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PROOF OF CONCEPT TESTING OF AN INTEGRATED DRY INJECTION SYSTEM FOR SO_2/NO_x CONTROL

FINAL REPORT

MARCH, 1994

PREPARED BY

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RESEARCH-COTTRELL

AND

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DOE CONTRACT NO. DE-AC22-88PC88890

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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1-1

2.0 INTRODUCTION 2-1

3.0 SUBSCALE TESTING 3-1
3.1 Background 3-1
3.2 Objectives 3-1
3.3 Test Procedures 3-2
3.4 Calcium Hydroxide Injection Results 3-4
3.5 Sodium Injection Results 3-4
3.6 Subscale Testing Conclusions 3-8
3.7 Recommendations for Proof of Concept Tests 3-9

4.0 PROOF OF CONCEPT SYSTEM 4-1
4.1 Heat Exchanger Specifications 4-1
4.1.1 Economizer 4-1
4.1.2 Air Heater 4-4
4.2 Cold Side Duct 4-4
4.3 Electrostatic Precipitator and Baghouse 4-4
4.4 Instrumentation and Control 4-6
4.5 Sorbent Storage and Transport 4-6
4.6 System Chart Recorder 4-8
4.7 Gas Analysis 4-8

5.0 PROOF OF CONCEPT TEST PROGRAM 5-1

6.0 START-UP AND CALIBRATION 6-1
6.1 Sorbent Feeding Systems 6-1
6.1.1 Calcium Feeder Refilling 6-1
6.1.2 Calcium Feeder Setup/Calibration 6-1
6.1.3 Calcium Transport/Injection System 6-1
6.1.4 Sodium Injection System 6-2
6.2 Flow Measurement 6-2
6.2.1 Venturi Calibration 6-2
6.2.2 ESP Humidification System 6-2
6.3 Burner 6-2
6.4 Heat Exchangers 6-3
6.5 Other Components 6-3
6.5.1 System Blowers 6-3
6.5.2 Solids and Removal System 6-3

7.0 PROOF OF CONCEPT TEST RESULTS 7-1
7.1 Mixing Studies 7-1
7.2 SO_2/NO_x Studies 7-1
7.3 Electrostatic Precipitator Results 7-20
7.4 Material Balance 7-26
7.4.1 Total Loading 7-26
7.4.2 Utilization 7-28

8.0 WASTE CHARACTERIZATION 8-1

9.0 ECONOMIC EVALUATION 9-1

10.0 CONCLUSIONS 10-1

11.0 REFERENCES 11-1

APPENDIX I Subscale Sodium Injection Tabular Results

APPENDIX II Proof of Concept Testing Condensed Numeric Data

APPENDIX III Proof of Concept Testing Condensed Graphical Data

1.0 EXECUTIVE SUMMARY

The team of Research-Cottrell and Riley Stoker have conducted a proof of concept demonstration of an Integrated Dry Injection process, under U.S. Department of Energy contract with co-funding by the Electric Power Research Institute, the Illinois Department of Energy and Natural Resources, the New England Power Company, and the Church & Dwight Company. A Utility Review Committee, consisting of representatives from New England Power Service Co., Ohio Edison Co., Ontario Hydro, and Pennsylvania Electric Co. provided guidance throughout the program with respect to the needs and concerns of the utility industry.

The process consists of combustion modification using low NO_x burners to reduce NO_x emissions, dry injection of hydrated lime at economizer temperatures for primary capture of SO_2, dry injection of a commercial grade sodium bicarbonate at the air heater exit for additional SO_2 and NO_x removal, and evaporative cooling for precipitator conditioning. Hydrated lime at $84/ton is relatively inexpensive, but not as effective for SO_2 removal as the more expensive sodium bicarbonate at $200/ton. The initial injection of hydrated lime and subsequent injection of sodium bicarbonate results in the lowest cost and optimum utilization of each sorbent to achieve the highest SO_2 removal.

Subscale tests were performed in order to identify the best calcium and sodium sorbents. These tests involved the injection of calcium hydroxide and sodium sorbents at various points of the flue gas system downstream of a 0.25 MM BTU/hr. coal fired combustor, and the gas residence times, cooling rates and temperatures were comparable to those found for full-scale utility boilers. These tests verified that a high surface area hydrated lime provides maximum sorbent utilization and identified an alcohol-water hydrated lime as yielding the highest surface area and the best SO_2 removal capability. The tests also identified sodium bicarbonate to be somewhat more effective than sodium sesquicarbonate for SO_2 removal.

The proof of concept demonstration was conducted on the large combustor at the Riley Stoker Research Facility in Worcester, MA. The demonstration plant begins with a combustor equipped with a low NO_x burner firing at a rate of 50 million BTU/hr. A slip stream of flue gas from the combustor is routed to a heat exchanger in order to reduce temperature of the gas entering the simulated economizer to 900-1100°F. The hydrated lime is injected at this point. The gas exits the economizer section at 650-750°F and is then cooled in a simulated air heater to 300°F. Dry sodium bicarbonate is injected in the flue gas exiting the air preheater. Subsequent humidification of the flue gas with a water spray is used to enhance precipitator performance. Overall, the proof of concept demonstration showed that 90% SO_2 and 65% NO_x removal can be accomplished through a combination of low NO_x burners, calcium to sulfur mole ratio of 2, and normalized sodium to sulfur mole ratio of 1. Furthermore this can be accomplished while maintaining precipitator efficiency to pre-sorbent injection levels through the use of evaporative

cooling.

The mixed sorbent-flyash waste material can be fixated through water addition to a structurally acceptable landfill material, but the leaching of sodium compounds may preclude its acceptability in some landfills.

When economically compared to conventional limestone slurry scrubbing on a 300 MW plant, the dry injection process shows lower capital cost but higher operating cost ($560/ton SO_2 vs. $341/ton SO_2). Hydrated lime injection can be less costly than limestone scrubbing when two or more of the following conditions exist:

- The plant is small (less than 100MW)
- Yearly operating hours are small (less than 3000)
- The remaining plant lifetime is small (less than 10 years)

These conditions are most likely to be found among the population of industrial boilers.

2.0 INTRODUCTION

The Integrated Dry Injection Process (IDIP) consists of combustion modification using low NO_x burners to reduce NO_x emissions, dry injection of hydrated lime at economizer temperatures for primary capture of SO_2, dry injection of a commercial grade sodium bicarbonate at the air heater exit for additional SO_2 and NO_x removal, and humidification for precipitator conditioning. This concept is illustrated in Figure 2-1. IDIP offers the potential for simultaneously achieving 90% SO_2 removal, and 65% NO_x removal from a high sulfur flue gas. The process is well suited for new or retrofit applications since it can be incorporated within existing economizer and downstream ductwork.

The ability of hydrated limes to react rapidly with SO_2 at temperatures below 1200°F was first noted in the EPRI-sponsored Dry Sorbent Emission Control program when optimizing sorbent injectors on a pilot facility. These tests showed that SO_2 capture levels with pressure hydrated dolomite decreased as the injection temperature was gradually reduced from 1800°F to approximately 1200°F and then again increased with further reductions in injection temperature. This prompted a short study at the Southern Research Institute where pressure hydrated dolomite was injected at temperatures ranging from 2800°F to 200°F. As shown in Figure 2-2, a second sulfation window was verified between 1200°F and 800°F.[1]

Unlike the higher temperature sulfation window around 2000°F where $CaSO_4$ is the only thermodynamically stable compound, $CaCO_3$ is also a stable specie in the temperature range 1200°F - 800°F. The amount of SO_2 capture will initially depend on the rate of three competing reactions.[2]

$$Ca(OH)_2 + SO_2 \rightarrow CaSO_3 + H_2O \quad (1)$$
$$CA(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O \quad (2)$$
$$Ca(OH)_2 \rightarrow CaO + H_2O \quad (3)$$

Maximizing SO_2 removal by hydrates injected at around 1000°F requires optimization of both sorbent and process parameters. Two parameters appear to control the hydrate's ability to remove SO_2. The initial sorbent porosity (or surface area) is a good indicator of the hydrate's ability to react with either SO_2 or CO_2. The second important hydrate characteristic for enhancing SO_2 removal is particle size. Because the chemical reaction rate is so fast, bulk diffusion of SO_2 to the particle can be a controlling factor unless the particles have a mass mean diameter of less than 5 microns.[2]

Figure 2-1 Integrated Dry Injection Concept

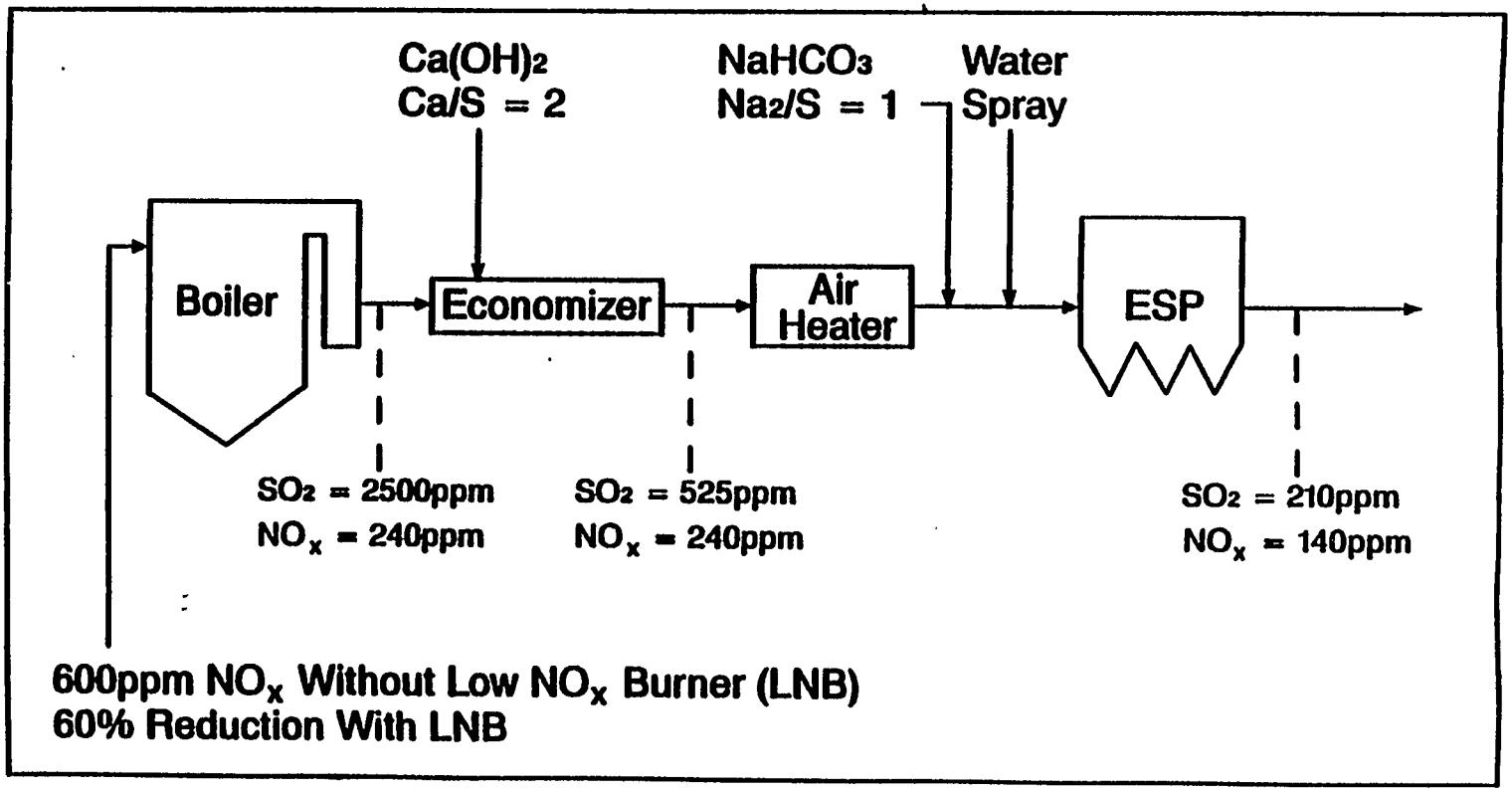
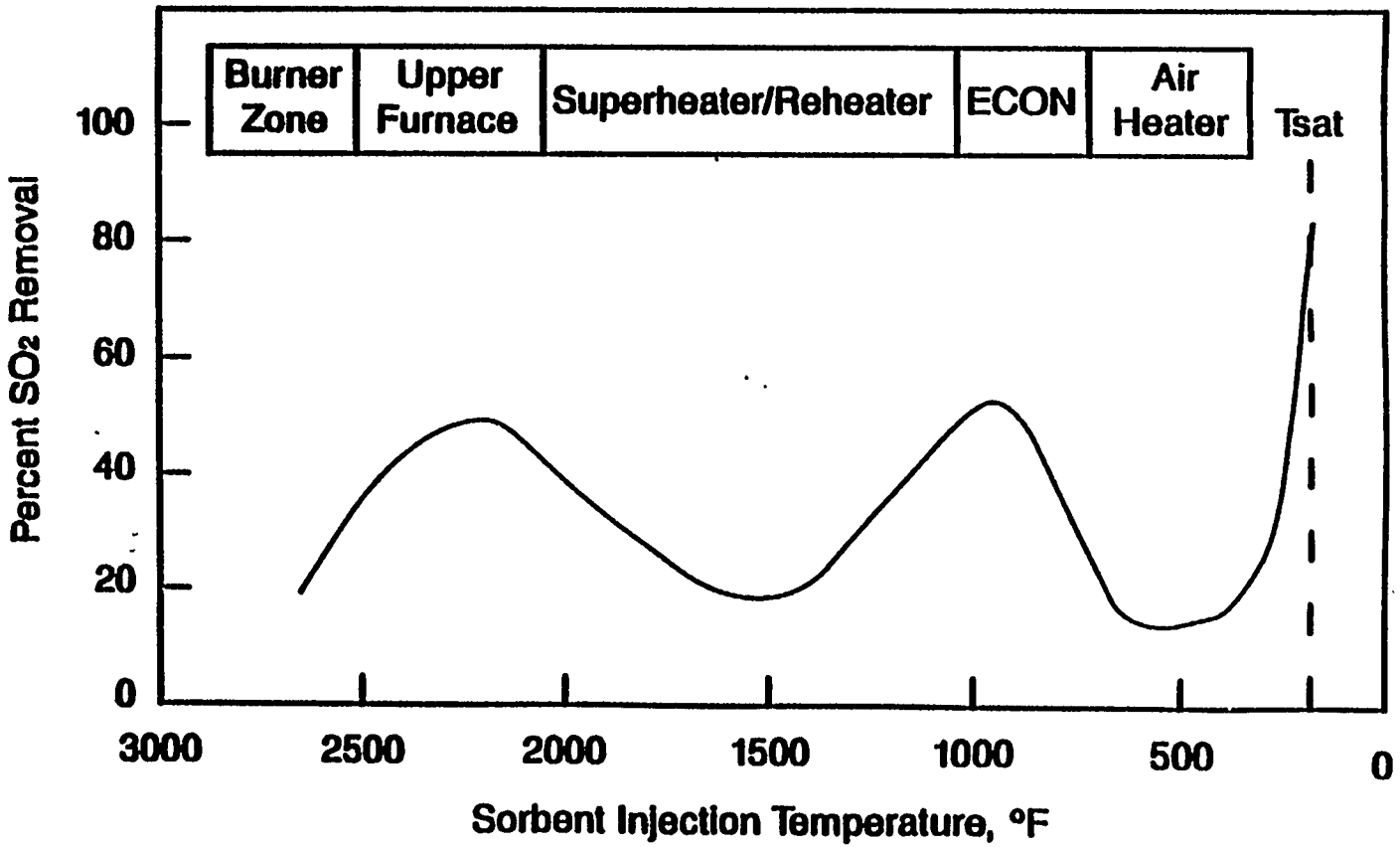


Figure 2-2 Temperature Windows for Hydrated Lime Injection



When sodium bicarbonate is injected into a flue gas between 200°F and 400°F, the following reactions can occur.

