford, Hensley, Hamm, and Long indicate that KCPL personnel were acutely aware of the water damage to the BMS.

Q. WERE THERE OTHER INDICATIONS THAT THE BMS SYSTEM HAD EXPERIENCED WATER DAMAGE?

A. Yes. As indicated by the KCPL employee statements below, the wastewater overflow began shortly before 3:00 p.m. on February 16.

- Mr. Lunsford: "At approximately 14:45 hours, the control room toilets started to overflow." (Exhibit___JNW-8)
- Mr. Cox: "At approximately 3:00 p.m. the meeting was interrupted by a call on my radio from the Shift Foreman. He said that he had an emergency. He had wastewater all over the control room floor." (Exhibit___JNW-6)
- Mr. Fischback: "Approximately around 3:00 p.m. the control room floor was covered with water from a sewage problem." (Exhibit___JNW-9)

Q. MR. COX'S STATEMENT QUOTED ABOVE INDICATES THAT THE WASTEWATER TRIGGERED BMS ALARMS. CAN YOU CONFIRM THAT?

A. Yes. KCPL's records, as shown on Exhibit___JNW-10, show that the Fuel Safety System lost AC power at 2:53 p.m., and that it lost DC power a few minutes later. The timing of these events are consistent with water entering the BMS cabinets in the computer room. In each case the power was restored and the systems were reset immediately. Also, at 3:22 p.m., the operator reset an MFT trip.

Q. WHAT DO THE TRIPS, RESETS AND EMPLOYEE STATEMENTS DEMONSTRATE ABOUT THE CONDITION OF THE BMS FUEL SAFETY SYSTEM AT THE TIME?

A. It demonstrates what one would expect: the computer components of the FSS were entrained in water and sewage and, as a direct result, were malfunctioning. The reset of the MFT condition is particularly significant. At this time, several of the conditions that cause an MFT were still in the "offending" state:

- Both forced-draft fans were off
- Both induced-draft fans were off
- Airflow was less than 25 percent

These conditions were substantiated by the following KCPL statements:

- Mr. Pender: "On 2-16-99, I was on the 3-11 shift. M. Lunsford (Shift Foreman) had just had the control operator take both sets of fans off." (Exhibit___JNW-11)
- Mr. Lunsford: "Then fans were removed from service around 14:30 hours." (Exhibit___JNW-8)
- Mr. McLin: "I relieved Kirkwood at 23:00. I normally arrive at 22:00 but had a rest period. I had worked 16 hours the previous day. I read the log book and walked the control panel down." "We did not have a fire in the boiler. The fans were off. The drum level was normal. We were waiting for the Fischback welders to finish their work on number four low pressure heater." (Exhibit___JNW-5)

Q. PLEASE SUMMARIZE THE STATUS OF THE FUEL SAFETY SYSTEM AT 4:00 P.M. ON FEBRUARY 16, 1999

A. The FSS system was energized but had experienced substantial water damage due to the wastewater flood. The system was malfunctioning. In this condition, alarm signals from the system would not be reliable, shorts or other damage could permit system resets to occur without clearing all unsafe conditions, and shorts or other damage similarly could send spurious signals to fuel and burner system equipment.

Q. WHICH ELECTRICAL COMPONENTS OF THE BMS AND FUEL SAFETY SYSTEM WERE DAMAGED BY WASTEWATER?

A. On November 10, 1999, KCPL stated in response to a GST data request 10.6 that it was still trying to determine which of the systems and components were damaged by the water. Certainly on the afternoon of February 16, 1999, the company did not know the full extent of the systems' that were damaged by water and which were fully functional. Moreover, even if circuit boards did not appear to be damaged, continually dripping water from the control room to the computer room could have caused additional shorts at any time. KCPL plainly knew that the BMS was not operating normally and should have alerted the Control Operator to take precautions against inadvertent fuel flow by shutting the gas valves.

Q. HOW WOULD REASONABLE AND PRUDENT UTILITY MANAGERS HAVE RESPONDED TO THESE CONDITIONS?

A. KCPL's operators were advised that the reheater repairs would take at least another twelve hours when they decided to abort the plant restart on February 16. When they became aware of the water damage to the BMS and the Fuel Safety Subsystem, KCPL's operators immediately should have placed a red hold on the main gas valves until the extent of the damage could be assessed, all waste water flowing down from the control room three floors above that could cause new shorts to the BMS could be cleaned up, all required repairs were completed and the unit was finally ready for restart. The need for a red hold was obvious. The situation was more dangerous than in a normal shutdown condition because KCPL could not be certain how the water damage would affect the

BMS or what malfunctions would occur. KCPL knew that the BMS was not functioning properly but failed to put the necessary holds in place.

Q. WAS THERE WORK GOING ON TO CLEAN AND REPAIR THE BMS SYSTEM DURING THIS PERIOD?

A. Yes. Several of the plant staff statements (KCPL Item #6) document their efforts to repair the effects of the water intrusion into the BMS computers:

- Mr. Irwin: "I also spent one or two hours in the #5 computer room with Messrs. Hensley, Long and Tyrrell. Though I did not get involved in the technical work on the control problems, I was there to assist in any way possible. I accompanied Mr. Long and Mr. Tyrrell to the storeroom for parts on two occasions." (Exhibit___JNW-7)
- Mr. Cox: "I went down again and saw that Ed Long and Dave Tyrrell were drying cards and working inside the cabinets. I knew that Darrel Hensley was staying with them." (Exhibit___JNW-6)
- Mr. Hensley: "Stayed over 4-11 shift with Elec/Tech to repair Burner Management System." (Exhibit___JNW-14)
- Mr. McLin: "Daryl Hensley the maintenance foreman was supervising a crew of technicians on the 16th on replacing and drying out the equipment on the fuel safety cabinet in the computer room which is three levels below the control room. They had completed their work by 22:20." (Exhibit___JNW-5)

Q. DID THE BMS PROVIDE OTHER SPURIOUS SIGNALS ON THE EVENING OF FEBRUARY 16?

A. Yes. In the evening, the following alarm was received, and reset some two hours later: (Exhibit___JNW- 10)

When this MFT TRIPPED-RESET occurred, the same plant conditions were present as before, and, therefore, the alarm should not have reset. Again, this indicates the BMS still was not operating normally in the evening of February 16, six hours after the water damage was first observed.

Q. WAS THE BMS EVER FULLY REPAIRED FROM THE WATER DAMAGE?

A. No. As described in his statement, Mr. Boylan, a journeyman electrician, was called in for the 11:00 p.m. – 7:00 a.m. shift on February 16-17, to assist in the BMS repairs. He was preparing to replace a damaged relay when the explosion occurred. (Exhibit___JNW-15).

Q. WHAT CAN BE DETERMINED CONCLUSIVELY FROM THIS INFORMATION?

A. There really are no facts in dispute. All of the information demonstrates that:

1. The cycling of a wastewater sump while a clogged sewer line was under repair caused the wastewater flood in the Hawthorn control room on February 16, 1999.
2. KCPL failed to place a necessary hold on the sump pump while the plumbing repairs were underway.
3. Overflowing wastewater traveled from the control room to the computer room, three floors below, entered electrical conduits and the cabinets containing the

BMS and the Fuel Safety subsystems, and caused damage to various circuit boards, relays and other electrical components of the BMS and FSS.

4. KCPL violated safe operating practices and its own procedures in that it failed to re-establish holds on the main gas line to the boiler after restart of the Hawthorn unit was aborted in the afternoon of February 16, 1999, or after the damage to the BMS was discovered. This failure was unreasonable, imprudent and dangerous.

5. KCPL did not de-energize the BMS system while it was being repaired or take necessary protective measures to prevent shorted or damaged BMS components from sending spurious signals to plant equipment. On several occasions, BMS trips occurred but the damaged system allowed resets even though KCPL knew non-permitted conditions persisted.

At this point (i.e., by mid-afternoon on February 16) the evidence conclusively demonstrates that imprudent KCPL practices with respect to the wastewater system, the BMS system, and the fuel delivery system had caused not simply an unsanitary mess in the control and computer rooms, but fundamentally dangerous and unsafe conditions. KCPL acted in an unreasonable and imprudent manner and the explosion was the result.

Q. PLEASE DESCRIBE THE FLOW OF GAS INTO THE HAWTHORN BOILER ON FEBRUARY 16 AND 17?

A. As indicated in my direct testimony (Exhibit___JNW-11), records from the gas company indicate that gas was flowing again into the boiler at the 2100 (9:00 p.m.) reading. This is corroborated by information received from KCPL since then (KCPL Item #53 – Williams Gas Charts (flow & pressure)). It shows gas flow beginning just prior to 2130

(9:30 p.m.) (Exhibit___JNW-16). This means that gas started flowing to the boiler just about at the time the latest master fuel trip was reset. Obviously, if the BMS had been functioning properly, another MFT would have occurred immediately once gas started to flow and there was no flame. KCPL was in no position at this point to know whether any other circuits could experience shorts or other malfunctions as a result of the water damage. The company failed to follow its own hold procedures, and accordingly took a foolish and imprudent risk that an unsafe fuel condition could develop undetected.

Q. HAS KCPL PROVIDED INFORMATION SHOWING HOW NATURAL GAS ENTERED THE HAWTHORN BOILER?

A. Yes. In February and March, KCPL provided data that shows the position (open or closed) of gas valves found following the boiler explosion.

Q. PLEASE EXPLAIN.

A. On a diskette labeled, "1 Finished Draft Valve Log", all valves in the FGS are presented in a spreadsheet which includes considerable information about each valve. Included in the information is the position (open or closed) for each valve found during the retrieval/demolition phase following the explosion. Excerpts from the diskette showing valves "open" in the gas flow path to the boiler are shown on Exhibit___JNW-22:

Q. ARE THERE DRAWINGS THAT SHOWS THESE VALVES?

A. Yes. KCPL Item #46 is the Piping and Instrument Drawing (P&ID) for the Fuel Gas System (Drawing No. 3512), and Sheets 01, 02 and 03 show the piping and valves discussed above. The drawings are attached as Exhibit___JNW-17. Drawing 3512-01 shows the 16" William's Gas Valve and piping leading to the Unit 5 Boiler on Drawing 3512-02. Valve 5-FG-21 is the first manual valve, and it was open as indicated above. Valve 5-FG-22 is the pressure control valve and is next in line. 5-FG-23 is the next manual valve. 5-FG-24 is the main gas trip valve, also found open. 5-FG-25 was apparently not found, but 5-FG-27 was found and was open. Following the main gas pipe, we go to Drawing 3512-03, and in the Northwest #1 Corner, at level CD, valves 5-FG-51-1 and 5-FG-51-2 (the main burner valves) were also found open. These valves should have been maintained closed by the BMS. In sum, the wreckage from the boiler confirms that a series of gas valves were open that created a gas pathway to the Hawthorn 5 boiler.

Q. ARE THERE ANY OTHER VALVES THAT MUST BE OPEN TO HAVE GAS FLOW TO THE BOILER?

A. Yes. In addition to these valves, the "William's Gas Valve" is required to be open for gas to flow to the boiler. We know from the statements of the plant staff (KCPL Item #6) that it was opened on February 16 and remained open at the time of the explosion.

- Mr. Stack: "In what seemed like a few minutes, the structure housing the boiler had been reduced to rubble and there was a huge ball of fire burning in the middle

of it. The ball of fire gradually got smaller as the main gas valve was closed." (Exhibit___JNW-18)

- Mr. Kirkwood: "The Boiler exploded and there was a large fire at the bottom of the rubble. I then went to close the William's gas valve (Exhibit___JNW-19)
- Mr. McLin: "I told Mr. Kirkwood to shut the gas off to the unit. He shut all the gas off. The fire went out." (Exhibit___JNW-5)
- Mr. Martin: "Once I found my glasses, I exit the building and notice a large fire where the boiler was, also I notice Mr. Kirkwood walking toward the main gas line, so I followed to assist him. Once the fire was out, I started looking for personnel. (Exhibit___JNW-20)
- Mr. Utterback: "Rick ran to look and saw the boiler was gone and there was a fireball. He then ran to the main gas valve to shut it off. When he got there Mr. Kirkwood was shutting the valve." (Exhibit___JNW-21)

Obviously, the main gas valve was open when it should have been tagged closed. After the explosion, when the gas flames were observed rising from the rubble, KCPL employees recognized the danger and closed the main valve. KCPL recklessly endangered the lives of all of those on site in failing to require the necessary holds be implemented to the gas valves to ensure a safe working environment while the BMS system was under repair.