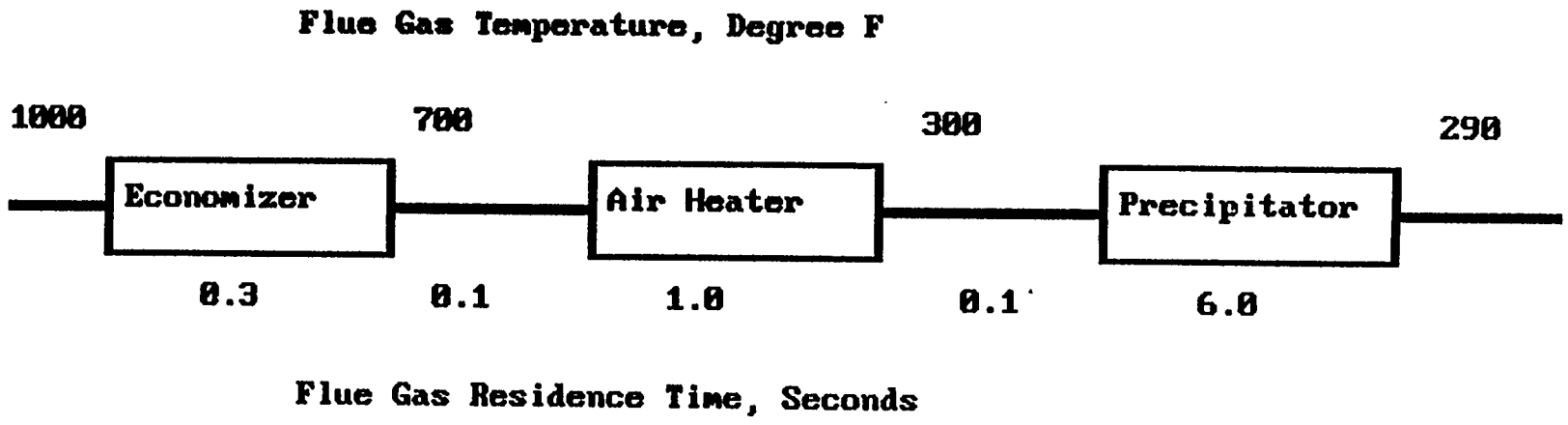
$$2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O \quad (4)$$
$$Na_2CO_3 + SO_2 \rightarrow Na_2SO_3 + CO_2 \quad (5)$$
$$Na_2CO_3 + SO_2 + 1/2\ O_2 \rightarrow Na_2SO_4 + CO_2 \quad (6)$$
$$4Na_2CO_3 + SO_2 + 2NO + O_2 \rightarrow Na_2SO_4 + 2NaNO_3 + 4CO_2 \quad (7)$$
$$4NaHCO_3 + SO_2 + 2O_2 + 2NO \rightarrow Na_2SO_4 + 2NaNO_3 + 4CO_2 + 2H_2O \quad (8)$$
$$2NaNO_3 + SO_2 \rightarrow Na_2SO_4 + 2NO_2 \quad (9)$$

At temperatures higher than 300°F, the bicarbonate decomposes to sodium carbonate before reacting with SO_2. The decomposition results in a sodium carbonate product with a large surface area, thus enhancing reaction with SO_2. Nitrogen oxide can also react with sodium carbonate but only in the presence of SO_2. It has also been found that at temperatures below 300°F and with high water vapor concentration, SO_2 can react directly with sodium bicarbonate, as shown in Reaction (8), and it has been found that such low-temperature, high-humidity conditions also suppress the formation of NO_2 via Reaction (9).

The time available for hydrate and bicarbonate to complete the reactions with SO_2 and NO_x shown above are on the order of seconds. Figure 2-3 shows a typical flue gas time/temperature profile between the economizer and stack[3].

A two stage test program has been completed in order to fully characterize the process. Subscale testing was done on a .25 MMBtu/hr scale to identify the optimum sorbents. These tests were carried out at the Research-Cottrell Combustion Laboratory in Santa Ana, CA. In order to demonstrate the concept and equipment capabilities, proof of concept scale testing was done at the 50 MMBtu/hr scale, and these tests were carried out at the Riley Research Coal Burning Test Facility in Worcester, MA.

Figure 2-3 Flue Gas Time/Temperature Profile



3.0 SUBSCALE TESTING

3.1 Background

The proof of concept testing at the Riley Stoker Test Facility was designed to demonstrate the integrated dry injection technology on a relatively large scale and over a relatively long time period. The program was not designed to evaluate a number of potential sorbents. Indeed, such an evaluation would be difficult due to the large quantities of sorbents required. On the other hand, it is known that the sorbent properties strongly influence the SO_2 and NO_x removal capabilities, and the proper choice of sorbents for use in the proof of concept testing is clearly important if target SO_2 and NO_x. removal efficiencies are to be achieved. The subscale testing was proposed as a quick and economic means to evaluate a wide range of sorbents, resulting in recommendations for the choice of sorbents for use in the proof of concept tests.

The subscale tests were developed to investigate three areas of concern. Calcium hydroxide sorbents can be obtained from a large number of sources and can be enhanced by means of milling or additives to the hydration water. One concern was how to choose the best sorbent from among such a large group.

It has been found that the effectiveness of sodium bicarbonate for SO_2 removal decreases as temperature falls below 300°F. Some investigators have found that sodium sesquicarbonate is more effective at low temperatures due to its lower decomposition temperature. Since it was expected that the flue gas temperature will need to be reduced to about 200°F for precipitator enhancement, it was important to characterize the low temperature effectiveness of both sodium bicarbonate and sesquicarbonate, in order to make a selection for the proof of concept tests.

There is a net generation of NO_2 with sodium bicarbonate injection, and several additives to the sodium bicarbonate that can reduce the amount of NO_2 have been identified. These are ammonia, urea and activated carbon. While it is known that these compounds can suppress NO_2 increases, the mechanism is not yet determined. For the projected rates of NO removal, it was expected that NO_2 can be generated in excess of 100 ppm. This level of NO_2 could result in a brown stack plume and would be unacceptable. As a result, it was important to identify an NO_2 suppressing additive, capable of maintaining NO_2 emissions at under 30 ppm.

3.2 Objectives

The objectives of the subscale test program were designed to provide sorbent and additive selection guidance. The objectives are:

- Identify the best commercial hydrate sorbent and the best enhanced hydrate

sorbent from a list of nine types, based upon SO_2 removal at Ca/S=2.

- Determine the relative effectiveness of sodium sesquicarbonate versus sodium bicarbonate for SO_2 and NO_x control over the temperature range of 200°F - 400°F.

- Identify the best NO_2 suppressing additive among the group of ammonia, urea, and activated carbon.

3.3 Test Procedures

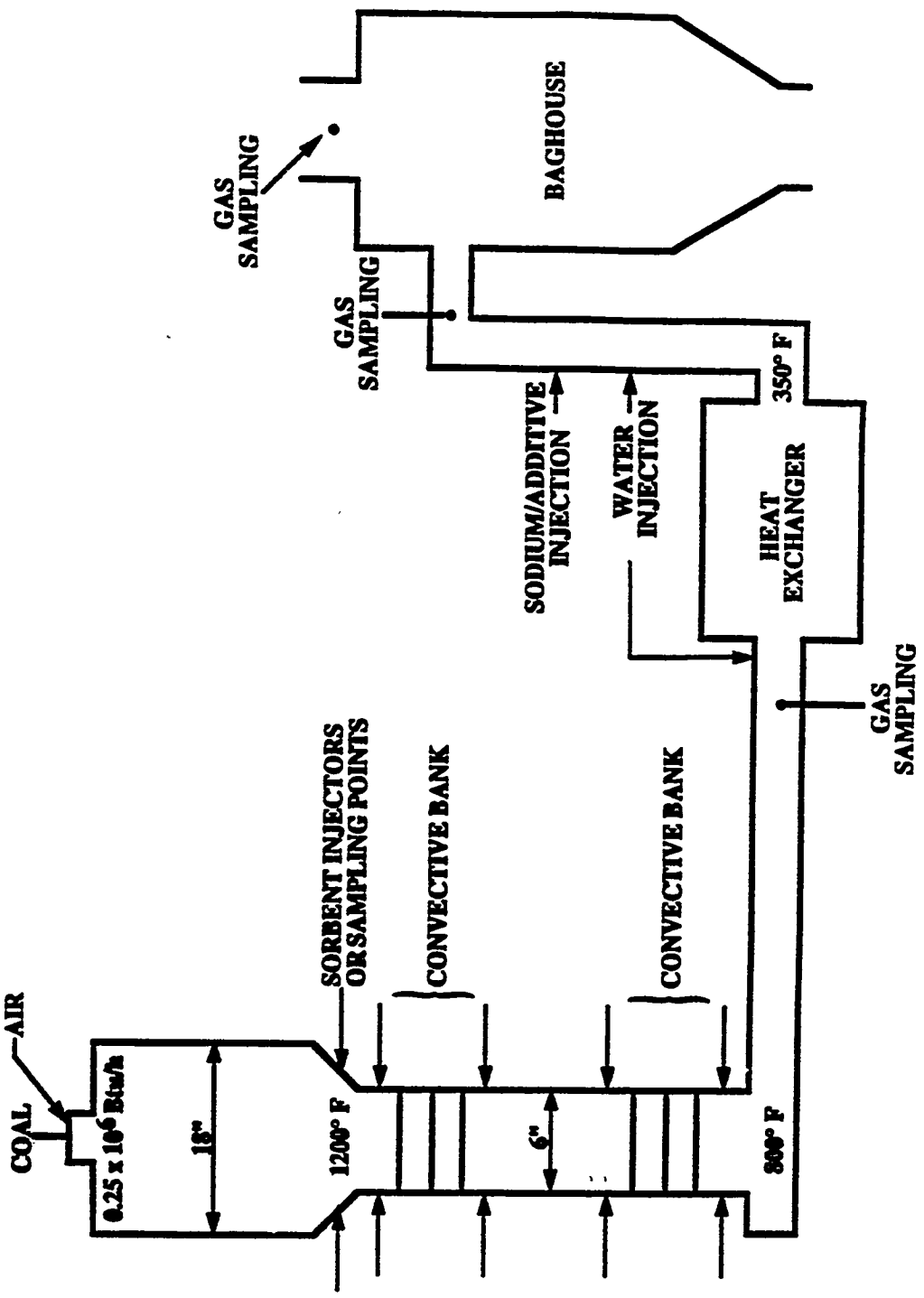
Subscale sorbent tests were performed at the Research-Cottrell Combustion Lab during May, June, and July, 1989. These tests involved the injection of calcium hydroxide and sodium sorbents at various points of the flue gas system downstream of a $.25 \times 10^6$ Btu/hr coal fired combustor. The system is shown in Figure 3-1. Sorbents could be directly injected by means of a compressed air driven eductor or could be milled immediately preceding injection by means of an air mill.

SO_2 and NO_x were measured at three positions, at the end of the convective section, at the baghouse inlet and the baghouse outlet. The SO_2 and NO_x reductions were based on the difference between the SO_2, NO, NO_2 and NO_x levels at convective section exit without injection and the same gas species measured at the baghouse exit with calcium and sodium injection. The SO_2 reduction resulting from calcium alone was based on the readings at the convective section exit with and without calcium injection. All measurements shown in the data tables were normalized to 3% O_2. Actual O_2 values were approximately 4% at the convective section exit, 4% at the baghouse inlet and 8% at the baghouse exit.

Water injection could be performed upstream or downstream of the heat exchanger. The water injection position upstream of the heat exchanger was the position used for lowering the temperature of the flue gas stream while the position downstream of the heat exchanger was used to inject a urea solution when this additive was tested.

The flue gas flow from the furnace is approximately 4.2 pound/min. and the residence time between the sodium injection point and the baghouse inlet is about 1.0 seconds during which time the temperature remains steady. The baghouse temperature was measured by inserting a thermocouple through the wall of the baghouse between bags and should accurately represent the temperature of the sorbent deposited on the bags. The gas residence times and cooling rates are comparable to those found for full scale boilers, as given by Figure 2-3.

Figure 3-1 Subscale Testing Arrangement



3.4 Calcium Hydroxide Injection Results

The hydrates tested and their characteristics are given in Table 3-1. These hydrates were injected into the convective section of the pilot scale combustor as indicated in Figure 3-1. The injection points correspond to gas temperatures of 1100, 1000, and 900°F. The SO_2 inlet concentration for all hydrate injection tests was 2600 ppm, and the Ca/S mole ratio was 2 for all tests. The hydrates were injected as received by means of an eductor for some tests and were injected after being air milled in other tests.