Q. WHAT IS YOUR ASSESSMENT OF KCPL'S ACTIONS?

A. This is not rocket science. The BMS manual begins with an emphasis of its fuel safety features. The manual repeatedly lists potential unsafe operating conditions, and the universal first line of defense of that system is to shut off the flow of fuel to the boiler.

The damage caused by water to electrical components can be unpredictable, and that unpredictability is dangerous. Any time something as abnormal as water inundating a major control computer occurs, care must be exercised in the recovery process to ensure that the safety measures normally provided by the damaged system are preserved. Immediately after the flood, KCPL should have mandated the closure and tagging of all gas supply valves, as well as the tagging of the power supplies to the BMS. Based on the information presented by KCPL, neither of these actions were taken. This was unreasonable, imprudent, and dangerous.

Following the drying process and the replacement of any needed parts, a careful startup and testing of the control functions of the BMS should have been undertaken while holds on the gas supply valves were maintained. Only then should the gas valves have been opened and the system carefully brought on line. The haphazard activities of the plant staff instead led directly to the explosion. Moreover, information that the BMS was operating erratically was evident to the operators, but even that direct evidence did not cause them to ensure that the gas valves were shut and remained closed.

Q. DO YOU AGREE WITH STAFF'S RECOMMENDATION THAT THE COMMISSION SHOULD DELAY ANY DECISIONS IN THIS DOCKET PENDING COMPLETION OF STAFF'S INVESTIGATION INTO THE BOILER EXPLOSION IN CASE NO. ES-99-581?

A. No. All necessary facts for the Commission to determine the imprudence of KCPL's actions and failure to act are available and have been presented in my testimony. As I understand it, staff has been waiting for KCPL and Crawford to complete their reports on the incident before filing this report. It is apparent from the dates of the materials I have reviewed that KCPL possessed the essential facts concerning the explosion within a month or so after the incident, and had conclusive information by mid-summer. Moreover, it was obvious to KCPL employees the minute they recovered from the explosion and saw the fireball that they had failed to secure the gas valves while the BMS system was under repair. The hold procedures required under these circumstances were not followed and there is no documentation that any safety checks were performed along the way as repairs were being made to the water damaged electrical components. This casual disregard of safe operating practices was imprudent and dangerous. KCPL's employees and the other workers on-site escaped unhurt, but there is no doubt of KCPL's imprudent behavior.

The Commission has all the facts required to determine that KCPL's actions were unsafe and imprudent. It does not matter whether KCPL continues to try to pinpoint the source of the spark that actually touched off the explosion. The Commission does not require that level of detail to decide the issues raised in GST's petition. KCPL carelessly

and imprudently caused the water damage to the BMS system. KCPL unreasonably and imprudently failed to tag closed the gas valves to the boiler. Gas was observed to be flowing to the boiler in the form of a fireball immediately after the explosion and the valves found in the rubble confirmed an open pathway from the main valve to the boiler. None of the facts are in dispute. Indeed, they are spelled out plainly enough in KCPL's documents. Further investigation by staff, or further disclosure of data by KCPL, may or may not reveal the specific reason gas began flowing into the boiler on the evening of February 16 while the BMS was being repaired. Either way, it would not justify KCPL's careless and unsafe practices that allowed that circumstance to arise in the first place. The evidence is overwhelming that KCPL failed to act in a reasonable and prudent manner, and that this failure caused the catastrophic boiler explosion.

Q. PLEASE COMMENT ON MR. GILES' STATEMENT THAT THE HAWTHORN BOILER EXPLOSION IS NOT RELEVANT TO THE ISSUES IN THIS PROCEEDING?

A. In three separate Orders, dated July 29, 1999, August 19, 1999, and October 12, 1999, the Commission determined that the "Hawthorn Incident", as the February 1999 boiler explosion is euphemistically referred to, is directly relevant to the prices GST pays under its Special Contract with KCPL and the issues raised in this docket. KCPL has conceded as well that the boiler explosion has resulted in higher energy costs charged to GST. It is apparent that Mr. Giles' statement is in error, and that the prudence of KCPL's actions, which resulted in the boiler explosion, is a core issue to be resolved in the proceeding and that KCPL cannot avoid.

Q. PLEASE COMMENT ON MR. GILES' CLAIMS IN HIS REBUTTAL TESTIMONY THAT GST DID NOT PROVIDE ENOUGH INFORMATION FOR THE COMMISSION TO ADDRESS THE HAWTHORN EXPLOSION (GILES AT 17-18)?

A. Mr. Giles refers to words used in my direct testimony, such as "appear", "apparent" and "apparently" as an indication that my testimony is speculative with respect to the prudence of KCPL's actions that caused the explosion and destruction of its base load unit. The use of those words does not indicate that there was anything speculative about my findings. At the time my direct testimony was filed in November 17, 1999, there was persuasive evidence, referenced or attached to that testimony, that KCPL, through a lack of due care expected of any responsible power plant operator, caused the flood of sewage that damaged Hawthorn's Burner Management System, and that KCPL imprudently failed to take the precautions necessary to prevent an inadvertent gas accumulation in the boiler while that safety system was under repair. KCPL's operating practices were dangerous and imprudent regardless of the source of the spark that touched off the explosion. Information forthcoming since my direct testimony conclusively supports my earlier conclusions.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Exhibit 1

BMS Theory of Operation
(KCPL Item #49) Page III-1

SECTION NO. II
THEORY OF OPERATION

II.A INTRODUCTION

The Burner Management System (BMS) is a supervisory flame Safety System designed to prevent unsafe admission of fuel into the boiler. It is an interactive system designed to give the operator a large amount of information in a clear manner. In the event of an unsafe condition, the system will notify the operator of the fault through an audible and/or visual alarm. If the fault condition is serious enough, the system has the ability to cutoff the gas and coal supplies to the boiler diminishing the chances of an uncontrolled flame.

This system continuously monitors the burner systems through a series of logical subsystems. The BMS subsystems are:

1. Status/Transfer/Control
2. Fuel Safety
3. Boiler Purge
4. Prelight
5. Gas Burner Operation
6. Mill Control

Each subsystem is displayed on one or more screens that continually interact with another. Therefore, an unsafe or fault condition appearing in one subsystem is identified by the entire system, and actions are taken to protect the boiler and KCPL employees. All the screens are broken down in detail in Section III.

II.B STATUS/TRANSFER/CONTROL

In general, the T70 Operator workstation will display the Overview screen. This screen displays the status of all the warmup burners, main burners, mills, master fuel trips, common alarms, purge and gas headers. The operator can move to another screen by pushing any button on this screen.

Other screens in the Status/Transfer/Control subsystem are the Menu, Flame Signal and Air Dampers. The Menu screen allows

Exhibit 2

Forney Burner Management System
Technical Manual (KCPL Item #1061)

Hawthorn 5 Explosion

Books & Guides Transmittal

TO:	**Cause of Loss**	
Date:	**3/17/99**	
Unit #:	**Hawthorn 5**	
KCPL Item No.	**Book or Guide Description**	
M-1061	Burner Mgmt System, Technical Manual, Haw 5, Publ. M-1061, Dated April 1995	3/17/99

FORNEY
BURNER MANAGEMENT SYSTEM

Kansas City Power & Light Company

Hawthorn Station, Unit 5
Publication M-1061
April 1995

NOTICE

The equipment described in this manual was manufactured and sold under a contract containing limitations of manufacturer's liability for negligence and disclaimers of certain warranties. Installation or use of the equipment described in this manual constitutes an acceptance by the installer and user of those limitations and disclaimers. Copies of the contract may be obtained through any office of the manufacturer.

FORNEY INTERNATIONAL, INC.

Section 1

GENERAL INFORMATION

1.1 INTRODUCTION

This section contains a general description of the Forney burner management system (BMS) for Kansas City Power & Light Company, Hawthorn Station, Unit 5. Component publications in Section 5 contain specific information on equipment and parts that are part of the BMS.

1.2 DESCRIPTION

1.2.1 SYSTEM DESCRIPTION

The BMS protects against the unsafe admission of fuel to the boiler by continuously monitoring all supervisory interlocks, valve positions, and flame status. If an out-of-tolerance condition exists, the system annunciates, audibly and/or visually, which item has the problem and shuts down that fuel system, or the entire boiler depending on the situation. The BMS consists of the following major components.

1.2.2 BMS PANELS

The BMS consists of programmable logic controller (PLC) racks, terminals, relays, and associated hardware mounted on four panels. The panels are installed in existing cabinets. The operator control and systems Status/Alarm messages are performed and displayed on the Allen-Bradley T70 Operator Workstation.

The system features a PLC-based logic system that monitors and controls boiler conditions via input, control, and output sections. The digital control system includes a processor, digital input and output modules, and system power supplies. The processor, input, and output modules reside in the PLC racks.

Field devices are wired to existing terminals mounted in the cabinets. The BMS contains screw-type terminals that are wired to the existing terminals with wiring harnesses.

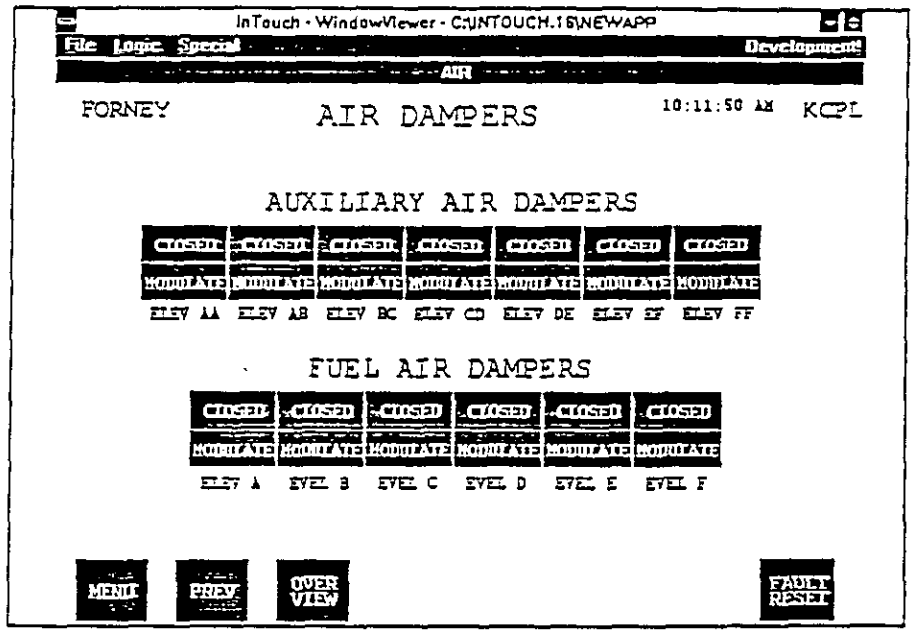
1.2.2.1 Universal I/O Chassis, 1771-A4B

The 1771-A4B modular I/O mounting rack, used for the remote I/O racks, is a 16-slot chassis. The left-hand slot holds Remote I/O Adapter Module 1771-ASB/D. Slots 0 through 14 hold the systems input and output modules. The power supply is located in slot 15 of the I/O mounting rack. For more information, refer to Allen-Bradley 1771 bulletins.

Exhibit 3

BMS Theory of Operations
(KCPL Item #49) Page III-7, 8 & 9

Figure B.6 Air Dampers



C. FUEL SAFETY

C.1 MASTER FUEL TRIP

Primarily, the MFT logic initiates a boiler trip when unsafe conditions exist within the boiler. This trip is accomplished by continuously monitoring a number of conditions which could present a hazard to safe operation if not within certain predetermined limits. Refer to drawing 382671-01, sheet 2, for the MFT logic.

C.1.a CAUSES

Any of the following conditions initiates an MFT.

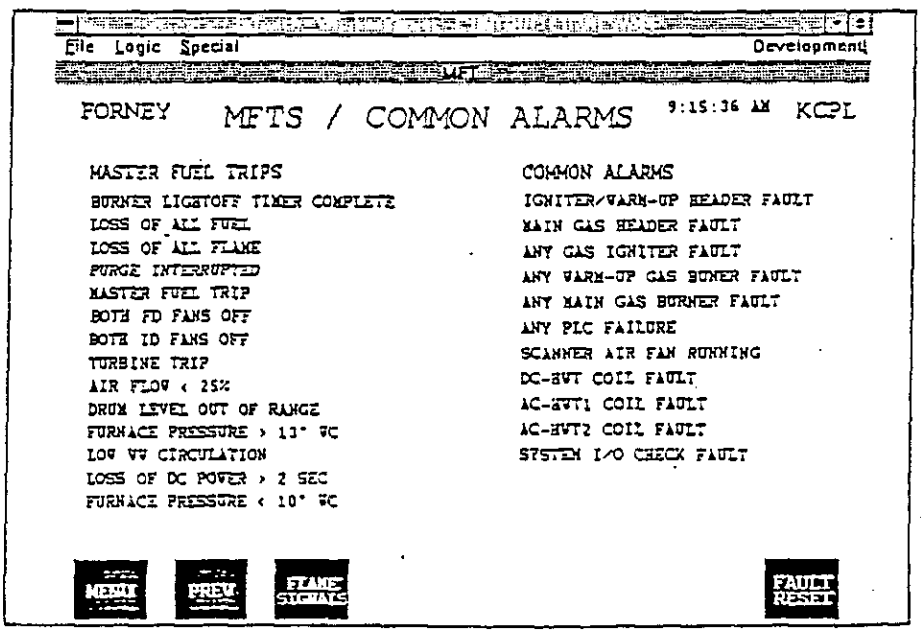
- Burner lightoff timer complete (The 5-minute timer completes after purge sequence is completed and no burners have proven on.)
- Loss of all fuel
- Loss of all flame (A total loss of flame detection occurs while fuel had been burning.)

- Purge interrupted (A loss of a purge permit occurs during the Purge In Progress period.)
- MFT pushbutton
- Both forced-draft fans off
- Both induced-draft fans off
- Turbine trip
- Airflow is less than 25%
- Drum level not within range
- Furnace pressure is greater than 13-inch WC
- Inadequate waterwall circulation
- Loss of common dc power for more than 2 seconds
- Low furnace pressure (less than 10-inch WC)

C.1.b MFT SCREEN

The MFT screen is combined with the common alarm screen and is pictured below.

Figure C.1b MFT Screen



The first MFT condition to trip will be displayed in yellow, as described previously, indicating a "first-out" condition. The first out condition may or may not trip other MFT conditions which will be displayed in red (true).

C.1.c ACTIONS

A Master Fuel Trip initiates the following actions:

- Signal is sent to initiate an MFT.
- Signals close the igniter warmup gas trip valve and main gas trip valve.
- Signals close the igniter warmup gas valve and main gas valve.
- All gas burners shut down.
- Signal to start mills and feeders is removed.
- Signal is sent to stop mills.
- Post purge timer starts (5 minutes).
- System is tripped to purge required status.

To reset the MFT condition, the operator must press the master reset pushbutton or the master reset box on any of the screens of the T70 Operator Workstation. The trip condition is cleared only if the problem or unsafe condition has been resolved.

C.2 COMMON ALARMS

Primarily, the common alarm logic initiates a system alarm when any system fault condition exists within the boiler. This alarm is detected by monitoring continuously a number of conditions which could upset the operation of the boiler. Refer to drawing 382671-01, sheet 2, for the common alarm logic.

Exhibit 4

Operational Guide 5-4-5A For Hawthorn Station
(KCPL Item#49)

KCPL Item No. 49

HAWTHORN STATION

OPERATIONAL GUIDE NO. 5-4-5A

UNIT NO. 5 DATE _____

BURNER CONTROL GAS AND PULVERIZERS

NORMAL OPERATION

TO LINE UP MAIN GAS AND WARMUP GAS

PREPARED BY _____

APPROVED BY L. Ellis APPROVED BY C Hagg

To Line Up Main Gas and Warmup Gas

1.	Open valve	5 FG 1
2.	Open valve	5 FG 4
3.	Open valve	5 FG 21
4.	Open valve	5 FG 23
5.	Open valve	5 FG 92
6.	Open valve	5 FG 136
7.	Open valve	5 FG 94
8.	Open valve	5 FG 138
9.	Close valve	5 FG 119
10.	Close valve	5 FG 174
11.	Close valve	5 FG 162
12.	Close valve	5 FG 111
13.	Close valve	5 FG 150
14.	Close valve	5 FG 103
15.	Close valve	5 FG 186
16.	Close valve	5 FG 127
17.	Open valve	5 FG 163
18.	Open valve	5 FG 112
19.	Open valve	5 FG 164
20.	Open valve	5 FG 223
21.	Open valve	5 FG 168
22.	Open valve	5 FG 172
23.	Open valve	5 FG 104
24.	Open valve	5 FG 151

HAWTHORN STATION

OPERATIONAL GUIDE NO. 5-4-5A

APPROVED BY C Ellis APPROVED BY C Riggi

25.	Open valve	5 FG 152
26.	Open valve	5 FG 156
27.	Open valve	5 FG 160
28.	Open valve	5 FG 222
29.	Open valve	5 FG 96
30.	Open valve	5 FG 139
31.	Open valve	5 FG 140
32.	Open valve	5 FG 144
33.	Open valve	5 FG 148
34.	Open valve	5 FG 221
35.	Open valve	5 FG 175
36.	Open valve	5 FG 120
37.	Open valve	5 FG 176
38.	Open valve	5 FG 180
39.	Open valve	5 FG 184
40.	Open valve	5 FG 220

EMERGENCY OPERATION

No emergency operating procedure is recommended for the Fuel Safety System. If the system does not work properly, have it repaired.

Exhibit 5

Statement of McLin, Control Operator
(KCPL Item #6)

KCPL#6

Incident Report
Explosion, February 17, 1999
Approximately 00:25

I relieved Kirkwood at 23:00. I normally arrive at 22:00 but had a rest period. I had worked sixteen hours the previous day. I read the log book and walked the control panel down.

Roto Rooter a sewer maintenance company, cleaned the sewer lines in the control room during the day and afternoon shifts. The waste water sump operated. The pumps pumped water into the control room. The water was an inch to one and a half inches on the floor. It is known that circuit boards had shorted out and had to be replaced. The fuel safety system was entrained in water. Daryl Helsley the maintenance foreman was supervising a crew of technicians on the sixteenth on replacing and drying out the equipment on the fuel safety cabinet in the computer room which is three levels below the control room. They had completed their work by 22:00. This was before I arrived on the seventeenth

We did not have a fire in the boiler. The fans were off. The drum level was normal. We were waiting for the Fischbach welders to finish their work on number four low pressure heater.

While doing the midnight readings, the boiler exploded. I put my hands over my eyes and waited until the noise stopped.

I called Doug at dispatching . I notified him that we needed to call emergency people in because of the explosion.

I surveyed the control room;

Everything was covered with ash and broken glass. The patio doors had exploded inward. The Aux Buss OCBs had opened. The emergency lighting was on. I noticed a bright light outside. I went outside to see what was going on. The boiler was gone. I told Kirkwood to shut the gas off to the unit. He shut all the gas off. The fire went out. We continued to survey the damage. I Checked the D.C. Emergency power on the turbine lubrication pumps. It was OK. More damage reports came in, Jim Martin had lost his eyeglasses because of being knocked down during the explosion. He was not injured. I made a list of all personnel and their current whereabouts. Worked with the fire department on this list to verify it. Call the appropriate management people. The fire department had requested a structural engineer. Mike Schockey was contacted by some else. Had to make a list of V.I P. people to let them into the plant. The police would not allow anyone access to the plant.

Kirkwood informed me that water was raining down of the power centers and the 4160 buss. We decided to shut off the fire protection system main isolation valve.

Our next concern was the explosive status of the generator. It was decided to vent all the Hydrogen gas from the generator. We informed the fire department that we need to purge the generator with CO^2
The Generator was purged. We were giver direct orders by Jim Martin to evacuate the area. We evacuated the unit.

It is abnormal for the gas valves or any fuel to enter the boiler without all permits being met. If this has occurred, then the cause of operation is an abnormal circuit failure. Failure would be caused by a short circuit. I believe this is the case.

February 18, 1999

Melford H. McLin

By; Melford H. McLin

Exhibit 6

Statement of Cox (KCPL Item #6)

KCPL #6.

February 21, 1999

To: Bob Smith

Re: WasteWater Incident - February 16, 1999

From: Steve Cox

I learned at the 7:15 a.m. work management meeting that we had a stopped up bathroom stool in the control room. Jim Bailey, the "Facilities" Team Leader, announced that he would take care of the problem. Sometime later in the day, I walked past the restroom and noticed that the stool was in a state of disassembly, but no one was working on it at the time. Somebody told me that the Roto-Rooter guy had moved downstairs to get at the stoppage, which was evidently further down the line.

Later in the day, at the 2:45 p.m. work management meeting, we were going around the room, each Team Leader reporting both on their state of readiness to start the boiler back up, and on their work plans for the next day. The Shift Foreman was not present at the meeting. At approximately 3:00 p.m. the meeting was interrupted by a call on my radio from the Shift Foreman. He said that he had an emergency. He had wastewater all over the control room floor. We all left Conference Room B immediately and headed for the control room.

When we arrived at the control room there was a terrible stench and the floor was covered with waste. Several of us spent a couple of hours cleaning up the mess. The Roto-Rooter guys were using a wet-dry vacuum. The rest of us were using squeegees, mops, and rags. We moved lots of furniture, washed and wiped down the lower 3 feet of the walls, and mopped floors.

At some time during the clean up, I had heard that water was running down into the computer room. I went down to see how bad it was. Water was raining through cable trays and was starting to accumulate on the floor. I opened a cabinet that I knew had been stripped of live equipment and could see traces of the water running down the inside back wall of the cabinet.

I went back up to help with the clean up. As we finished up, Roger Parrett took a bucket and a mop and told us that he was going downstairs to start cleaning up the mess. I went down again and saw that Ed Long and Dave Tyrell were drying cards and working inside the cabinets. I knew that Darrel Hensley was staying with them. I saw some water on the floor, but not too much. I also knew that there would not be room for too many of us, in fact I didn't want to get in the Technician's way, so I went to the shower. -

After I cleaned up, I called Jim Teaney, the Plant Manager, at his home. I reported the status of the Low-Pressure Heat Exchanger repair, the wastewater spill, and the fact that the spill had triggered some Burner Management System alarms. I told him that the Technicians were cleaning up the cabinets, drying the boards, and basically correcting the conditions that had triggered the alarms. I believe that it was just a little after 6:00 p.m. when I left for home.

Steve Cox 2/22/99

Exhibit 7

Statement of Irwin (KCPL Item #6)

KCPL #6

February 23, 1999

Mr. Robert G. Smith
KCPL

RE: Hawthorn Incident

Mr. Smith:

I was working the 3-11 shift on Tuesday, February 16 as the Team Leader overseeing the work on the #4 feed water heater. This involved assisting the two Fischbach employees that were working on the heater and making sure that the job was going smoothly. At around 3:00 PM, we were notified of the toilet overflow problem in the control room. I went up to the control to assist, and did so until the spillage was cleaned up.