The results are shown in Figure 3-2, which gives SO_2 removal as a function of injection temperature. The use of the mill did not change the results shown in Figure 3-2.

Peak effectiveness of all hydrates is achieved at about 1000°F, and the clear superiority of the alcohol hydrate is evident. On the other hand, the expected SO_2 enhancement by means of the lignosite additive did not occur. Upon examination of the hydrate characteristics, it is obvious that the single most important hydrate characteristic for good SO_2 removal is surface area, and Figure 3-3 shows hydrate utilization as a function of surface area. Utilization is almost directly proportional to surface area.

3.5 Sodium Injection Results

The sodium compounds tested were sodium bicarbonate ($NaHCO_3$) and sodium sesquicarbonate (Na_2CO_3 $NaHCO_3$ $2H_2O$). The mass mean diameter particle sizes were 12.9 microns for the bicarbonate and 12.2 microns for the sesquicarbonate. The NO_2 suppressing additives tested were ammonia, urea, and activated carbon. The injection point of these compounds is indicated in Figure 3-1. The heat exchanger was used to cool the flue gas to 350°F and a water spray to cool to lower temperatures. For all tests the inlet SO_2 concentration was 2600 ppm and the inlet NO concentration was 350 ppm. The alcohol hydrated lime was injected at 1000°F for all tests and the sodium compounds at temperatures between 250°F and 500°F. The baghouse temperature was lower than the injection temperature, due to heat loss through the walls. The injected sodium compounds were entrained in flue gas at the injection temperature for about one second, after which they entered the baghouse, where they remained until removed from the bags. The reactions between the sodium compounds and SO_2 and NO_x therefore took place initially at the injection temperature (one second) and subsequently at the baghouse temperature (minutes). The tabulated results of the tests are given in the Appendix I.

Table 3-1 Hydrated Lime Characteristics

	Hydrate	Surface Area m^2/g	MMD (μm)
1.	Mississippi	23.5	2.2
2.	Marblehead Lime	16.0	3.4
3.	Bellefonte Lime	20.5	2.8
4.	Tenn-Luttrell	19.0	2.7
5.	Chemical Lime	19.1	3.4
6.	Colton Lime	19.0	2.6
7.	Alcohol Hydrate	38.0	1.7
8.	Lignosite Additive	15.1	2.6

Figure 3-2 SO_2 Removals by the Hydrates of Table 3-1

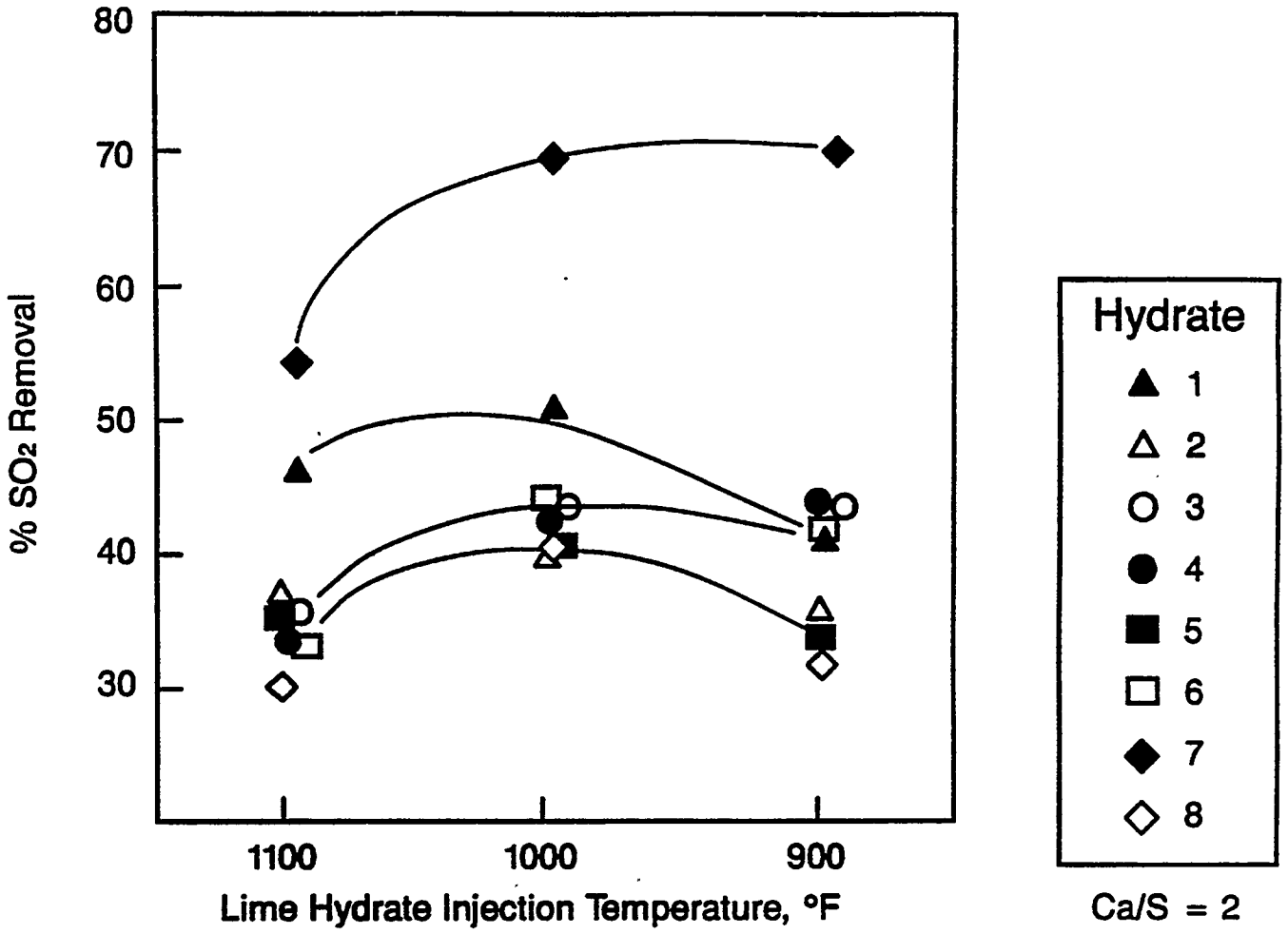


Figure 3-3 Hydrate Utilization as a Function of Surface Area

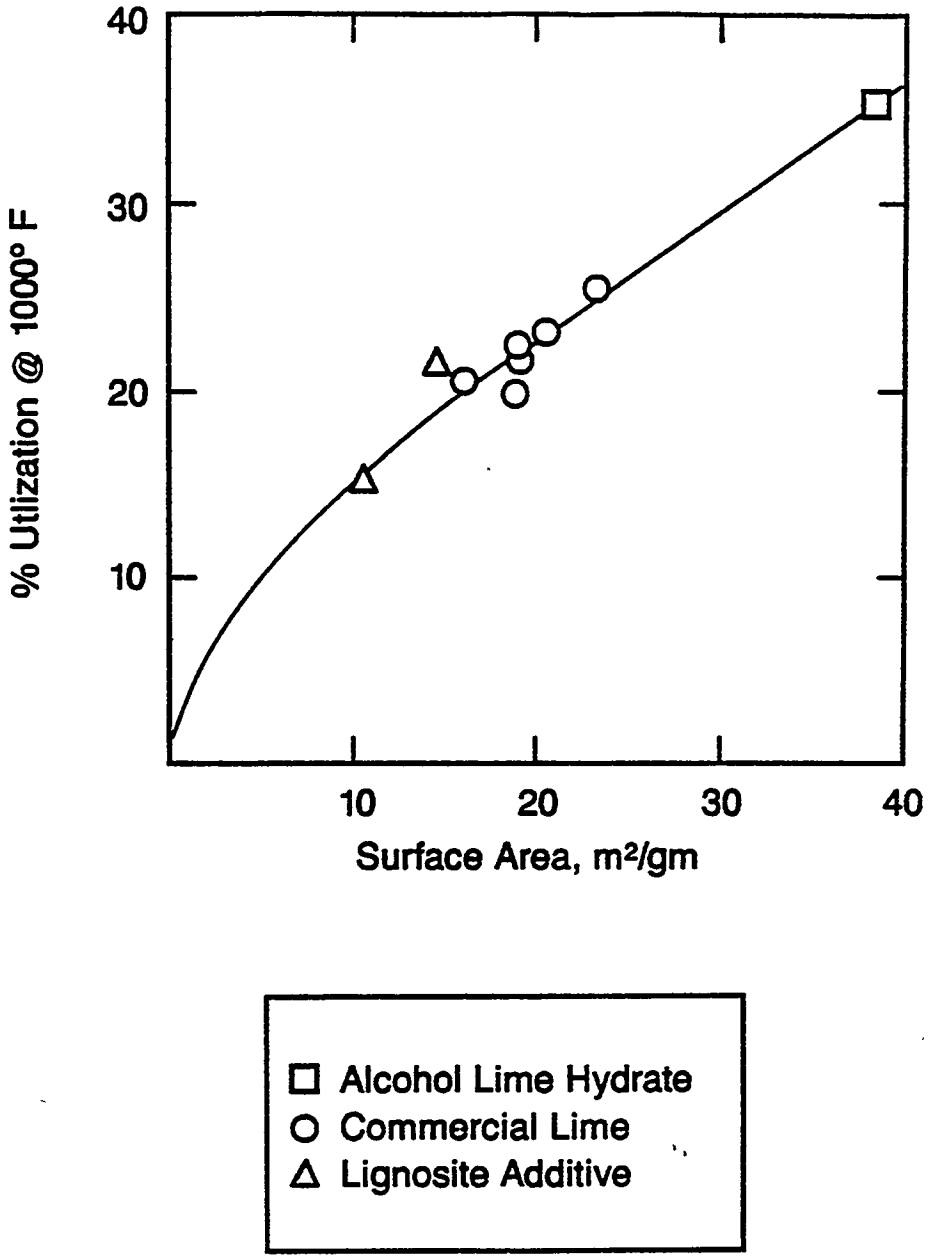


Figure 3-4 shows $\Delta NO_x/\Delta SO_2$ as a function of temperature. The decrease in NO_x (ΔNO_x) is normalized by the decrease in SO_2 (ΔSO_2) caused by reaction with sodium carbonate.

This is done to eliminate the effects of differing Na_2/SO_2 mole ratios, from test to test, and is valid because NO_x can only be effected in conjunction with SO_2. Maximum NO_x removal occurs at an injection temperature of 350°F (baghouse temperature = 240°F), and it is seen that this result applies for both bicarbonate and sesquicarbonate injection. The use of additives for NO_2 suppression have the effect of increasing $\Delta NO_x/\Delta SO_2$ at the higher temperatures.

Figure 3-5 shows the net increase in NO_2 as a function of temperature. The additives only become effective at suppressing NO_2 at injection temperatures greater than 350°F, and at these temperatures the urea additive appears to be superior. Also the NO_2 levels decrease below a 350°F injection temperature, and NO_2 is less than 30 ppm at temperatures lower than 300°F (200°F baghouse temperature). Similar NO_2 temperature dependence was observed by Markussen in spray dryer testing utilizing lime slurry containing sodium hydroxide[4].

Figure 3-6 shows percent SO_2 and NO_x removals as functions of temperature. The data is surprisingly independent of temperature and sorbent type, showing approximately 90% SO_2 removal and 20% NO_x removal over the full range of injection temperature. Sodium bicarbonate yields slightly better SO_2 removal than does sodium sesquicarbonate.

3.6 Subscale Testing Conclusions

The conclusions that can be drawn from the results of the subscale tests are:

- Utilization of the hydrated lime sorbents is almost directly proportional to surface area.

- The alcohol hydrates have the highest surface area and hence yield the highest SO_2 removal efficiency at 70%.

- Milling the hydrate sorbents prior to injection has no effect on SO_2 removal efficiency.

- Sodium bicarbonate is slightly more effective than sodium sesquicarbonate for SO_2 removal.

- Approximately 90% SO_2 removal can be achieved when using an alcohol hydrate in combination with either sodium sesquicarbonate or sodium bicarbonate.

- Approximately 20% NO_x removal can be achieved by either sodium sesquicarbonate or sodium bicarbonate injection.

- Urea additive can limit NO_x Production to below 30 ppm when gas temperatures are higher than 300°F (baghouse temperature).

- NO_2 Production does not exceed 30 ppm when gas temperature is lower than 200°F (baghouse temperature).

3.7 Recommendations For Proof Of Concept Tests

Several recommendations were made concerning the design and plans for the proof of concept tests at Riley Research Center. These recommendations were:

- Original planning called for an on-line milled commercial hydrate to be used as the principal sorbent. It was recommended that this be changed to an unmilled alcohol hydrated lime.

- Due to its somewhat better SO_2 absorption, it was recommended that sodium bicarbonate be the sodium sorbent for all tests.

- Urea should be used for NO_2 suppression when needed, although it is likely that no additive will be required for tests where the precipitator exit temperature is lower than 200°F.