I also spent 1 or 2 hours in the #5 computer room with misters Hensley, Long and Tyrrell. Though I did not get involved in the technical work on the control problems, I was there to assist in any way possible. I accompanied Mr. Long and Mr. Tyrrell to the storeroom for parts on two occasions.

I left the property at around 11:45 PM, when I learned that Mr. Jim Martin was on his way in to relieve me on the #4 feed water heater job.

Sincerely,

M. M. Irwin 2/23/99

Mike Irwin

Exhibit 8

Statement of Lunsford (KCPL Item #6)

KCPL #6

Lunsford Mike

From: Lunsford Mike
Sent: Monday, February 22, 1999 3:43 PM
To: Smith Bob
Subject: Incident report

Bob Smith
Hawthorn Station
Incident Report for 2-17-99

2-22-99

Upon arrival at work that morning (16th), I relieved T. Stowers, who had worked the 11-7 shift. There was a fire (1 level warm-ups) in the unit at that time. Pressure was around 30 lbs. The fire had been in since 03:38 am. Before leaving for the morning meeting (07:15) I told the operator to go ahead and put another level of gas in. Dispatching had been told that Hawthorn would be on around 10:30 am.

At the morning meeting, I brought up the subject of the control room urinal's. They had not been functioning since early monday morning. The decision was made to have a contractor come in and repair.

We started to pull vacuum around 10:00 or 10:30. We were only able to sustain about 11 inches of vacuum. Operator's and myself started checking area's for reasons. It was found that the #4 L.P. Heater shell repair was causing the low vacuum. I had been told, the previous night, that the heater work would be done by noon tuesday. I contacted Steve Cox and relayed the problem we were having. He checked with the contractor's working on the heater and was told that it would be tuesday before they are done. He told me that they were going to see about getting a different contractor in to finish the work. This was around noon to 13:00 hrs.

I attended a training committee meeting at 13:00 hrs. At 13:30 hrs, Steve called me and told me that it was going to be at least 12 hrs before the heaters would be done. I called the control operator and told him to take all the fuel out of the boiler. This was done, however, the fans were left on at this time.

Upon returning from the training meeting at 14:15 hrs, I noticed the fans still on. I had the operator take the fans off in an effort to keep as much pressure bottled up as possible. The fans were removed from service around 14:30 hrs.

At approximately 14:45 hrs, the control room toilets started to overflow, like someone was backflushing the line and it was coming up here instead of going out the discharge. I called for Steve Cox and J. Martin in an effort to get someone that knew where the contractor, who was working on the toilets, was at this time so he could be told to stop what he was doing. The toilets overflowed for several minutes before stopping. There was raw sewage and water over half of the control room floor and water was running down the holes in the floor for cable routing. Maint. was surveying the damage and cleaning up as much as possible after the water stopped. There was no apparent problems showing up on the BTG board when I left at 15:30 hrs.

M. Lunsford
2-23-99

Exhibit 9

Statement of Fischback (KCPL Item #6)

KCPL #6

2-16-99

Approximately around 3:00 P.M. the control ~~floor~~ room floor was covered with water from a sewage problem.

Ronald A. Fischbach

Exhibit 10

Excerpt of Ronan Tetrieval Diskette

ENTRIES FROM RONAN RETRIEVAL DISK 2

No Type Tag Time Date User Address Real Adr

Page 26

47105 # AC 020 14:53:44.704 Feb-16-99 OPERATOR 02/04/062 02/04/062 FUEL SAFETY SYSTEM AC LOST

47106 # NO 020 14:53:47.022 Feb-16-99 OPERATOR 02/04/062 02/04/062 FUEL SAFETY SYSTEM AC LOST-RESET

Page 27

47125 # AC 020 15:05:27.028 Feb-16-99 OPERATOR 02/04/061 02/04/061 FUEL SAFETY SYSTEM DC LOST

47126 # NO 020 15:05:32.352 Feb-16-99 OPERATOR 02/04/061 02/04/061 FUEL SAFETY SYSTEM DC LOST-RESET

Page 29

47204 # NO 020 15:22:20.360 Feb-16-99 OPERATOR 02/04/060 02/04/060 MFT TRIPPED-RESET

Page 40

47510 # AC 020 19:20:23.442 Feb-16-99 OPERATOR 02/04/060 02/04/060 MFT TRIPPED

47524 # NO 020 21:21:29.263 Feb-16-99 OPERATOR 02/04/060 02/04/060 MFT TRIPPED-RESET

Page 60

47937 # AC 020 00:29:00.463 Feb-17-99 OPERATOR 02/04/060 02/04/060 MFT TRIPPED

47934 # AC 020 00:29:00.463 Feb-17-99 OPERATOR 02/04/061 02/04/061 FUEL SAFETY SYSTEM DC LOST

47931 # AC 020 00:29:00.463 Feb-17-99 OPERATOR 02/04/062 02/04/062 FUEL SAFETY SYSTEM AC LOST

Exhibit 11

Statement of Pender (KCPL Item #6)

KCPL #6

Incident report
Hawthorn Station
Johnny Pender

2-18-99

On 2-16-99, I was on the 3-11 shift. M. Lunsford (Shift Foreman) had just had the control operator take both sets of fans off. The feedwater system was still on, Steve Cox and all of the team leaders was finishing up with sewage that backed up all over the floor in the control room. After that things were normal.

11-7 shift came in about 22:15 hrs. M. Mclin (control operator), A. Kirkwood (roving c.o.), R. Mitchell (P.E.O.), Z. Noland (P.E.A.) and T. Russaw (reliefman). All operators went to check equipment that was still on. Around 23:45 hrs Jim Martin came in to finish with #4 L.P.Htr. I told him that M. Irwin said that Fishbach Co. was going to finish up with #4 L.P.Htr about 10:00 to 12:00 noon on the 17th Martin said he will check on it. He came back and told me that no one was up there, so I said I was going to leave. I gave operators and J. Martin my pager number and I left. When I was going north on I-435 (heard) a boom but I did not see what it was when I exited off I-435 to 210 hwy. I saw the fire and turned around and came back but the Police would not let me in, so I waited, after about 2 hrs, they let me in the gate.

Exhibit 12

KCPL Safety Manual

Production

Safety Rules & Procedures

Safety is the proper planning of work and the exercise of good judgment in completing the work.

RULES BOOK COMMITTEE MEMBERS

Roger Bollinger
Bob Caldwell
Wayne Hall
Ken Kerr
Dave Long
Leroy Goodwin
Bill McGuire
Pat O'Connor
Marvin Price
Bill Radford
Wayne Scott
Darrel Shriner
Bob Smith

ALTERNATES

Gary Grimsley
Clint Harris
Ray Marvin
Doug Weatherman
Gary Wheeler
Gary Phelps
Dale Lawler
Gano Watson

SECTION 1

General and Definitions

1.01 Kansas City Power & Light Company is committed to the concept that safety must be given top priority and appropriate safety precautions are required by all employees in performing company-related activities. This commitment recognizes when appropriate, the need for safety consideration of company employees, the Company's customers, and members of the public.

The safety rules contained in this book have been compiled for the purpose of making work safer for employees and to prevent accidents. By cooperation in the enforcement of and obedience to the rules, accidents WILL be prevented.

While many Sections of this Safety Rule Book make reference to a specific work group, rules in other Sections may also apply. Employees must be familiar with this entire Safety Rule Book in order to work safely.

1.02 Should local, state or federal laws and regulations pertaining to any given condition be more stringent than the KCPL rule, the more stringent law or regulation SHALL prevail.

1.03 The rules that prescribe methods, do so only insofar as they affect safety and are not intended to be a complete description of the procedure for carrying out the work prescribed.

1.04 If the KCPL rules fail to cover the procedure or hazard in question and there are no local, state or federal laws and regulations to cover them, the Company SHALL determine the rule or rules required.

CAUSES OF ACCIDENTS

1.05 The causes of accidents fall into three categories:

(1) those over which we have limited control due to floods, landslides, earthquakes, fires, lightning and other acts of nature;

(2) those due to improper or defective equipment and failure to provide adequate protective devices, and

(3) the element of human error, i.e. memory lapse, poor work habits, etc.

CAUSES OF ACCIDENTS (continued)

Machinery and equipment are as a rule manufactured as perfectly as human ingenuity can conceive. Statistics prove that more than 90 percent of industrial accidents are due to human error or failure to use safety devices provided for accident prevention.

Human error can be divided into two classifications:

(1) failure on the part of the workers to observe safety rules made for their protection and

(2) failure on the part of the supervisor, or others having responsibility over workers, to properly instruct those under their supervision about their duties and to insist that ALL employees observe the safety rules.

1.06 SAFETY IS THE PROPER PLANNING OF WORK AND THE EXERCISE OF GOOD JUDGMENT IN COMPLETING THE WORK.

Experience has proven that the majority of accidents are preventable. The observance and enforcement of safety rules carried out in the proper spirit WILL be a hardship to none, but WILL be a benefit to everyone. The purpose of safety rules is to prevent accidents and to lighten the burden of sorrow and loss which accidents bring to all concerned, but which fall heaviest on the injured victim and his or her family.

DEFINITIONS OF KEY TERMS

1.07 **ALIVE** - See Energized.

1.08 **SHALL, MUST** and **WILL** indicate the provisions which are mandatory. SHOULD or IT IS RECOMMENDED are used to indicate the provisions which are not mandatory because of variation in working conditions; however, if work conditions are of such a nature as to make a non-mandatory rule applicable, then it SHALL be complied with.

1.09 **AUTHORIZED PERSON** - One who is properly qualified to perform specific duties under certain conditions.

1.10 **CONFINED SPACE:** means a space that;

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work, and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that have limited means of entry) and

(3) Is not designed for continuous occupancy.

DEFINITIONS OF KEY TERMS (continued)

1.11 **PERMIT-REQUIRED CONFINED SPACE (PERMIT SPACE):** means a confined space that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere;

(2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

1.12 **COMPETENT PERSON** - is one who, because of experience or training is capable of performing a work assignment with knowledge of the associated hazards, and has the responsibility and authority to take prompt corrective action to eliminate the hazards as well warning other workers of the hazards including what protective equipment or procedures are needed.

1.13 **CONTROL AUTHORITY** - The Control Authority is the person responsible for approving "Requests for Holds" and switching and tagging operations required in connection with HOLDS and for granting of HOLDS on circuits and equipment.

1.14 **DEAD** - Free from any connection to a source of potential difference or electrical charges and being the same potential as that of the earth (i.e. grounded).

1.15 **DE-ENERGIZED** - Physically disconnected from any source of potential difference.

1.16 **EMERGENCY** - When an unusual condition exists that endangers life and/or property.

1.17 **ENERGIZED** (Alive; in motion) - Means electrically connected to a source of potential difference, or electrically charged so as to have a potential difference from that of the ground or different from that of adjacent conductors or equipment. This definition does not include communication lines of less than 100 volts.

1.18 **GROUNDING** - The act of placing adequate shorts and grounds on de-energized conductors or equipment for the purpose of protecting workers while working on such lines or equipment (the act of rendering dead).

1.19 **GUARDED** - Protected by personnel, covered, fenced or enclosed by means of suitable casings, barrier rails, screens, mats, platforms, warning signs, or other suitable devices in accordance with standard barricading tech-

DEFINITIONS OF KEY TERMS (continued)

niques designed to prevent dangerous approach or contact by persons or objects.

1.20 **HIGH VOLTAGE** - Is any voltage greater than 600 volts.

1.21 **HOLD** -

(a) For worker protection: means the certification by the proper authority that a specified line or piece of equipment is de-energized, that the proper precautionary measures have been taken and that the line and/or equipment is being turned over to the workers.