Figure 3-4 The Effect of Urea Injection on NO_x Removal

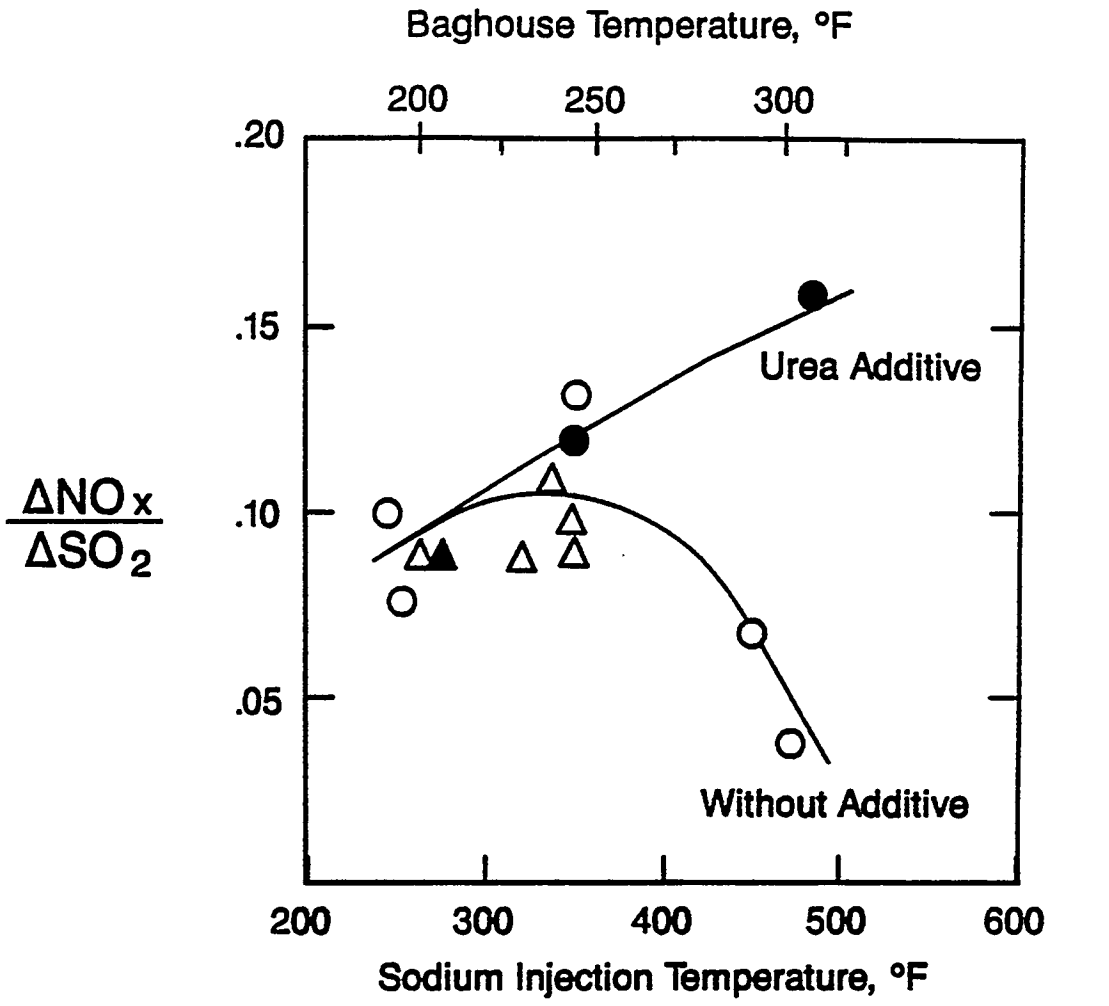


Figure 3-5 The Effectiveness of Additives for NO_2 Suppression

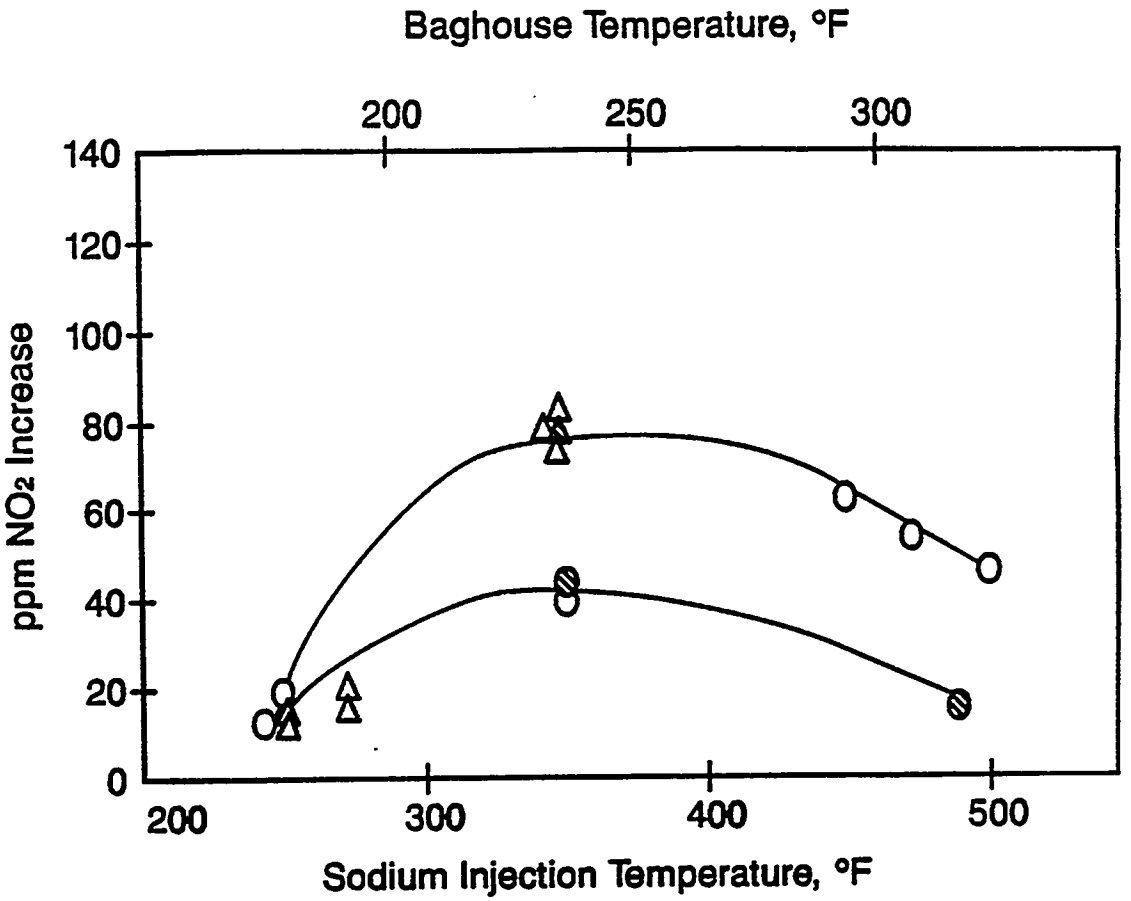
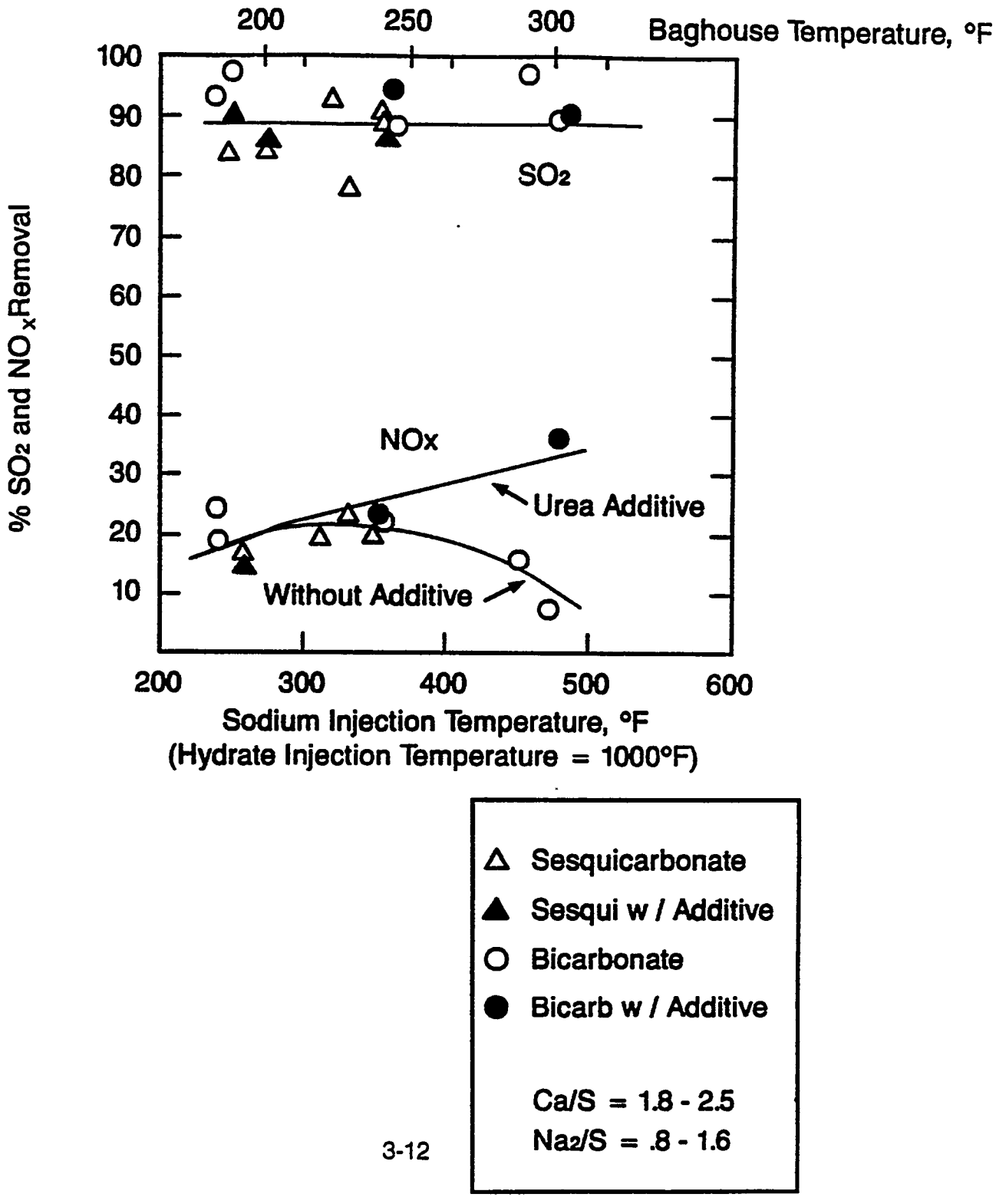


Figure 3-6 Combined SO_2/NO_x Removal for the Subscale Tests



4.0 PROOF OF CONCEPT SYSTEM

Flue gas was taken from the Riley Research Coal Combustion Test Facility (CBTF) at the furnace exit just upstream of the spraydown and scrubber. The gas leaves the furnace at about 1200°F, and is routed to a tube-bank heat exchanger used to reduce the temperature of the gas entering the simulated economizer to the 9000-11000° range. Hydrate is injected at this point. The economizer is also constructed with tube-bank heat exchangers. The gas exits the economizer section at 650-750°F, and is then cooled in a simulated air heater to 300°F. Sodium bicarbonate is injected at this point. The air heater exit gas enters a 30-inch ID duct, nominally 100 ft. in length and providing about 2 seconds isothermal residence time at 40 ft/s and 300°F. The duct is straight except for one 180 degree turn to bring the flue gas back to the particulate control devices. The 30-inch diameter duct continues into the pulse-jet baghouse, and a 15-inch diameter duct takes a portion of the flow into the ESP. Separate meters and dampers are used in the exit lines to control flow through the baghouse and ESP independently. The gas streams are then combined and returned to the CBTF scrubber using a booster fan. Figure 4-1 shows a plan view of the equipment arrangement.

4.1 Heat Exchanger Specifications

4.1.1 Economizer

The design for the economizer simulation was based on the results of a survey of utility convective sections. The design specifications are:

- Economizer inlet controllable at 900 - 1100°F.
- Economizer outlet controllable at 650 - 750°F.
- Maximum velocity between tubes of 40-60 ft/s (corresponds to 20-30 ft/s superficial velocity with typical tube spacing).
- Typical residence time of 0.3s.

In order to supplement this information, the economizer sections of three Riley boilers were examined. All were pulverized coal fired, 1967-1970 construction, and ranged from 250-410 MWe. A summary of the boiler design data is:

- The economizer in each boiler was divided into two parallel passes with the area split ranging from 75/25 to 67/33%. This is a common design feature allowing control of upstream superheat/reheat temperatures by varying the proportion of flow through each pass. At full load, the flow through each pass should be approximately proportional to area. (At reduced load, the gas flow through each pass would not be proportional to area since most of the flow would be directed through the main pass.) Since the amount of heat transfer surface upstream of each economizer pass is different, inlet temperatures can be significantly different

in each pass. This issue is not addressed in the simulation, but should be kept in mind for full scale application.

- The calculated superficial velocity at full load was 18- 19 ft/s, and the maximum (intertube) velocity calculated at an assumed temperature of 800°F, was 35-42 ft/s. These velocities are based on the full duct cross section. Unbalanced flow could increase the velocity in one pass.

- Tube patterns were either 2.0-inch OD on 4.0-inch centers, or 2.5-inch OD on 4.5 inch centers.

- The number of rows varied from 17 to 27 deep in the direction of flow, or a tube-bank depth of 6 to 9 ft.

- Two of the three economizers included a cavity about 3 feet deep.

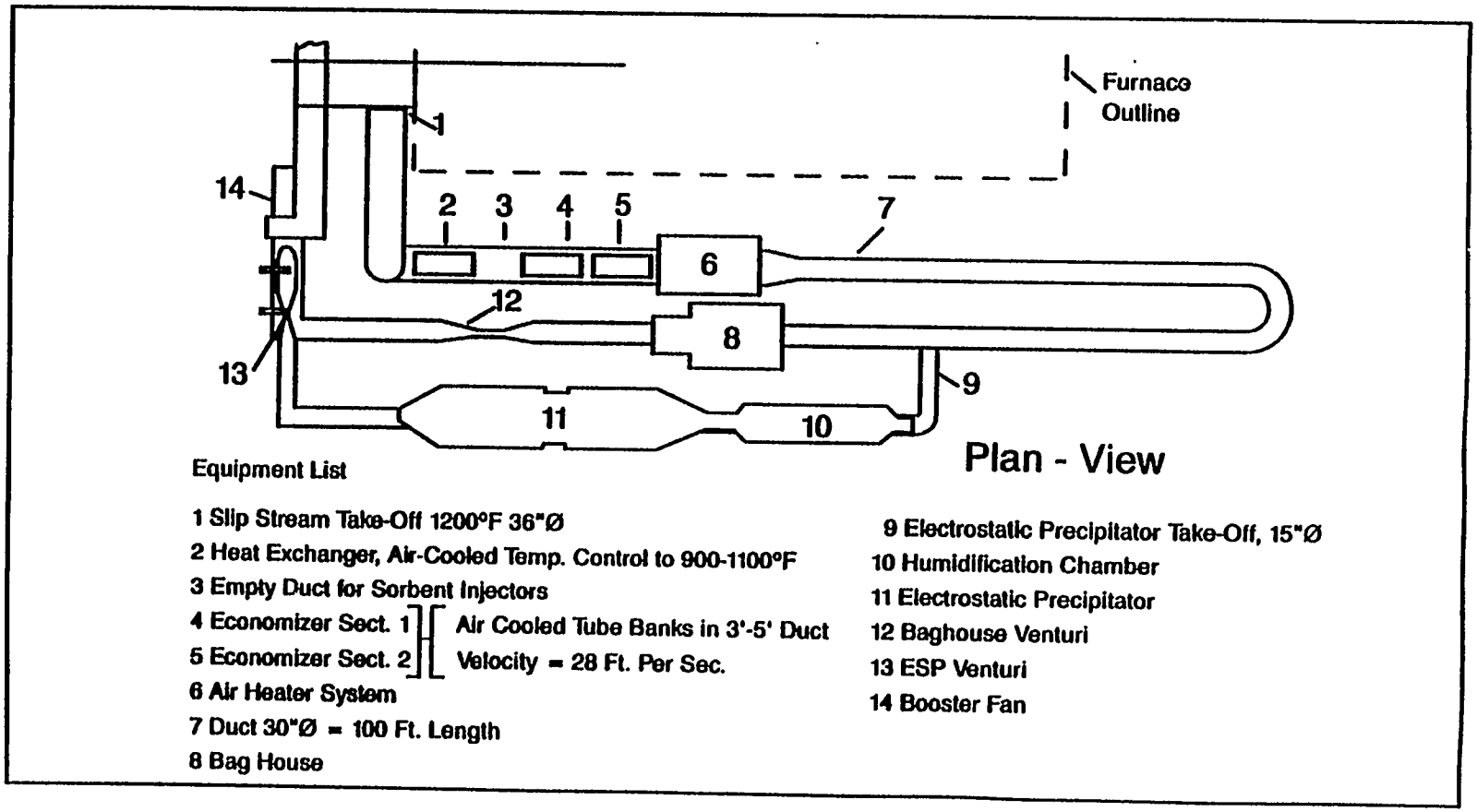
- The superficial residence time within the tube banks (excluding the cavity) ranged from 0.33 to 0.5 s (proportional flow and identical temperatures through the two passes assumed).

- Calculated inlet/outlet temperatures were 850/750, 922/721, and 935/715°F, with corresponding quench rates (based on tube bank depth excluding the cavity) of 275, 590, and 400°F/S.

These particular economizers had a lower velocity and quench rate and longer residence time than the average from the survey; however, the recommendations from the survey appear to be sound. The design superficial velocity were taken as the mid to upper part of the 20-30 ft/s range. Tube bank depth and temperature drop capability were increased to ensure adequate performance. Two separately cooled tube banks and the use of air cooling allow the heat removal to be controlled as required.

Water temperatures in the three Riley economizers ranged from 481 to 553°F. Since tube metal temperature would closely approach water temperature, and since we wished to avoid a pressurized system for the simulator, air cooling was used to maintain realistic tube temperature.

Figure 4-1 Proof of Concept System Arrangement



Equipment List

1 Slip Stream Take-Off 1200°F 36"Ø
2 Heat Exchanger, Air-Cooled Temp. Control to 900-1100°F
3 Empty Duct for Sorbent Injectors
4 Economizer Sect. 1] [Air Cooled Tube Banks in 3'-5' Duct
5 Economizer Sect. 2] [Velocity = 28 Ft. Per Sec.
6 Air Heater System
7 Duct 30"Ø = 100 Ft. Length
8 Bag House
9 Electrostatic Precipitator Take-Off, 15"Ø
10 Humidification Chamber
11 Electrostatic Precipitator
12 Baghouse Venturi
13 ESP Venturi
14 Booster Fan

4.1.2 Air Heater

The heat exchanger simulating the air heater must be capable of cooling the flue gas to 300°F from the maximum economizer outlet temperature of 750°F. The most common utility air heater by far is the regenerative type typified by the Lungstrom; however, this type of air heater exhibits excessive leakage between the flue gas and air streams at this scale (20 - 40% compared to about 5 in large units). A parallel plate type recuperative heater was used in order to roughly simulate the geometry of the regenerative heater, and because it was more compact than the cross flow tube type of exchanger.

4.2 Cold Side Duct

SO_2 removal by sodium bicarbonate injected downstream of the air heater depends on the residence time available in the duct connecting the air heater and the ESP. Since the primary aim of the project was to demonstrate a retrofit technology, the duct was designed with a realistic residence time and velocity. Based on information provided by DOE, the duct was designed to provide about 2 seconds residence time at 40 ft/s and 300°F. The duct was 30" in diameter and approximately 80' long, with one 180 degree bend.

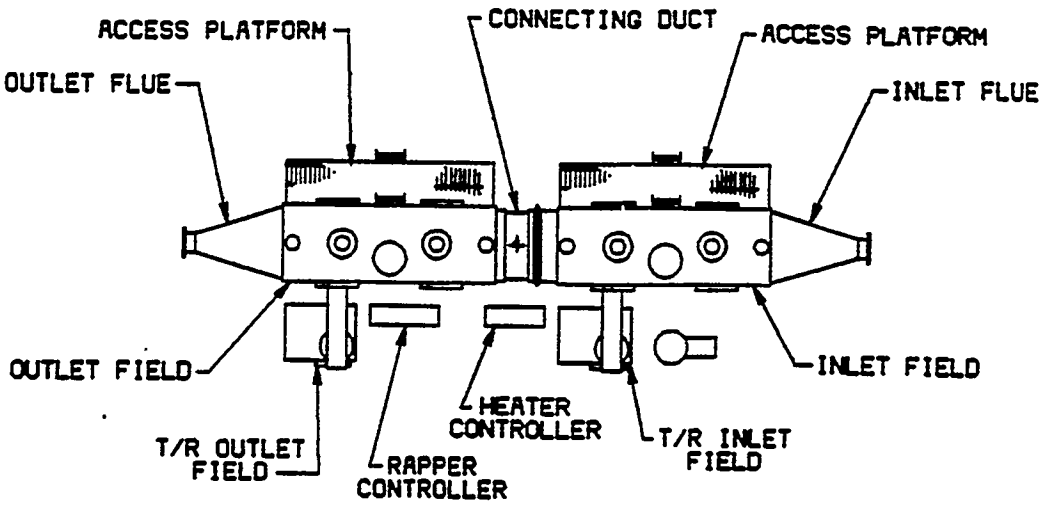
4.3 Electrostatic Precipitator and Baghouse

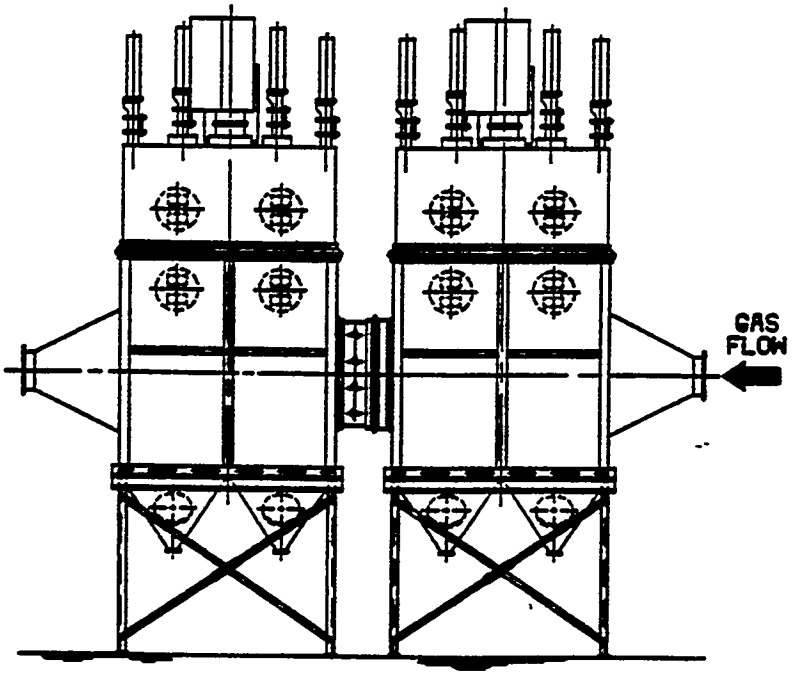
The electrostatic precipitator is an existing Research-Cottrell pilot unit and is shown in Figure 4-2. The precipitator is a two-field unit and is designed as a small segment of a standard R-C precipitator. The gas passage width is 9" and the discharge electrodes consist of the weighted wire design. The collecting surface is the G-Opzel design and is the same as in a full-scale precipitator, with the exception of height, and the total collecting surface is 792 square feet.

The gas passing through a full-sized ESP does not normally lose more than a few degrees of temperature from inlet to outlet; but the ratio of gas volume to outside surface is so much smaller on the pilot ESP that the shell is heated to prevent a large temperature change.

The baghouse is a pulse jet type, containing approximately 3,000 sq. ft. of filter fabric, yielding an air cloth ratio of 3 ACFM/sq. ft. The filter fabric is acid resistant Nomex felt and on-line pulse jet cleaning is employed. The baghouse is insulated with 3 inches of fiberglass wool.

Figure 4-2 Proof of Concept System Precipitator





R-C PILOT PRECIPITATOR EQUIPMENT

GENERAL ARRANGEMENT

4.4 Instrumentation and Control

Figure 4-3 shows the flow and temperature control diagram. Three temperatures and two flow rates are controlled using single loop controllers. Cooling air through the first tube-bank heat exchanger is throttled to maintain a set temperature at the inlet to the simulated economizer sections represented by the second and third heat exchangers. The second heat exchanger is manually controlled, with the economizer section outlet temperature maintained by automatic control of the third heat exchanger. The simulated air heater exit temperature are also under automatic control.

The flow rates through the baghouse and ESP are independently controlled. Single-loop controllers with square root extraction control the throttling valves. Line temperature and pressure are noted for calculation of a corrected flow rate, but control by meter delta-P alone maintains a flow constant within a few percent for the range of conditions in any given test.

Transport air for hydrated lime injection is manually controlled. The hydrated lime feed rate is gravimetrically controlled since this material tends to feed erratically at a fixed feeder speed. Gravimetric control adjusts the feeder speed so that the weight rate of hydrate feed remains constant. Transport air for sodium bicarbonate is manually controlled. The sodium bicarbonate is fed at a fixed feeder motor speed since volumetric feeding of this material gives good consistency. Both sorbent feed systems are set up to allow convenient checking of feed rate by collecting a weighed, timed feeder discharge.

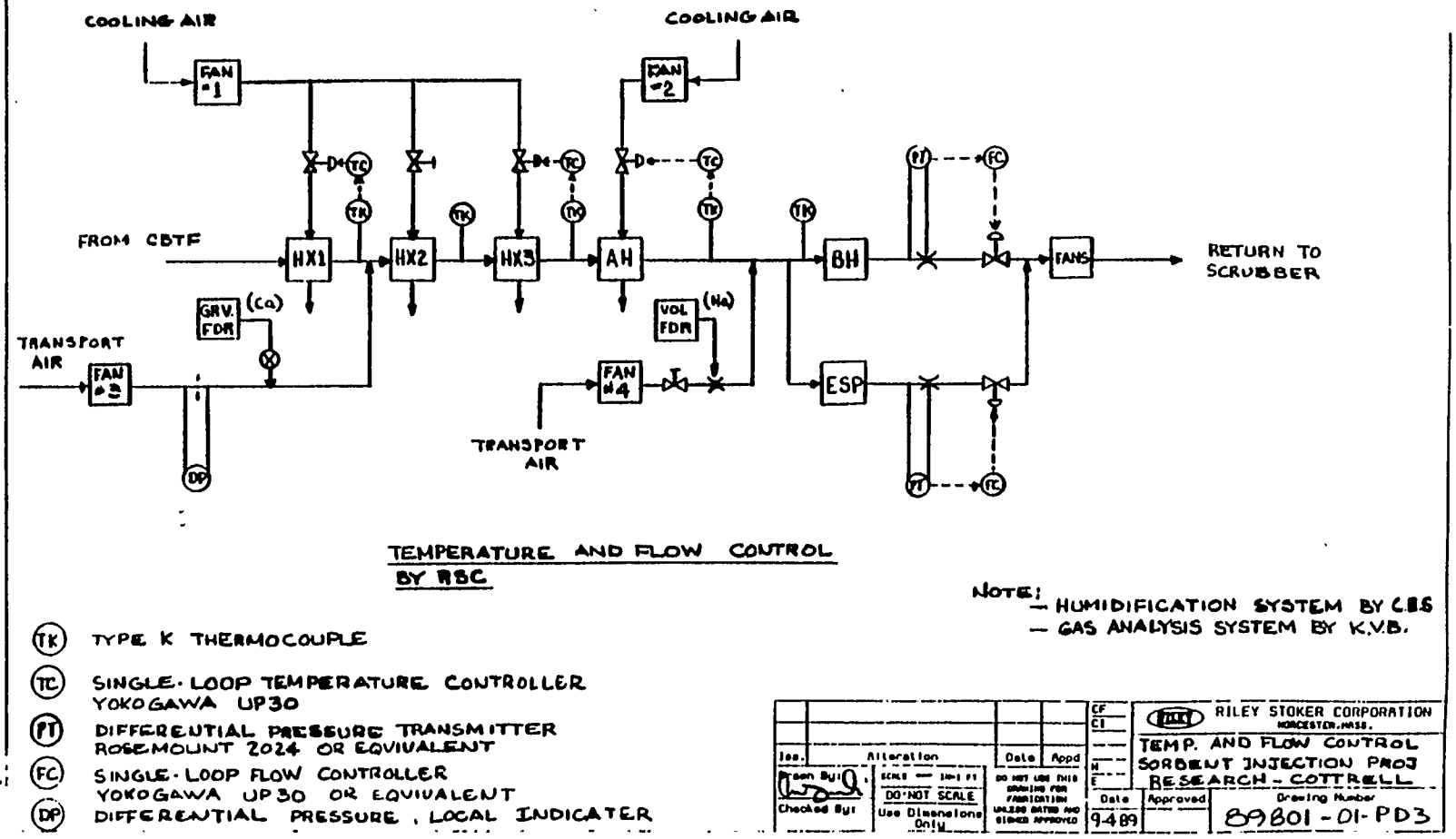
4.5 Sorbent Storage and Transport

The specifications of the sorbent storage and injection rates are based upon the peak usage calculated for maximum SO_2 and NO_x levels and maximum stoichiometries.