(b) All circuits and equipment WILL be considered "alive" at all times unless fully protected in accordance with the Hold Procedure.

1.22 **HOT LINE TOOLS** - Those tools which are especially designed and tested for work on energized HIGH VOLTAGE lines and equipment.

1.23 **INCIPIENT STAGE FIRE** - A fire which is in the initial or beginning stages and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus.

1.24 **LOW VOLTAGE** - Any voltage 600 volts or less.

1.25 **HOUSEKEEPING** - The maintaining of a clean and neat area to the extent that the nature of the work allows.

1.26 **PRIMARY AREA** - Any area into which a worker can reach, slip or fall contacting any energized HIGH VOLTAGE conductor and/or equipment, including any objects which might extend the workers' reach. The minimum working and clear hot stick distance clearance from the primary area, as defined from OSHA 1926 Std. Subpart V, Table V-I, is as follows:

TABLE V-I

Voltage Range Phase to Phase Kilovolt	Minimum Working and Clear Hot Stick Distance
2.1 to 15	2 ft 0 in
15.1 to 35	2 ft 4 in
35.1 to 46	2 ft 6 in
46.1 to 72.5	3 ft 0 in
72.6 to 121	3 ft 4 in
138 to 145	3 ft 6 in
161 to 169	3 ft 8 in
230 to 242	5 ft 0 in
345 to 362	7 ft 0 in

DEFINITIONS OF KEY TERMS (continued)

1.27 **UNQUALIFIED WORKER WORKING CLEARANCE** - Electrical clearance for workers who do not have the specific training and experience that makes them qualified to work on live electrical parts SHALL maintain the clearance in Table 1.26.

TABLE 1.26
Minimum Electrical Working Clearance
for Unqualified Workers

50 to 120/208 volts	**Avoid contact and/or install insulating barriers**
277 to 480 volts	**Install insulating barriers**
2,300 to 50,000 volts	**10 feet minimum clearance**
161,000 volts	**12.3 feet minimum clearance**
345,000 volts	**16.7 feet minimum clearance**

1.28 **PROTECTIVE DEVICES** - Those devices especially designed for the protection of workers and the public.

1.29 **QUALIFIED PERSON** - One who by reason of experience or training is familiar with the operation to be performed and the hazards involved, unless defined by any other specific Federal Regulation or Standard.

1.30 **SUPERVISOR** - A management employee at any level who is directly or indirectly in charge of workers or a non-management employee who is temporarily promoted to a management position and is directly or indirectly in charge of workers.

1.31 **TOOLS** - All implements of work. Tools will be reviewed by the Tool Committee upon request.

1.32 **VOLTAGE** - The effective potential difference between any two conductors or between a conductor and ground.

SECTION 4

Hold Procedure

GENERAL

4.01 All circuits and equipment, including electrical and mechanical apparatus, steam lines, etc., are classified as either "dead" (grounded, at rest, etc.) or "alive" (energized, in motion, etc.).

4.02 All circuits and equipment MUST be considered "alive" at all times unless fully protected in accordance with the Hold Procedure.

4.03 It is the responsibility of every employee of all operating divisions of the Kansas City Power & Light Company to familiarize themselves with and understand the Hold Procedure, and to fully comply with the various provisions outlined herein.

4.04 A Hold cannot be granted to anyone other than an authorized employee of the Kansas City Power & Light Company.

CONDITIONS UNDER WHICH A HOLD IS REQUIRED

4.05 A Hold MUST be obtained for worker protection whenever "dead" work is to be performed on a completed circuit or equipment or on those portions of circuits and equipment under construction which can be made "alive" through normal sources by the operation of a switch or valve.

4.06 Circuits and equipment under construction or those portions thereof, which cannot be made "alive" through normal sources do not require a Hold; however, if such circuit or equipment can become "alive" accidentally by fallen wires or induced voltages, protection SHALL be provided as set forth in Section 7 (Grounding Guidelines) hereof, before "dead" work is started.

DEFINITIONS

4.07 **CONTROL AUTHORITY:** The Control Authority is the person responsible for approving "Requests for Holds" and switching and tagging operations required in connection with Holds and for granting of Holds on circuits and equipment.

4.08 **AUTHORIZED EMPLOYEE:** An Authorized Employee is any person who has authority to secure a Hold on a specific circuit or equipment which is to be worked as "dead." The employee SHALL obtain a Hold on that particular circuit or equipment, be responsible for making certain that

DEFINITIONS (continued)

sufficient and adequate protection has been provided, and convey to other workers associated with him the limits of the protection and the safe working area.

A RED HOLD CANNOT BE GRANTED FOR ANY SECTION OR EQUIPMENT COVERED BY A BLUE HOLD

4.09 **RED HOLD:** A Red Hold is a condition, wherein a specific circuit or equipment is isolated from all normal sources of energy by having all switches or valves necessary for such isolation placed in the "Protective Position" and tagged with Red Tags. It is granted by a Control Authority to an Authorized Employee. Once granted, it continues to exist until the Authorized Employee properly surrenders the Hold to the Control Authority. Any number of Authorized Employees may be granted a Red Hold on the same circuit or equipment.

A BLUE HOLD CANNOT BE GRANTED FOR ANY SECTION OR EQUIPMENT COVERED BY A RED HOLD OR ANOTHER BLUE HOLD

4.10 **BLUE HOLD:** A Blue Hold is a condition wherein a specific circuit or equipment is initially isolated from all normal sources of energy by having all switches or valves necessary for such isolation placed in the "Protective Position" and tagged with Blue Tags. It is granted when it is known that isolating switches or valves must be operated or tests applied before the work is complete. It permits operation of isolating switches or valves by or under the direct order of the Authorized Employee designated on the Blue Hold only when permission is granted by the Control Authority.

APPLICATION OF A BLUE HOLD

4.11 The following sequence of action SHALL be followed:

(a) Any number of trial operations may be made by utilizing the options on the Blue Hold Form, and additional trials as required by utilizing the Blue Hold Attachment Form.

(b) Clear the machine or equipment of tools and materials.

(c) Remove employees from the machine or equipment area.

(d) Remove each Blue Tag and energy control device.

(e) Energize and proceed with the testing or positioning.

(f) When testing is completed, de-energize all systems and reapply energy control measures in accordance with the Hold Procedure.

(g) Whenever it is necessary to work under a Blue Hold in one section having a common limit point with an adjacent section which is to be worked under a Red Hold, the common limit switch or valve SHALL bear both a Blue and a Red Tag. The Red Tag WILL in this instance, take precedence over the Blue Tag and the switch or valve cannot be operated.

DEFINITION (Continued)

4.12 **SWITCHING ORDER FROM THE TRANSMISSION SYSTEM OPERATOR (DISPATCHER):** This is a condition where a Hold is requested through Transmission System Control Center for Generator Holds, Switch Yard Holds, etc. and Control Authority remains with the Transmission System Control Center.

4.13 **PLANNED HOLD:** A Hold may be written up by an approved planner with switching and tagging performed in advance.

(a) In order for the isolation to be initiated, the lines at the top of the request Planned by, and For MUST bear the name of the employee planning the request and the name of the employee the request is planned for.

(b) A signature MUST be on the request form on the line designated for the Authorized Employee before a Hold can be granted, and

(c) All provisions in section 4.14 through 4.19 WILL be followed.

OBTAINING A HOLD

4.14 A Hold may be hand written or Red Holds can be computer generated. A request for a Hold (Red or Blue) may be made by any authorized employee and SHALL be submitted to the Control Authority as far in advance as practical of the time when the Hold WILL be needed. Such requests SHALL be filled out in ink or computer printed. When errors are made during the hand written request stage, the form must be disposed of by the requesting employee and new form used. Requests SHALL specify the following:

(a) The circuit or equipment, and limits of the Hold (the switches, valves, etc.) between which work is to be done.

(b) The time the Hold is wanted and its approximate duration.

(c) The nature and location of the work to be done and other pertinent information.

(d) When rearrangements are planned a sketch of the changes SHALL also be furnished at the time of the request. This sketch SHALL be dated, signed and marked "proposed."

(e) The signature of the employee making the request.

NOTE: In all cases where there is doubt as to the Authorized Employee's qualifications or his proper knowledge of the rules or equipment, the Control Authority SHALL communicate the facts to one of the applicant's supervisors who WILL then take full responsibility for whatever procedure is followed.

CONTROL AUTHORITY PREPARATION

4.15 The Control Authority SHALL make preparations for the Hold as follows:

(a) Check carefully to make sure that no condition exists which WILL prevent the granting of the proposed Hold.

(b) The Control Authority may add or extend isolation points to the request. however, the Control Authority SHALL NOT delete isolation items from the original request.

(i) When conditions preventing the Hold or an addition to the limits are made the Control Authority SHALL notify the person who originated the request and/or the Authorized Employee as soon as practical.

(ii) The Control Authority SHALL approve the Hold by signature.

(c) On hand written Holds the Control Authority will write out the proper limits and sequence of switching. On computer generated or preprinted Holds the Control Authority verifies the accuracy and modifies if necessary the proper limits and sequence of switching.

(i) The Control Authority SHALL have all switches or valves necessary to secure the equipment or section of equipment isolated from all known sources of energy by properly placing these switches and valves in the protective position and tagged by the Switch Person.

(i) The Switch Person WILL perform isolation steps in the order that appears on the clearance copy of the Hold request form. As each step is performed, the Switch Person WILL check the appropriate box on the form. The Switch Person WILL sign and date the original Hold document upon completion of the switching.

(d) Where instruments are available, the Control Authority SHALL have the instruments read as a check on the isolation of the circuit or equipment against electrical energy, mechanical motion, flow of fluid, gases, rotation, etc.

GRANTING A HOLD

4.16 After the switching has been completed the Control Authority SHALL notify the requesting Authorized Employee of the existing conditions and that he has been granted a Hold. The Control Authority WILL sign, date and time the Hold.

NOTE: A Hold has not been granted until notification has been given to the requesting Authorized Employee.

4.17 The Control Authority may request an interconnected company or a customer to place switches or valves in the proper position to insure the required isolation and to apply an approved tag or sign where the interconnected company or customer has personnel qualified to perform the operation.

AUTHORIZED EMPLOYEES RESPONSIBILITY UNDER A HOLD

4.18 After an Authorized Employee has been granted a Hold, he WILL perform or closely supervise the testing, grounding, immobilizing, etc., as follows:

(a) Check the switches or valves tagged for his protection, i.e. available switch and/or valves on site must be checked and tags initialed by the Authorized Employee. Remote switches and/or valves WILL be checked when practical.

(b) Test, and if found "de-energized" apply protection, such as grounding or immobilizing device, etc., on the "de-energized" side of all possible sources to the working zone, check draining, or render positively "dead" by other approved means.

(c) Proper instructions SHALL be given to all workers as to the extent of the protection and hazards present.

NOTE: When worker protection such as shorts and grounds are applied, the location and identification will be recorded by using the White Tag informational system.

(d) At the beginning of each job, and also at the beginning of each day or shift thereafter, when the job continues for more than one day, the Authorized Employee SHALL explain and point out to all workers under him the exact conditions which exist.

(e) The Authorized Employee SHALL keep the Control Authority advised of any increase or decrease in the estimated time required to complete the work.

4.19 No worker SHALL start work on or close to dangerous circuits or equipment until he or she has received and thoroughly understands the scope of the work and protection limits.

SURRENDERING A HOLD (continued)

4.20 Upon completion of the work, the Authorized Employee SHALL advise all workers under his Hold that they SHALL thereafter consider the circuit or equipment "alive". He SHALL have all workers protection removed which he has applied and see that the circuit or equipment is ready to be made "alive" as far as he is concerned. He SHALL then surrender the Hold to the Control Authority. When surrendering the Hold, the Authorized Employee SHALL:

(a) By his signature:

(i) Confirm that all workers under his Hold are in the clear.

(ii) Confirm that all worker protection applied by him has been removed.