Calcium hydroxide is fed using a gravimetric feeder, since experience with this material has shown that feeding can be erratic at a fixed feeder speed. The weigh hopper of the gravimetric feeder is refilled from a 1570 cu. ft. live-bottom storage bin. The storage bin is provided with a system allowing it to be filled either from a bag-dump station or a self-unloading dry material truck.

The gravimetric feed discharges into a jet ejector in the sorbent transport air line. Sorbent transport air is supplied from a dedicated blower. The transport velocity is a minimum of 80-100 ft/s. The air rate is 330 scfm, or about 3 lbs air/lb sorbent at a typical sorbent injection rate of 500 lbs/hr. This corresponds to about 3.3% of the combustion air rate and provides at least 0.5 psig available pressure drop to the injectors.

Figure 4-3 Temperature and Flow Control Schematic



Sodium bicarbonate is fed using a volumetric feeder, since this material, being coarser than hydrated lime, typically feeds at a consistent rate volumetrically. The feeder includes an integrated 50 cu. ft. hopper which holds enough sorbent for about 24 hours of continuous operation at typical rates. The feeder discharges into an eductor for transport to the duct. The sorbent transport air is provided by a dedicated blower. The line is sized for a velocity and air/material ratio similar to the hydrate injection and provides at least 0.5 psig available pressure drop to the injectors.

4.6 System Chart Recorder

A total of 27 input channels are wired into and recorded by the chart recorder (See Table 4-1). These include thermocouples, pressure transmitters, the calcium hydroxide feeder feedrate, and gas concentration readings from both the CBTF and from R-C analyzers. All signals were cross checked and/or calibrated as needed prior to testing. Numerical values are printed every fifteen minutes and can be checked at any time during operation. Several key channels are trended continuously by the recorder in one of ten specified colors. A detailed, relatively easy to read record of system temperatures, flowrates, and gas analysis is produced.

Thirteen additional channels are calculated by the recorder using the input channels and equations programmed into the recorder during setup. The values of these channels are also logged every fifteen minutes and selected ones are trended continuously.

Calculated channels contain the venturi flow calculations and corrections of gas concentration values to 3% oxygen. Both pressure at the venturi meters and water vapor content are treated as constants in calculations. Values for these variables must be reprogrammed into the recorder as conditions change. This process can be done during operation.

4.7 Gas Analysis

Gas analysis was accomplished by means of two, independent systems. The CBTF system is a permanent part of the Riley Research Large Combustor System and draws sample gas from the furnace enclosure. The CBTF instrumentation consists of O_2/ CO, CO_2, NO_x, and SO_2 analyzers, described in Table 4-3.

The test loop instrumentation consisted of O_2, SO_2 and NO_x analyzers (also described in Table 4-3) and drew gas samples from the test loop inlet upstream of the economizer heat exchanger, from just downstream of the economizer heat exchanger, and from downstream of the precipitator. Good correlation was found between the CBTF and the test loop instrumentation.

Table 4-2 Chart Recorder Channel Assignments

Ver. 2.1 9/13/91

Ch#	Description	Signal	Trend Color-Zn#	Range
1	TK1-Furnace Outlet	TC-K	Purple-Z1	0-2000 F
2	TK2-Sorb Inj Pt	TC-K	Red-Z1	0-2000 F
3	TK3-Inter Econ	TC-K	-	
4	TK4-Econ Out	TC-K	Orange-Z1	0-2000 F
5	TK5-Air Htr Out	TC-K	-	
6	TK6-Air Htr Cntrl	TC-K	Brown-Z1	0-2000 F
7	TK7-100'Duct	TC-K	-	
8	TK8-100'Duct	TC-K	-	
9	TK9-Humid Cham In	TC-K	-	
10	TK10-Baghouse In	TC-K	-	
11	TK11-Baghouse Out	TC-K	-	
12	TK12-ESP In	TC-K	Yel-Green-Z1	0-2000 F
13	TK13-Inter ESP	TC-K	-	
14	TK14-ESP Out	TC-K	Blue-Z1	0-2000 F
15	DP1-BH Venturi DP	1-5V	-	
16	DP2-ESP Venturi DP	1-5V	-	
17	Ca(OH)2 Feedrate	1-5V	Red-Z2	0-1000 #/hr
18				
19				
20				
21	CBTF CO2	0-1V	-	0-25%
22	CBTF O2	0-1V	Blue-Z2	0-10%
23	CBTF NOx	0-1V	-	0-1000 ppm
24	CBTF SO2	0-1V	-	0-5000 ppm
25	CBTF CO	0-1V	-	0-500 ppm
26	KVB O2	0-1V	-	0-25%
27	KVB SO2	0.4-2V	-	0-2500 ppm
28	KVB NO/NOx	0-1V	-	0-1000 ppm
29	Opacity	0-10V	Navy-Z	0-100%
30				
31	ESP Flow Calc	Calc	-	
32	ESP Flow Result	Calc	-	Actual SCFM
33	BH Flow Calc	Calc	-	
34	BH Flow Result	Calc	-	Actual SCFM
35	KVB SO2 @ 3%	Calc	Brown-Z2	0-5000 ppm
36	KVB NO/NOx @ 3%	Calc	Black-Z2	0-1000 ppm
37				
38				
39	CBTF NOx @ 3%	Calc	Red-Purple-Z2	0-1000 ppm
40	CBTF SO2 @ 3%	Calc	Orange-Z2	0-5000 ppm
41	CBTF CO @ 3%	Calc	Purple-Z2	0-1000 ppm
42	Total Flow	Calc	Black-Z2	0-10000 SCFM
43	KVB O2	Calc	Green-Z2	0-10%
44	SO2 Removal	Calc	Yel-Green-Z2	0-100%

CBTF INSTRUMENTATION

Gas Component	Make	M/N	Type	Nominal Accuracy	Ranges
O_2	Teledyne	326	Micro Fuel Cell	1% FS	0-5% 0-10% 0-25%
CO	Horiba	PIR-2000	NDIR	1% FS	0-500 ppm 0-1500 ppm 0-2500 ppm
CO_2	Horiba	PIR-2000	NDIR	1% FS	0-5% 0-15% 0-25%
NO_x	Thermo Electron	10A	Chemiluminescent	1% FS	8 Ranges 0-2.5 ppm to 0-10,000 ppm
SO_2	Western Research	721AT	Ultra Violet Photometric	2% FS	0-1000 ppm 0-5000 ppm

TEST LOOP INSTRUMENTATION

Gas Component	Make	M/N	Type	Nominal Accuracy	Ranges
O_2	Teledyne	326	Micro Fuel Cell	1% FS	0-5% 0-10% 0-25%
NO_x	Beckman	955	Chemiluminescent		7 ranges 0-10 ppm to 0-10,000 ppm
SO_2	UNOR	6N	NDIR	1% FS	0-5000 ppm

Calibration, sample acquisition, and sample conditioning was identical for both sampling systems. Zero and span checks were performed at the beginning and end of each test day. Calibration gases are manufacturer's certified standard grade. Sample extraction was through an in-duct filter probe. Sample conditioning was by gas chiller, condensate trap, and filter. Sample transport was by diaphragm pump, through a distribution manifold to individual instrument flow controls.

5.0 PROOF OF CONCEPT TEST PROGRAM

The proof of concept testing involved the variation of several independent parameters and the measurement of several dependent parameters. It also required the use of three coals and four sorbents. The test matrix is given by Table 5-1. The test system was operated for eight hours per day and generally one to three of the tests described by Table 5-1 could be run per day. The individual runs were not necessarily performed in the chronological order given by the Table.

The first five runs are designed to determine the importance of sorbent injection and humidifier exit temperature on precipitator performance. The first run establishes base case precipitator performance for fly ash only. Run 2 investigates the performance changes resulting from hydrate injections, run 3 investigates how precipitator performance changes resulting from bicarbonate injection, and in runs 4 and 5, a humidified temperature is chosen that yields acceptable precipitator performance. This temperature is used for the remaining tests.

Runs 6 - 8 are used to establish an economizer hydrate injection temperature for optimum SO_2 removal. This temperature is used for the remaining runs.

Runs 9 - 11 show the effect of hydrate to sulfur mole ratio on SO_2 removal efficiency.

The effect of air heater exit temperature on sorbent utilization is investigated in runs 12 - 14, and the effect of sodium bicarbonate mole ratio on SO_2/NO_x removals in runs 15 - 17. Runs 18 - 20 are used to determine the importance on SO_2 removal of approaching the saturation temperature at the precipitator.

An effort to enhance SO_2 capture through humidification to a close approach to the adiabatic saturation temperature was made in runs 18 - 20.

A second hydrated lime is evaluated in runs 22 - 27. Both the hydrate to sulfur mole ratio and the injection temperature were varied during these tests. A similar test procedure is carried out for a sodium sesquicarbonate sorbent in runs 28 - 33. Finally, runs 34 - 40 are used to determine the effect of inlet SO_2 concentration on SO_2/NO_x removal by burning lower sulfur coals.

Table 5-1 Proof of Concept Test Matrix

RUN NO.	CONDITIONS	ECON TEMP	Ca/S	AH TEMP	2Na/S+2NO	HUMID TEM
1	PROGRAM	1000	0	300	0	300
2	HYDRATE,	"	2	"	0	300
3	BICARB,	"	"	"	1	300
4	COAL &	"	"	"	"	200
5	LOW NOX	"	"	"	"	250
6	BURNER,	"	"	"	"	BEST
7	UNLESS	1100	"	"	"	"
8	OTHERWISE	900	"	"	"	"
9	INDICATED	BEST	"	"	"	"
10	"	"	2.5	"	"	"
11	"	"	1.5	"	"	"
12	"	"	2	"	"	"
13	"	"	"	270	"	"
14	"	"	"	350	"	"
15	"	"	"	300	"	"
16	"	"	"	"	1.5	"
17	"	"	"	"	.5	"
18	"	"	"	"	1	200
19	"	"	"	"	"	160
20	"	"	"	"	"	180
21	"	"	"	"	"	BEST(RUN 6
22	HYDRATE 2	"	"	"	"	"
23	"	1100	"	"	"	"
24	"	900	"	"	"	"
25	"	BEST	"	"	"	"
26	"	"	2.5	"	"	"
27	"	"	1.5	"	"	"
28	BICARB 2	BEST(RUN 9	2	"	"	"
29	"	"	"	270	"	"
30	"	"	"	350	"	"
31	"	"	"	300	"	"
32	"	"	"	"	1.5	"
33	"	"	"	"	.5	"
34	COAL 2	"	"	"	1	"
35	"	"	2.5	"	"	"
36	"	"	1.5	"	"	"
37	COAL 3	"	2	"	"	"
38	"	"	2.5	"	"	"
39	"	"	1.5	"	"	"

Analyses of the program coal and of the alternate low sulfur coals are given in Tables 5-2 and 5-3. The firing of these coals allowed the SO_2 concentration to vary between 2000 ppm to 500 ppm.

Chemical analysis of the calcium hydroxide sorbents used in the program are given in Table 5-4. The principle difference between the sorbents is surface area. The Wulfrasorp has a slight alcohol content.

Analyses of the sodium bicarbonate and sesquicarbonate sorbents are given in Table 5-5.

Table 5-2 Program Coal Analysis

	AS-FIRED	DRY
Moisture %	**8.97**	**--**
Carbon	**64.8**	**70.5**
Hydrogen	**4.37**	**4.8**
Nitrogen	**1.30**	**1.43**
Oxygen	**7.53**	**8.27**
Sulfur	**2.28**	**2.5**
Ash	**11.4**	**12.5**
Volatile %	**32.7**	**35.9**
Fixed Carbon	**47.0**	**51.6**
HHV, Btu/lb	**11,430**	**12,550**
lbs SO_2/10E^6 Btu	**4.0**	
equiv ppm @ 3% O_2	**2100**	
lbs Ash/10E^6 Btu	**9.96**	

Coal ID: "MARION".

Illinois No. 6, Marion Coal Sales, Marion IL.

Table 5-3 Alternate Coals Analyses

COAL ID	BRAYTON POINT	WEST VIRGINIA
Wt % As-fired,		
Moisture	**11.0**	**3.3**
Volatile	**29.4**	**32.4**
Ash	**6.1**	**7.4**
Sulfur	**0.98**	**0.58**
HHV, Btu/lb	**12,690**	**13,670**
lbs SO_2/10E^6 Btu	**1.54**	**0.91**
equiv ppm @ 3% O_2	**820**	**450**
RSC Sample ID (12/4/91)	**42,931**	**42,932**

Table 5-4 Hydrated Lime Sorbents

	WULFRASORP	CHEMCAL
TYPE	**Alcohol-hydrate**	**Standard Commercial**
Wt % Ca	**50.65**	**51.68**
Wt % Moisture	**0.39**	**0.24**
Wt % LOI	**22.98**	**23.17**
Wt % EtOH	**0.044**	**nm**
Wt % MeOH	**0.002**	**nm**
BET SA, m^2/g	**31.3**	**11.8**
Diameter	**2.4 micron**	**nm**

Composition by RSC, average of 4-6 samples feeder discharge.

Alcohol by GC/FID.

BET by RCEST, average 2-3 samples feeder discharge.

Note BET of Wulfrasorp from sealed storage was 36.9 (4-sample average).

Table 5-5 Sodium Sorbents

	Bicarbonate	Sesquicarbonate
$NaHCO_3$	99.8%	37%
Na_2CO_3	--	47%
H_2O (hydration)	--	16%
Diameter*	10.9 micron	9.0 micron

* Microtrac analysis

6.0 START UP AND CALIBRATION

6.1 Sorbent Feeding Systems

6.1.1 Calcium Feeder Refilling: The rate at which the gravimetric calcium hydroxide feeder refilled depended on the amount of material in the storage silo located immediately above it. With little material in the silo, the feeder greatly overshot its high level refill cutoff value. This value needed to be kept below 100 lbs. in order to insure the feeder would not exceed its maximum capacity of 220 lbs. when refilling. Methods of limiting the travel of the refill butterfly valve were investigated but not implemented due to the slow rate of refill when the silo was fuller.

With a full silo, the feeder usually exceeded 60 seconds in refill mode, triggering a time limit warning. Refill continued at a slow but acceptable rate with regular activation of the storage silo bin shaker. A bin shaker activation button was installed near the feeder control in order to facilitate refill. In addition, a new automatic timer was installed to produce periodic bin vibration at specified time intervals. The timer automatically resets after each refill in order not to activate the vibrator during refills which occur quickly (such as discussed above).

6.1.2 Calcium Feeder Setup/Calibration: Acceptable calcium hydroxide feedrates were obtained with a 2-1/4" full pitch NCR screw, which allowed for flowrates up to 762 lbs/hr at 104 rpm. Calibration and zeroing of gravimetric feeder was done on two occasions. Using the feeder's "learn" function provided accurate feedrate calibration. Subsequent checks resulted in no need for recalibration. The feeder provided acceptably steady feedrates during initial testing.

6.1.3 Calcium Transport/Injection System: All initial testing was done using Type 1 injectors (2 vertical pipes, each with 3/4" holes facing downstream). Air flow was measured using an orifice plate. With no solids loading in the line, total flow measured 345 scfm. Measured flowrates dropped to 325 scfm after starting sorbent at 8 lbs/min (Ca/S approximately 3). Flowrates dropped further to 315 scfm after 20 minutes of continuous operation but seemed to hold steady thereafter. The flowrate maintained itself at 310 scfm or more during subsequent operation.

Care was taken to clear the calcium hydroxide sorbent line after each operation by continuing to operate the calcium blower for 15 minutes after shutdown. The recommended minimum continuous flowrate through the blower is 320 scfm giving an additional reason to monitor whether flow drops significantly below this rate. Some initial buildup was observed inside the unions above the vertical injection pipes and in the flexible hose leading to these unions. Sand was fed through the system in order to clean the system for the present shutdown period. All significant buildup above the vertical pipes was removed.

All 8 injection holes were observed during operation. The flow of sorbent was well defined and steady near the injection point. An even fog was observed at ports 2-4' downstream, suggesting good mixing within the duct.

6.1.4 Sodium Injection System: Sodium bicarbonate injection during initial testing was accomplished by placing a 2" horizontal pipe with four 11/16" holes in the gas stream. The sodium transport air blower generated 70" W.C. (110 cfm airflow from the fan performance curve). A large capacity screw (2.25" 1/2 pitch NCR) was installed in order to meet capacity requirements. With this screw, feedrates from the volumetric feeder were found to be nearly linear with feedrate dial setting throughout the range necessary for testing. The maximum feedrate was 450 lbs/hr.

6.2 Flow Measurement

6.2.1 Venturi Calibration: A pitot traverse of both the baghouse and ESP venturi meter inlets was done in order to check their accuracy in measuring flow. Eight point traverses at perpendicular angles (16 points each venturi) were conducted on each for three flow conditions. Calculated flows from the pitot traverse were within 1% or 3% of those calculated based on venturi pressure differential for the ESP or baghouse respectively. The three tests averaged to within one percent for both venturi meters. Based on these results, no adjustments were made in the method of calculating flow rate.

6.2.2 ESP Humidification System: At 0.68 gallons per minute of humidification water flow, a temperature drop of 74°F was recorded at the ESP inlet. This was reasonably close to the 100°F temperature drop expected for these conditions.

Water flowrate was controlled manually. The flow regulator was set to maintain 60 psi of air pressure behind the water injection nozzle during operation (maximum rotameter rating = 75 psi). Controller air was regulated to 20 psi. The resulting 77 scfm of airflow provides for adequate humidification capacity under all expected conditions.

6.3 Burner

Maintaining constant coal feed and air flow rates at 50 million BTU/Hr heating in the furnace was sometimes difficult due to the higher nominal capacities of the equipment. SO_2 readings averaged approximately 2500 ppm (adjusted to three percent oxygen) and varied by less than 100 ppm 90+% of the time. Oxygen readings of flue gas exiting the CBTF averaged approximately 4.5% and varied +/- one percent.

NO_x output from the furnace averaged 220 ppm (corrected to three percent oxygen) and varied by less than 20 ppm 90+% of the time. Available time allowed for only limited attempts to minimize NO_x. Initial tests were run with a 25% register position and 50% shroud position. Adjustments in these settings also helped correct early problems with burner flame outs.

6.4 Heat Exchangers

Heat exchanger performance limited the gas flowrate through the test loop during initial testing. With no sorbent flow, the heat exchangers could maintain the design temperatures of 1000°F at the economizer section inlet, 700°F at the economizer section outlet, and 300°F at the air heater outlet only for flows of 7800 scfm or less. With typical sorbent feedrates, this flowrate had to be dropped to 6500 scfm or less to maintain the same temperatures. The latter case represents approximately 65% of design flow.

The most limiting heat exchangers were the second and third tube banks (the simulated economizer section). The temperature setpoint was only maintained for the previously mentioned conditions with 100% cooling air flow. Under the same conditions, temperatures were maintained with less than 100% cooling air for the first tube bank. The simulated air heater heat exchanger had no problem maintaining temperature.

6.5 Other Components

6.5.1 System Blowers: Maintaining adequate airflow through the test loop was easily accomplished with the NY Blower ID fan. The design airflow rate of approximately 10 KSCFM is well within capacity. During shakedown, the following flows were measured with the given damper positions:

Total	Baghouse Loop	ESP Loop		Fan	
KSCFM	% Open	KSCFM	% Open	KSCFM	Amps
6.7	22	5.9	0	0.8	75
10.1	22	5.9	50	4.2	90
13.2	22	5.9	63	7.3	100
19.7	45	12.7	63	7.0	127

6.5.2 Solids Removal System: Under design conditions, typically 1300 lbs/hr of solid waste is expelled from the one baghouse and the four ESP discharges. Because of the reduced flow rates during initial testing, total solids flow probably never exceeded 900 lbs/hr. The capacity of the system proved adequate under these conditions. No problems with plugging or ash build up occurred.

A cover was designed and built to allow dust collector discharge and containment of solids in the BFI waste container. Fugitive dust emissions were not a problem during initial testing. Under design conditions, a 20 yard BFI container is filled every one to two days.

7.0 PROOF OF CONCEPT TEST RESULTS

The test program was carried out during September - December, 1991. Unless otherwise stated, the results reported correspond to tests carried out with the program alcohol hydrated lime, sodium bicarbonate, the program coal, and the optimum hydrate injector arrangement. All results are corrected to 3% oxygen.

7.1 Mixing Studies

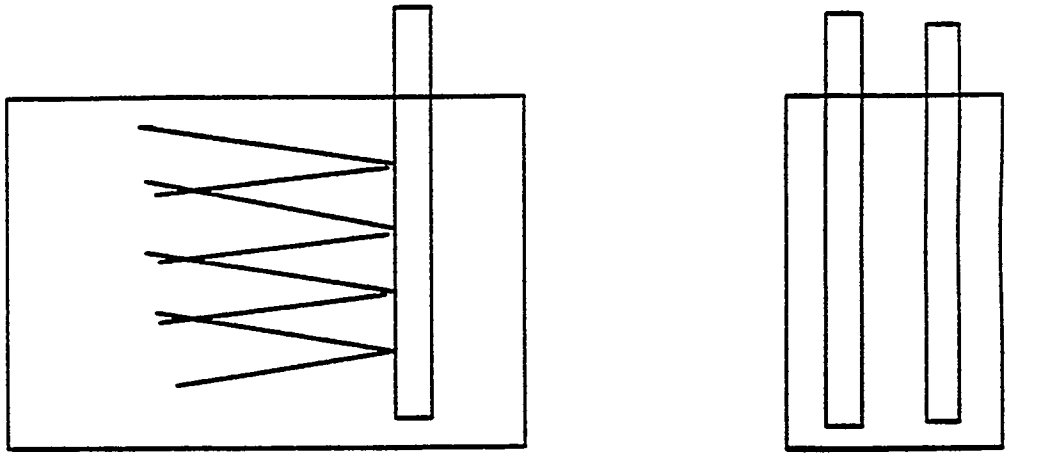
An initial series of SO_2 traverses were run at the economizer mid point plane in order to determine the quality of hydrate-gas mixing downstream of the sorbent injectors. The sorbent injectors consisted of two vertical 1-1/2 inch pipes, each with four 3/4 inch drilled holes pointed downstream in the horizontal 3'8" by 5'8" duct, see Figure 7-1. The resulting SO_2 distribution is shown in Figure 7-2. The SO_2 concentration at the top of the duct is three times higher than at the bottom. Subsequent observation of the injectors revealed that the hydrate jets were directed downward at about 15 degrees, which could result in higher SO_2 removal at the bottom. One inch sections of 3/4 inch tubing were welded onto the 1-1/2 inch pipes at the drilled holes in order to try to straighten the jets. This effect was confirmed by observation and the subsequent SO_2 traverse (Figure 7-3) indicated improved mixing; however, overall SO_2 removal was not improved.

A four-injector, horizontal jet system, as shown in Figure 7-4, was subsequently evaluated. This injector system consists of four, 2" pipes with 1-1/4" exit orifices. These pipes could be moved horizontally across the width of the duct. Figure 7-5, giving SO_2 removal as a function of Ca/S ratio, shows how the SO_2 removal is affected by the positioning of these injectors. The maximum SO_2 removal is achieved when two jet outlets are placed even with the duct wall and two jets are recessed by six inches from the duct wall. This configuration was also superior to the best vertical pipe arrangement, and was therefore used for all subsequent testing. SO_2 traverses were not carried out for this configuration because it was assumed that the best SO_2 removal would correspond to the most uniform distribution of SO_2 across the duct.

7.2 SO_2/NO_x Studies

In order to determine the optimum hydrate injection temperature, a series of runs were made in which the gas temperature at the injection point was varied. These runs were carried out for both hydrate injector configurations. The result is given in Figure 7-6, which shows percent SO_2 removal as a function of injection temperature. The horizontal pipe configuration (Figure 7-4) yields 10% higher SO_2 removal than the vertical pipe configuration (Figure 7-1) over the full range of temperatures. Also the optimum injection temperature is 1030°F for both injector types.

Figure 7-1 Vertical Pipe Sorbent Injector Arrangement



SIDE VIEW END VIEW

Two 2 1/2" Pipes with Four 3/4" Nozzles

Figure 7-2 Original SO_2 Distribution at Economizer Mid-Point

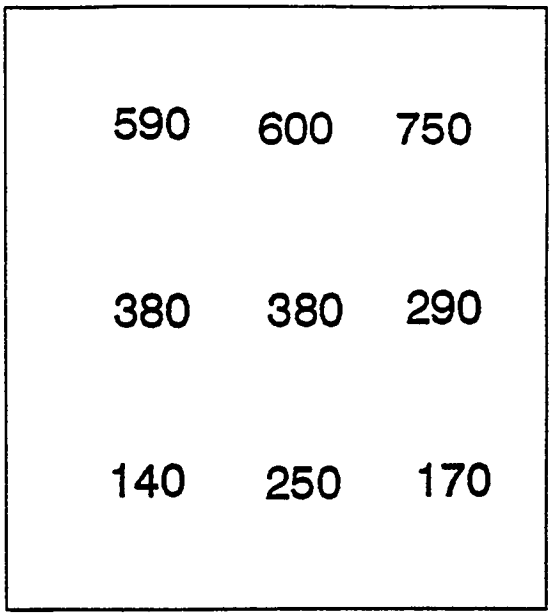


Figure 7-3 Improved SO_2 Distribution Using Jet Straighteners

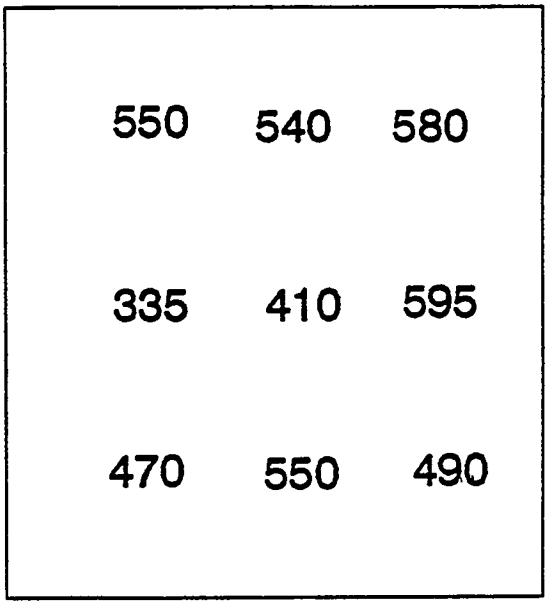
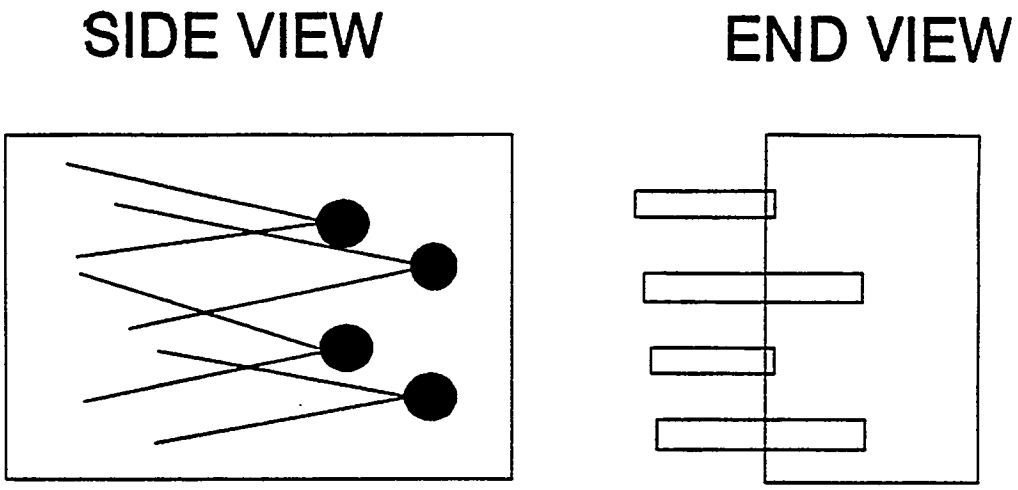