(b) Any changes made, such as reduced capacity, increased load, or new circuit configuration, must be noted and explained clearly. Reference should be made to appropriate circuit diagrams applying to the change.

NOTE: When an Authorized Employee is not at the facility and is unable to properly surrender a Hold, the immediate supervisor on shift SHALL take full responsibility for the surrender of that Hold as per Section 4.20 above. This responsibility includes notification of the Authorized Employee before he resumes work that his Hold has been released, however, this does not eliminate the responsibility of the Authorized Employee of verifying the status of this Hold before continuing work.

4.21 After the last Authorized Employee has surrendered his Hold, by signature the Control Authority SHALL:

(a) Check his diagram and records to see that any changes made do not affect any other outstanding Hold. If not, the circuit or equipment WILL be made ready service as required.

(b) The Control Authority SHALL have the isolation of the section of the circuit or equipment removed by writing out the proper limits and sequence of switching. Computer generated Holds may have this printed on the form.

(c) The Control Authority SHALL have all switches or valves placed in the required operating position by the switch person.

(i) The switch person WILL sign and date the original form and all of the tags upon release and completion of the switching.

(ii) The switching order is to be used for reference by the switch person as the Hold is released.

(d) A complete record SHALL be made of all transactions relating to a Hold. All signatures SHALL be proper names. All records, including the Original Hold form, tags, switching orders, etc., SHALL be returned to the Control Authority upon completion of the work. The Control Authority WILL retain the original Hold form, tags and other pertinent documents. These records WILL be forwarded to the Station Safety Representative for review and kept for a period of a minimum of five years.

SPECIAL CASES

4.22 Since there are different levels of Control Authorities on our system to cover all of the various classes of circuits and equipment, the top Control Authority, Vice President of Power Production, WILL delegate Control Authority. Control Authority WILL be permitted to take control from, or pass control to, a lower, or sub-control authority, as emergencies, lack of communications, or specific complexities of the system dictate.

4.23 The Control Authority may grant switching and tagging protection on circuits or equipment controlled by the Kansas City Power & Light Company to a recognized dispatching authority of other companies such as other utility or steam customers in accordance with provisions outlined in Section 4.15 (a) and 4.16 of these rules. However, the Control Authority SHALL NEVER grant, or otherwise assume responsibility for a Hold to any employee of another company.

4.24 If for any reason it is not possible to comply with a section of the Hold Procedure, the Plant Manager or his designated representative SHALL be advised at once. He and the Director of the System Control Center or his designated representative SHALL decide what emergency action WILL be taken.

NOTE: The type of equipment used on certain portions of the system may make it impossible to comply completely with all sections of these rules. In such cases, adequate protection of workers on that equipment SHALL be made by the Plant Manager or his designated representative, and such protection methods agreed upon by the Manager of Safety or designated representative and affected Control Authority.

Exhibit 13

Hawthorn 5 Hold Tags (KCPL Item #30)

RED HOLD No. 99-0116

Submitted by ______________________________

lanned by ______________________________ For ______________________________

CIRCUIT OR EQUIPMENT: 5-BO-HOLD #1 #5 BOILER HOLD #1	Work Will Start 1:00 am Date 02/13/9 Approx. Compl. 4:00 pm Date 02/15/9 Completed 12 05/Am Date 2/16/99

ork to be done: BOILER REPAIRS

imits of Hold Requested: AT GAS HOUSE CLOSE AND TAG VALVES 5-FG-4, 5-FG-8, 5-FG-12, 5-FG-16, 5-FG-20. AT PLATFORM BY "A" LOAD CENTER, CLOSE AND TAG VALVE 5-HPS-88, AND 5-HPS-87. 10TH FL.LIGHTING PANEL #35, OPEN & TAG BREAKE #12 TO S. ECONOMIZER SONIC BLOWER. 10TH FL. LIGHTING PANEL #38, OPEN AND TAG BREAKER #6 TO N. ECONOMIZER SONIC BLOWER. 4TH FLOOR PLACE POWER SWITCH ON AIR HEATER SONIC SOOTBLOWER IN OFF POSITION AND CLOSE AIR SUPPLY AND TAG. Close + Tag Williams Valve

ed Page - Original Copies for Release, Clearance, and Authorization Employe

Item No. 30

Exhibit 14

Statement of Hensley (KCPL Item #6)

LIMITS & SEQUENCE OF HOLD CLEARANCE	✓	SEQUENCE OF HOLD RELEASE	✓
8) OPEN 5-LP35-BRKR 12, S ECON SONIC BLOWER BRKR, AND TAG.	✓	8) REMOVE TAG AND NORMAL 5-FG-16, FUEL GAS BLOCK VLV.	RPM
9) OPEN 5-LP38-BRKR 6, N ECONOMIZER SONIC BLOWER BRKR, AND TAG.	✓	9) REMOVE TAG AND NORMAL 5-FG-12, FUEL GAS BLOCK VLV.	RPM
10) PLACE IN OFF POSITION 5-ASSB-SWITCH, #5 AIR HEATER SONIC SOOTBLOWER, AND TAG.	✓	10) REMOVE TAG AND NORMAL 5-FG-8, FUEL GAS BLOCK VLV.	RPM
11) CLOSE 5-SA-136, AIR SUPPLY VLV AH SONIC BLOWER, AND TAG.	✓	11) REMOVE TAG AND NORMAL 5-FG-4, FUEL GAS BLOCK VLV.	RPM
12) Close + Tag Williams Gas Valve	AK	12) Remove TAG AND Open Williams Gas Valve	RPM

Switchman R Paul A. Thurlood — Switchman _____

Time 0500 P.M. (A.M.) Date 2-13-99 — Time _____ A.M. P.M. Date _____

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RED HOLD No. 99-0116

LIMITS & SEQUENCE OF HOLD CLEARANCE	✓	SEQUENCE OF HOLD RELEASE	✓
8) OPEN 5-LP35-BRKR 12, S ECON SONIC BLOWER BRKR, AND TAG.	✓	8) REMOVE TAG AND NORMAL 5-FG-16, FUEL GAS BLOCK VLV.	RPM
9) OPEN 5-LP38-BRKR 6, N ECONOMIZER SONIC BLOWER BRKR, AND TAG.	✓	9) REMOVE TAG AND NORMAL 5-FG-12, FUEL GAS BLOCK VLV.	RPM
10) PLACE IN OFF POSITION 5-ASSB-SWITCH, #5 AIR HEATER SONIC SOOTBLOWER, AND TAG.	✓	10) REMOVE TAG AND NORMAL 5-FG-8, FUEL GAS BLOCK VLV.	RPM
11) CLOSE 5-SA-136, AIR SUPPLY VLV AH SONIC BLOWER, AND TAG.	✓	11) REMOVE TAG AND NORMAL 5-FG-4, FUEL GAS BLOCK VLV.	RPM
12) Close + Tag Williams Gas Valve	AK	12) Remove TAG AND Open Williams Gas Valve	RPM

Time 0500 A.M. / P.M. Date 2-13-99 Time _____ A.M. / P.M. Date _____

Red Page - Original Copies for Release, Clearance, and Authorized Employee

Exhibit 14

Statement of Hensley (KCPL Item #6)

2-1849 &CPL #6

3pm 2-16-99 Afternoon MTG
Informed that water running in Control Room + Down on DCS Control System.
Proceeded to put plastic + things over Controls
Stayed over 8-11 shift with Elec/Tech to Repair Burner Management System. Midnight shift Come in I informed them were we were in repair, gathered things for job
12:30 big Noise, Bldg - shaking, lights went out. We were in the Computer room About 30 secs later emergency lights came on I saw roof Shaky. We decided time to Run - Ran out to exit the tech shop door it was destroyed stopped, Exited out #5 Main Transformer Door west side looked over shoulder + Saw Huge orange flame + No Boiler Two welders past me + said it Blew up in his face he was holding his hand + appeared to have minor injury I told them to go to front gate + wait. I tried to Dial 911 on Cell phone it wouldn't connect, I tried to contact Tenney on two way. Discussed whether or not to go to Control Room for Assistance due to the Structure + fire decided to go to the front. Met Jim Martin all Accounted except Mclin then found him. Contact Tenney at Home + Cop.

Daniel Ansley

Exhibit 15

Statement of Boylan (KCPL Item #6)

KCPL #6

RB
2-17-99

I arrived on site at about 11:10 PM for a call-in from D. Sawsley which I recieved at home at about 4:00 P.M. 2-17-99

After arriving on site, I went to the elect. shop and got my work clothes on and picked up my handtools. I then went to the #5 control room and talked to the control operators about the reason for my call-in. I was told to find Darrel Hensley about work to be done in the computer room.

I found D. Hensley in the tech. shop and talked briefly to Ed Long about what I was needed for on the shift. I was to assist the tech. coming on shift in the replacement of a relay before start-up of the unit.

D. Hensley, the tech (Bill Hanna), I myself then went to the computer room and looked at the job to be done and a discussion of what the best way to change out the relay.

We got the tools and equipment we thought would be needed and were just setting down at the job when the unit exploded.

Ray D. Lyle
2-18-99

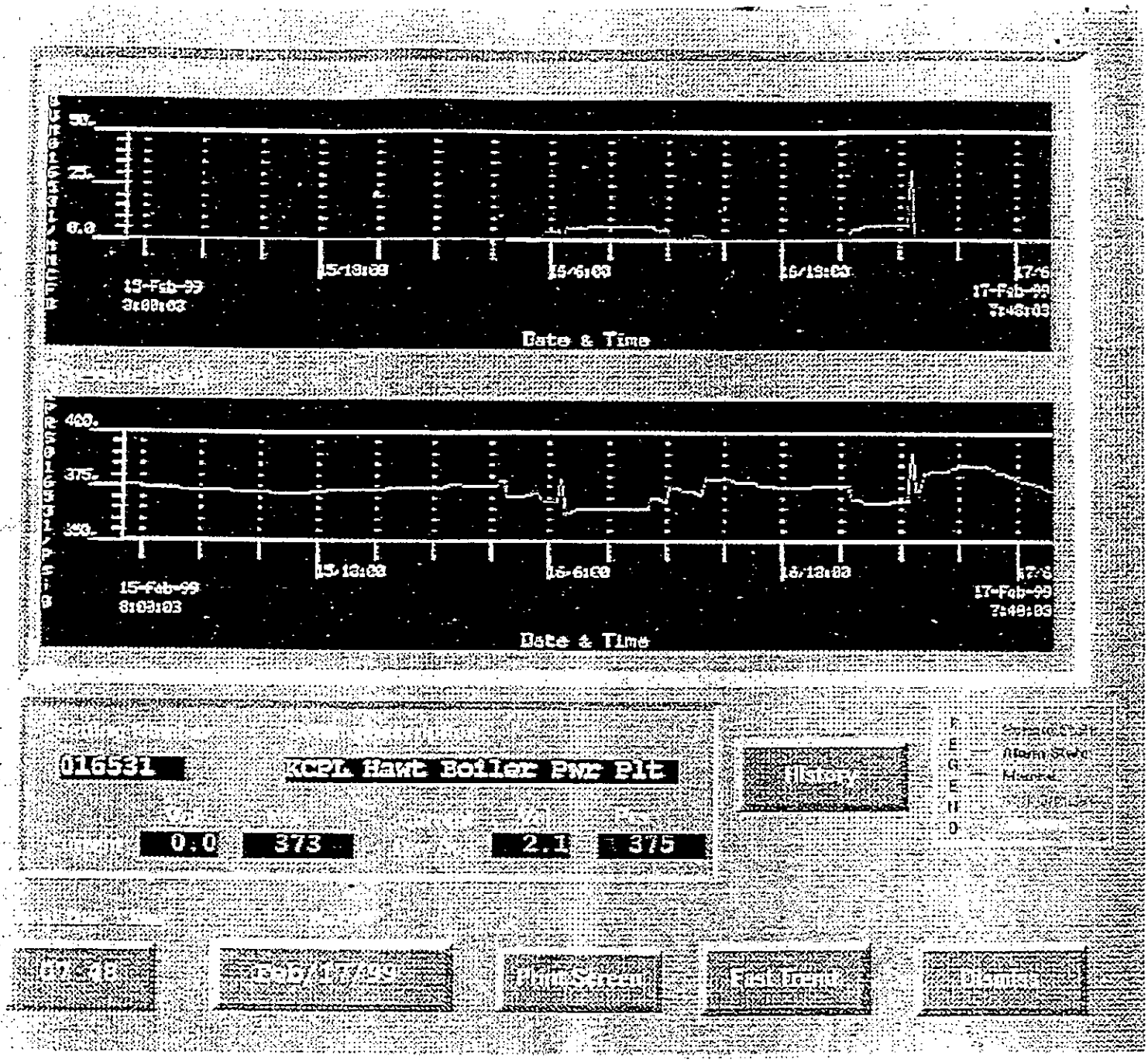
Exhibit 16

Williams Gas Charts (KCPL Item #53)

Hawthorn 5 Explosion

Correspondence Transmittal Sheet

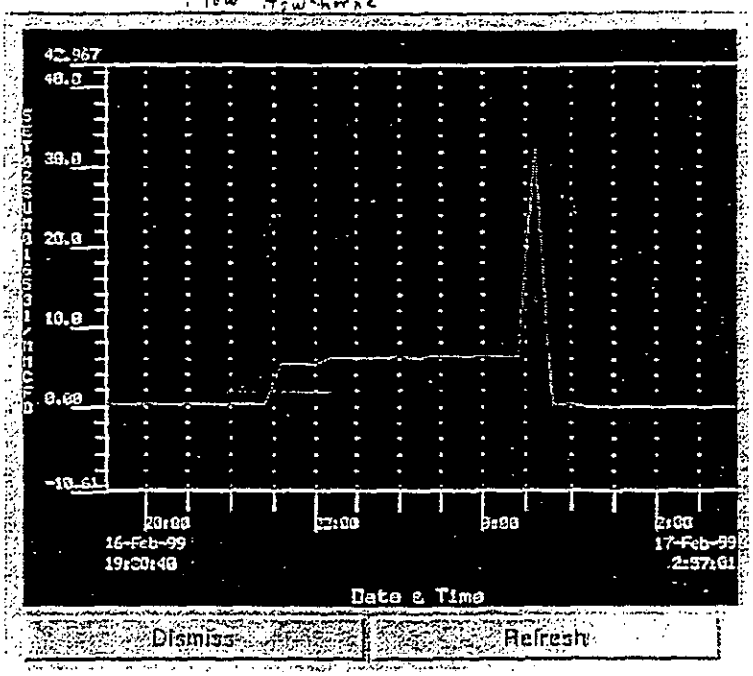
TO:	**File Copy**	
Date:	**3/17/99**	
Unit #:	**Hawthorn 5**	
Item No.	**Item Description**	
53	Williams Gas Charts (flow & pressure), from Williams through Lacinda Kramer. 3 sheets	03/17/99



KCPL Item No.

53

Flow Hawthorne



Flowline

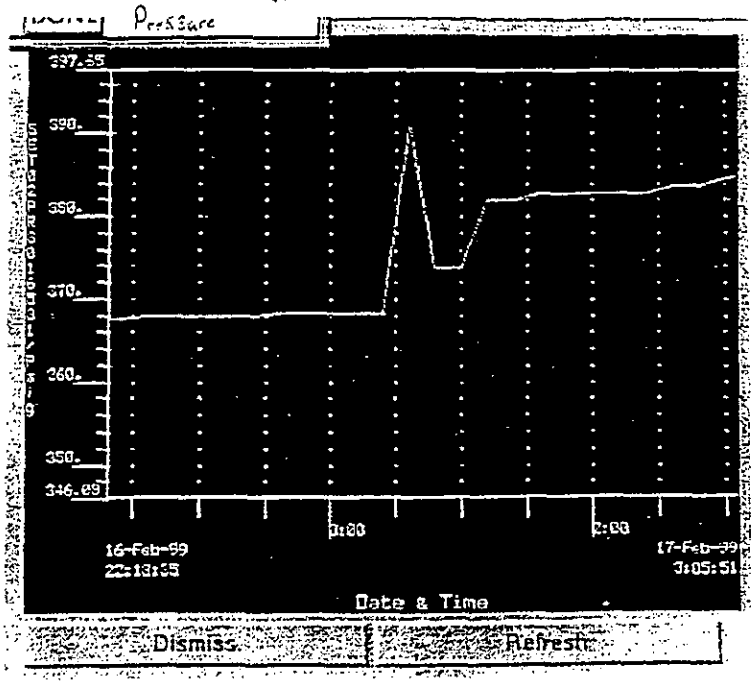

Pressure
337.55
390.
380.
370.
360.
350.
346.89
16-Feb-99
22:13:55
17-Feb-99
3:05:51
Date & Time
Dismiss
Refresh

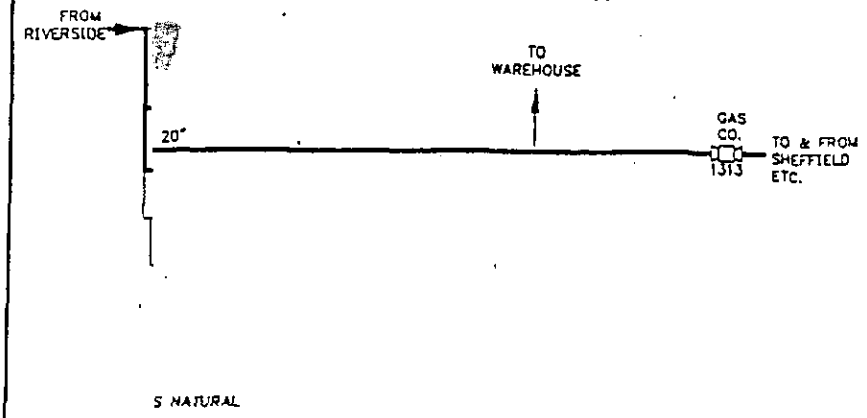
Exhibit 17

Piping and Instrument Drawing,
Sheets 01, 02, 03, Fuel Gas System
(KCPL Item #46)

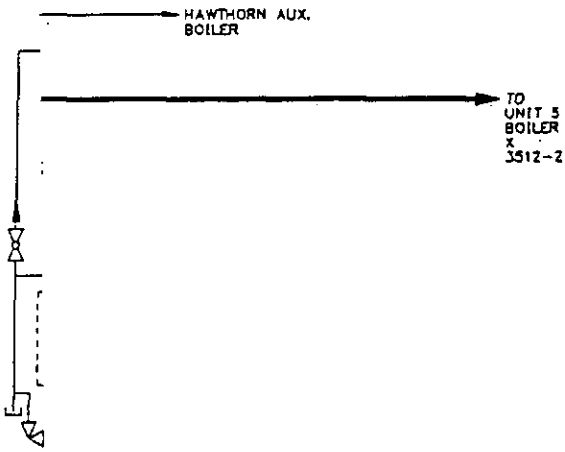
#5 FUEL GAS P & I D's

LVE 1313 24' NORTH OF SOUTH PROPERTY LINE
15' WEST OF SOUTHEAST PROPERTY LINE COAL YARD

LVE 1314 37'6" EAST OF EAST LINE OF METER HOUSE
4'6" NORTH OF NORTH LINE OF METER HOUSE



S NATURAL



NOTIFY
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1: USE 1

2. THE 8
16 SCM
THE O

3. USE 6
(PILOT

4. THE 6
OF 25

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RANGE

KCPL ITEM NO. 46

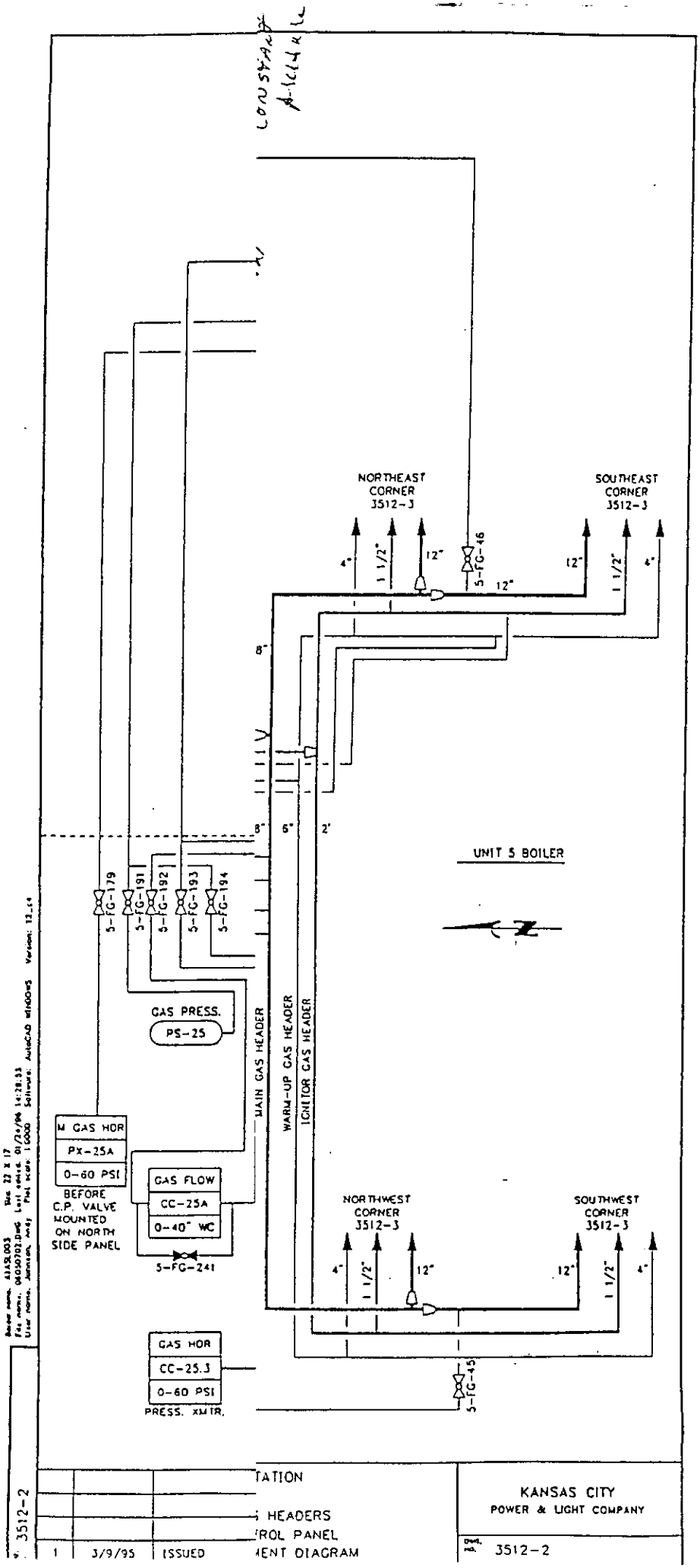
REV.	REV. DATE	
2	02/26/99	R
1	03/09/95	I

HAWTHORN STATION
UNIT 5
FUEL
FUEL GAS SYSTEM
AND INSTRUMENT DIAGRAM

KANSAS CITY
POWER & LIGHT COMPANY

DWG. NO. 3512-01

DWG. NO. 3512-01



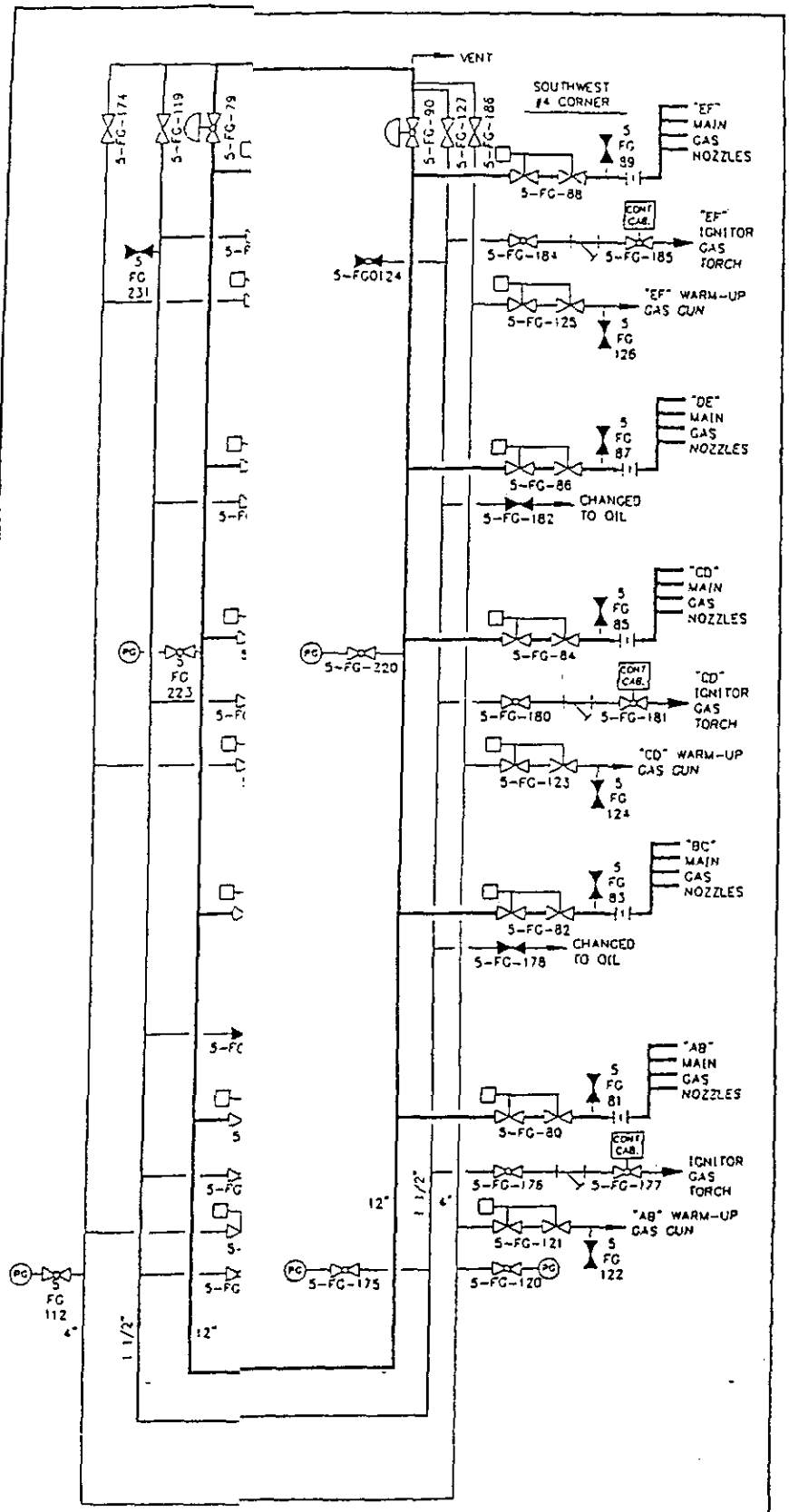
3512-2

		TATION
		HEADERS
		ROL PANEL
1	3/9/95	ISSUED

ENT DIAGRAM

KANSAS CITY
POWER & LIGHT COMPANY

3512-2



		STATION 5 & MAIN GAS SUPPLY PANEL UMENT DIAGRAM	KANSAS CITY POWER & LIGHT COMPANY
1	03/09/95	ISSUED	3512-03
REV	REV DATE		

3512-03

Exhibit 18

Statement of Stack (KCPL Item #6)

Smith Bob

From: Stack Don
Sent: Monday, February 22, 1999 1:58 PM
To: Smith Bob
Subject: Report On 2/17/99

Statement about explosion of 2/17/99:

Some time after 12:00 AM I was sitting at computer in the H-5 laboratory getting ready to check my email. In quick sucession, like a split second apart, the electricity went out, there was a tremendous explosion, there was a huge shock wave and flying debris and dust. My immediate instinct was to dive for the floor and cover up which is what I did and I think that the shock wave helped me to the floor. As I was going down I could see debris flying everywhere both inside and outside the lab. The building moved and shook from the explosion and shock wave. When I hit the floor I could feel stuff falling on me so I pulled out a lab drawer over my head. It was over in seconds and I got to my feet to evacuate. There was a cloud of dust in the air getting into my mouth, eyes, and nose. There are 2 doors to the lab. I tried to excape to the plant door but there was debris everywhere and there looked like a glow in the plant direction. I tried the fire excape door but the was large sheetmetal and duct work hanging over the door when I opened it. I got a flashlight (room had some emergency light on by this time). I headed outside exiting by way of stairs next to control room. I went to road by store room and turned around to see the destruction done. In what seemed like a few minutes, the structure housing the boiler had been reduced to rubble and there was a huge ball of fire burning in the middle of it. The ball of fire gradually got smaller as the main gas valve was closed. I went to control room for the next 15 to 30 minutes. McClin was calling supervisory personal. Debris all over control room and broken windows. All personal were told to get out of area and go to fuel foreman's office. I was there the rest of the night.

Don Stack
#2302

Exhibit 19

Statement of Kirkwood (KCPL Item #6)

KCPL FF&

On Feb 17 1998 I was working on Hawthorn Unit 5 as the Rover. Shortly after 11 pm I obtained hourly readings and returned to control room. At approx 1230am I was helping R Utterback (trainee) with the midnight readings. At that time the North sliding glass door exploded in with a large bang. The ceiling also fell in. It was soon determined that the boiler had exploded and there was a large fire at the bottom of the rubble. I then went to close the williams gas valve. Returned to Cont. Room briefly before going to 3rd floor to check on fishback contractors who were working on #4 HR. Finding them gone I returned to C Room. It was soon determined that all power was lost and the H_2 needs to be removed from #5 Gen. I isolated H_2 tank at same. H_2 was vented to 0 psi. I then evacuated to Coal office. At about 4 AM I returned to #5 Gen to purge with CO_2. Left plant at 0515

2-18-98 Alan R. Kirkwood

Exhibit 20

Statement of Martin (KCPL Item #6)

Feb 18, 1999

'200 a.m. I entered the plant about 1200 midnight to check on work done to #4 LP Heater by contractors.
I then went to control room and talk to J. Fender the operators. Fender wanted to known status of heater work. I went back to feeder deck and contractors were not there. I assume they were on break, so I went back to control room. Fender said that he would be here so I back up to feeder deck with 7 to 10 min. - and contractors were not there so I went back to control room and I would say I was there about One to two minutes
'230 a.m. before the Explosion.

I was knocked down on the deck. And lost my safety glasses, I could not see anything because of dust and lights were out, A couple of operator stay over me while I was looking for my glasses. Once I found my glasses, I exit building and notice A large fire over where the boiler was, also I notice A. Kirkland walking toward main gas line, so I followed to assist him. Once the fire was out I started looking for personnel.

KCPL 96

Went to front office building and found some employees, also called Tracy and S. Cox.
Went looking for Mel. Wehrin, also found another gas line leak. to Aux boiler, operators shut it down.
Found out McLinn and Kirkwood were in the control, went to control room and inform them they need to leave.
They inform me that hydrogen need to be vented from turbine and shut down D.C. Generator. I told them I would go with them and once this was done we need to go to front office.
Also I inform operators we need to check H-6 gas lines which they did.
Myself and operator went back to front office.

Exhibit 21

Statement of Utterback (KCPL Item #6)

0945 | #6

Rick Uterback was training on the Control Board with Mel McLin, Control Operator, a Alan Kirkwood, Roving Control Operator. He was ~~working on~~ the midnight readings when there was an explosion at approximately 0025. The windows were breaking, ceiling tile was falling and the air was full of dust. Mel McLin looked out and said the boiler was gone. Rick ran to look and saw the boiler was gone and there was a fireball. He ran to the main gas valve to shut it off. When he got there Alan Kirkwood was there shutting the valve. Rick ran back to the lockerroom to get a flashlight, he then started to go back to the Control Room when Jim Martin, Team Leader, yelled at him to come back to the Fuel Foremans office area and not to go back to the Control Room. When he got to the Fuel office area the Fire Department was there. The Fire Department then drove down ~~the~~ east side of the precipatator house. They called back to say they heard gas blowing. Rick, Jim Martin, Tony Russaw, and Roland Mitchell went by truck to the main gas valve. Rick went to the gas valve and found the 3" valve to the donkey boiler open. He needed a wrench to get the valve shut so he returned to the truck. Tony Russaw and Roland Mitchell took a valve wrench to close the 3" valve while Rick went to get a pipe wrench. While Rick was gone Tony and Roland got the valve closed. All four

people returned to the Fuel Foremans office are until time to go home. This report was written by Roger Ballinger as told by Rick Utterback on 2-18-99.

Richard Utterback

Roger Ballinger

Exhibit 22

Excerpt of "1 Finished Draft Valve Log" Diskette

COMPONENT ID		COMPONENT USE	SCENE RETRIEVAL INFORM			REFERENCE					NOTES
Line #	Component ID Number (P & ID #)	Purpose	Date Recovered	Component Description	Open / Closurements / x. Press.	Calibrt. Record	Repair History	KCP Doc	CIS Doc.	CIS Evid. No.	
21	5FG-021 (3512 - 2)	Isolation Valve from 24" Gas Meters to Press. Cont. Valve	04/29/99	Rockwell Nordstrom, 24", no gate	Open/A					5.000	CONSTANT PRESSURE VLV
22	5FG-022 (3512 - 2)	Pressure Control Valve at Main Gas Header	04/29/99	26-25-70075-01 200PSI Hydro	Open/A	144	Yes	181	245.0029	5.001	CONSTANT PRESSURE VLV
23	5FG-023 (3512 - 2)	Isolation Valve to 5FG-24	06/18/99	Rockwell, 24"	Open/A					5.002	
24	5FG-024 (3512 - 2)	Pressure Control Valve to 5FG-25 Main Gas Trip Valve	06/19/99	Rockwell, 24"	Open/O		Yes	182	245.0030	5.003	
27	5FG-027 (3512 - 2)	Flow Ctrl. Valve to Main Gas Header Mop Gas Min. Pressure Regulator	06/19/99	Fischer, 10" W/REG.,	Open/A			185	245.0033	5.004	
55	5FG-051-1 (3512 - 3)	Burner NW Corner CD Lvl Main Gas Vlv.	07/16/99	Rockwell, 6"	Open/A			192	245.0040	1.015	
56	5FG-051-2 (3512 - 3)	Burner NW Corner CD Lvl Main Gas Vlv	07/16/99	Rockwell, 6"	Open/A			192	245.0040	1.016	

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

GST Steel Company, Complainant	)	
v.	)	Case No. EC-99-553
Kansas City Power & Light Company, Respondent	)	

AFFIDAVIT OF JERRY N. WARD

STATE OF MISSOURI)
) ss
COUNTY OF JACKSON)

Jerry N. Ward, of lawful age and being duly sworn, deposes and state:

1. My name is Jerry N. Ward. I am a consultant to GDS Associates, Inc. testifying on behalf of GST Steel Company.

2. Attached hereto and made a part hereof for all purposes is my surrebuttal testimony consisting of pages 1 through 22.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Jerry N. Ward

Subscribed and sworn to me this 31st day of March of 2000.

Notary Public

My commission expires Notary Public, Cobb County, Georgia. My Commission Expires Jan. 7, 2003.