Figure 7-4 Horizontal Pipe Sorbent Injector Arrangement



Four 2" Pipes with 1 1/4" Nozzles

Figure 7-5 Effect of Injector Position on SO_2 Removal

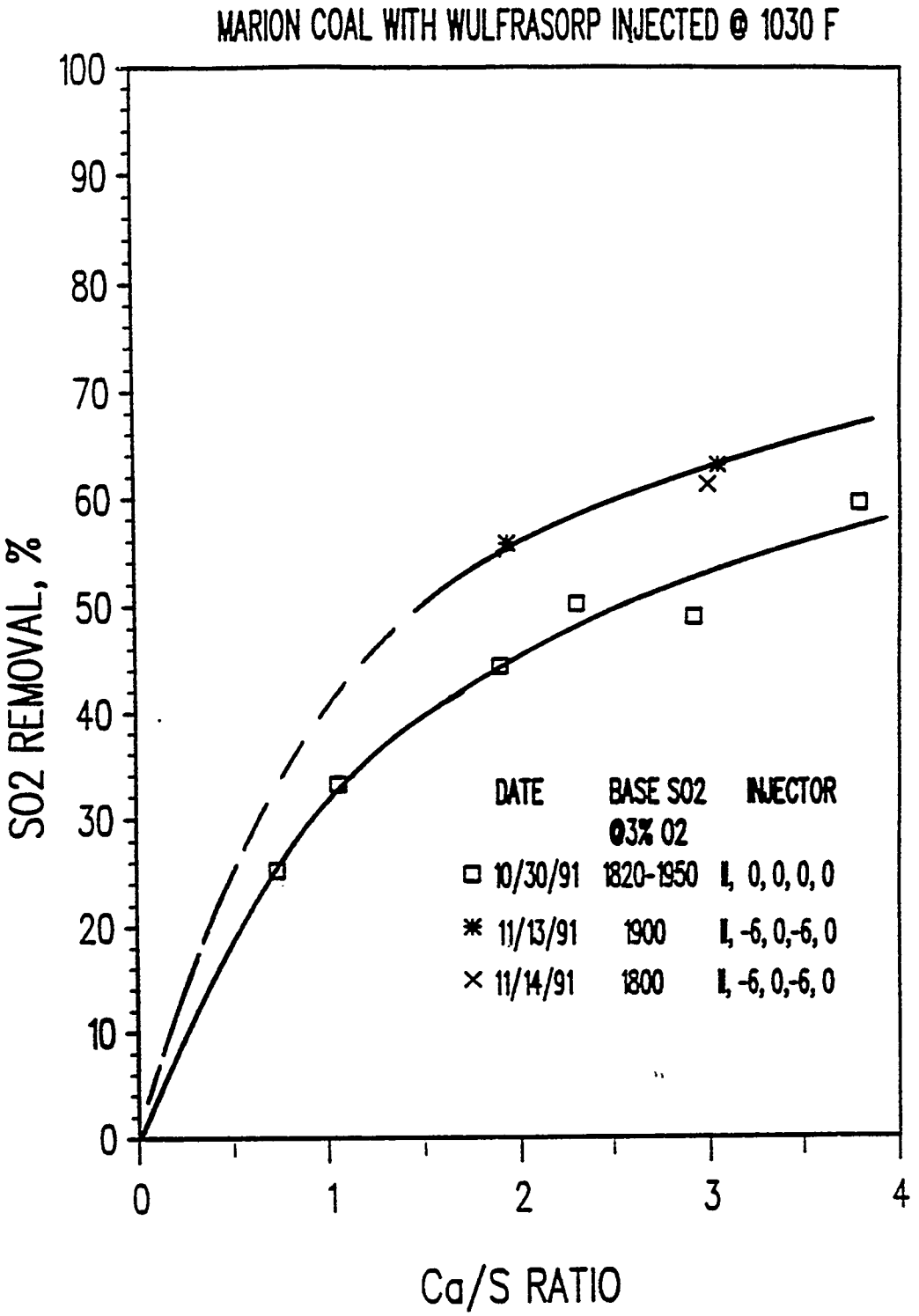
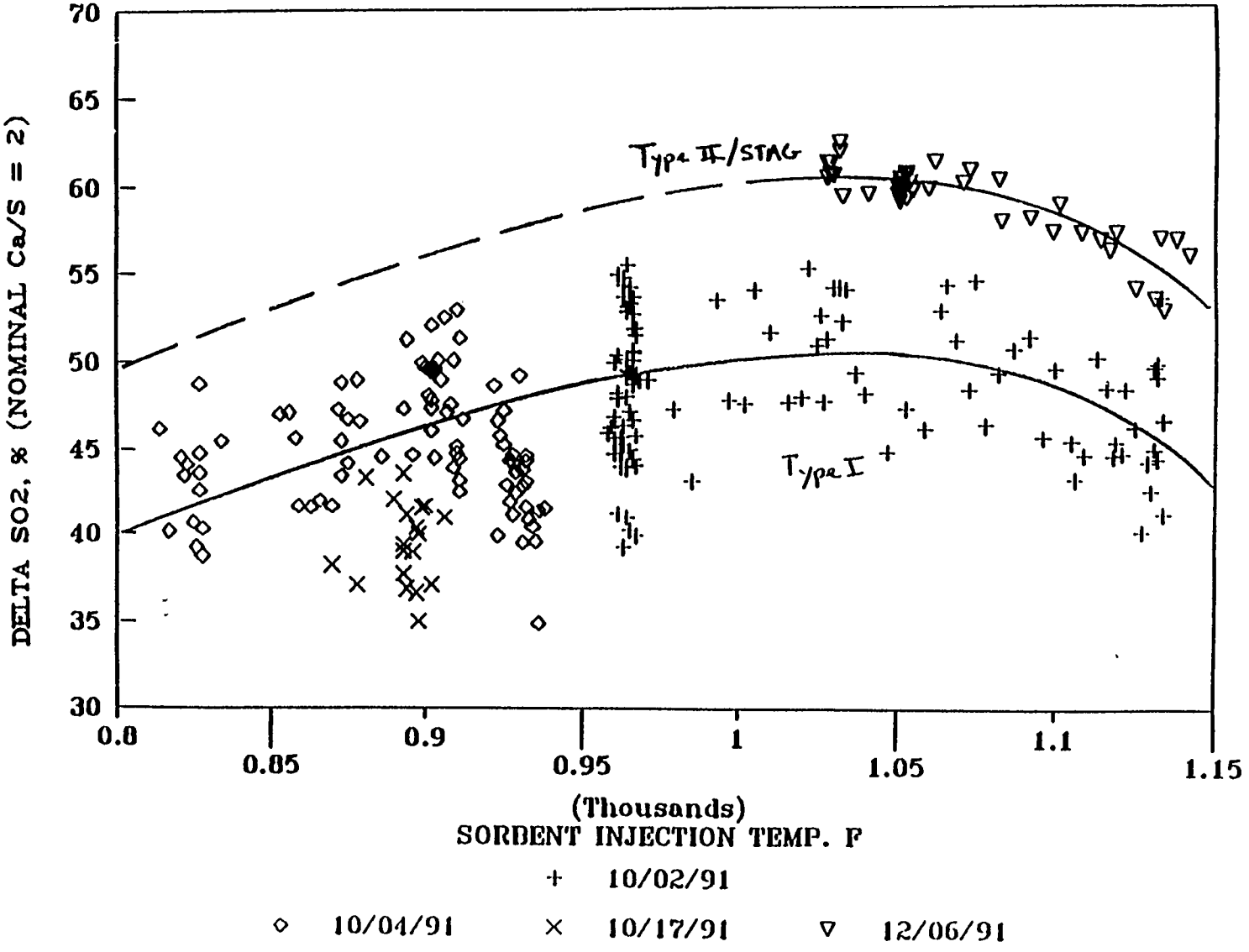


Figure 7-6 Effect of Injector Position and Injection Temperature on SO_2 Removal



Additional hydrate-only testing was performed in which the inlet S02 concentration was varied. These results, given in Figure 7-7, show SO_2 removal percentage as a function of Ca/S ratio for three levels of inlet SO_2 concentration. The data of this Figure is rearranged in Figure 7-8 to show SO_2 removal percentage as a function of inlet SO_2 concentration. Improved SO_2 removal clearly results from increased concentration, there being a 25 percentage point difference in removals between the lowest and highest concentrations. This result reflects the competition between sulfation and carbonation. The carbonation rate becomes equal or greater than the sulfation rate at low SO_2 concentration. The data point at 10% removal resulted from hydrate feeding difficulties at that required low feed rate.

The conventional hydrated lime was injected in place of the alcohol hydrate in one test. Severe transport problems were encountered with this hydrate. It was found that the feed to the injector nozzles was erratic and hydrate would appear in slugs as though it were building up in the transport line and then breaking loose. This behavior resulted in erratic data and difficult data interpretation, but it can be concluded that at a Ca/S ratio of 2, the SO_2 removal efficiency dropped from 56% to 40% when switching from alcohol hydrate to conventional hydrate.

Subsequent testing concentrated on SO_2 and NO_x removal resulting from combined hydrate and bicarbonate injection and the subsequent electrostatic precipitator impacts. Typical results for operation on November 14 are shown in Figure 7-9. This Figure shows SO_2 concentration at the system exit as a function of operating time. The initial SO_2 concentration without sorbent injection is 1800 ppm. The initiation of hydrate injection at 20 minutes into the test yields a drop of SO_2 concentration to 700 ppm. An additional decrease in SO_2 concentration to 200 ppm results with the initiation of bicarbonate injection at 40 minutes. The system response to sorbent injection shown in this figure is typical of that seen for all testing.

Figure 7-10 gives a comparison of sodium bicarbonate and sodium sesquicarbonate performance. The Figure shows incremental SO_2 removal as a function of Na_2/S ratio for the two sodium sorbents. The sodium bicarbonate is significantly more effective than sesquicarbonate, especially at higher mole ratios. Figure 7-11 shows this data in terms of sodium sorbent utilization.

Figure 7-7 Effect of Sorbent to Sulfur Mole Ratio on SO_2 Removal

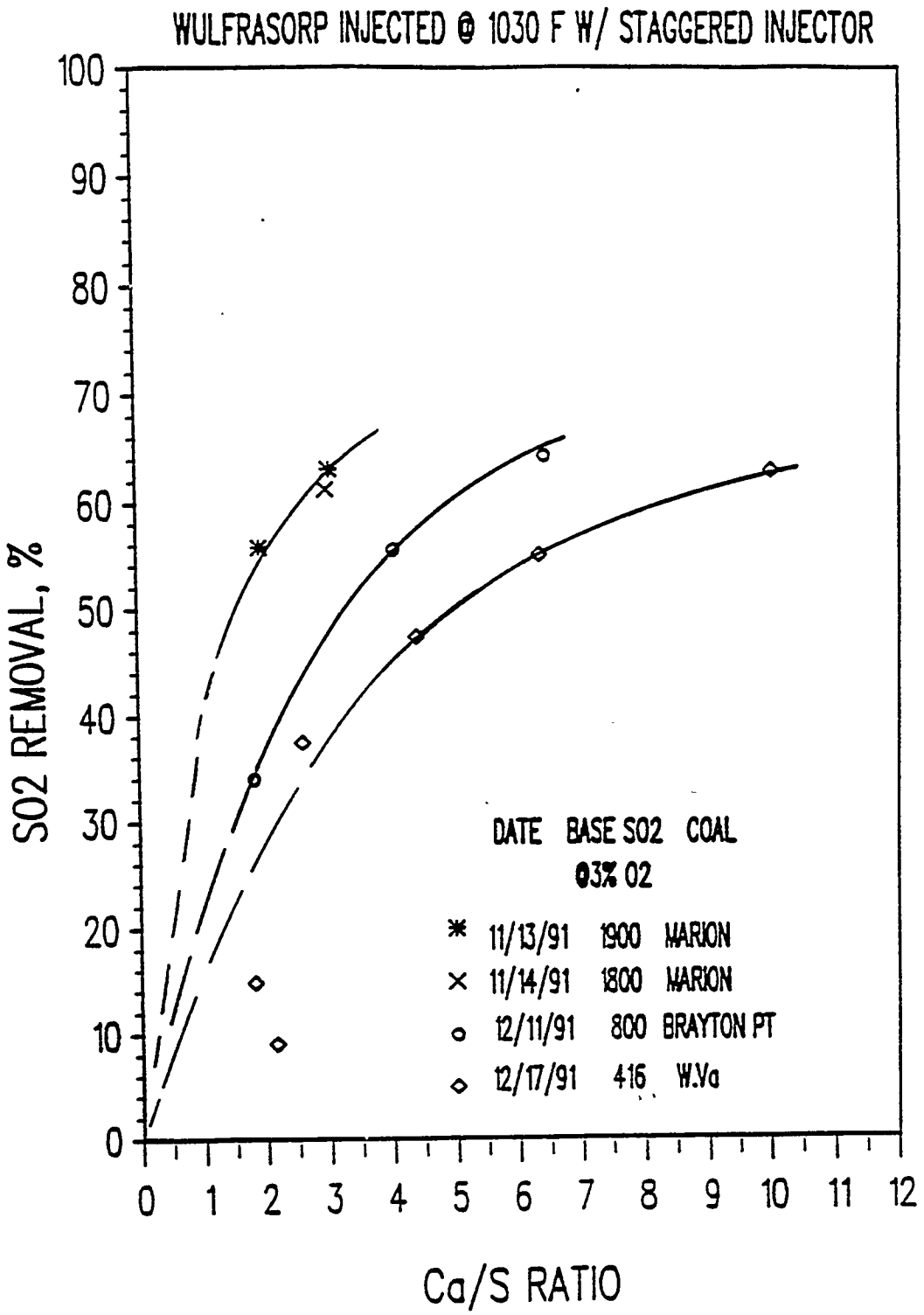


Figure 7-8 Effect of Inlet SO_2 Concentration

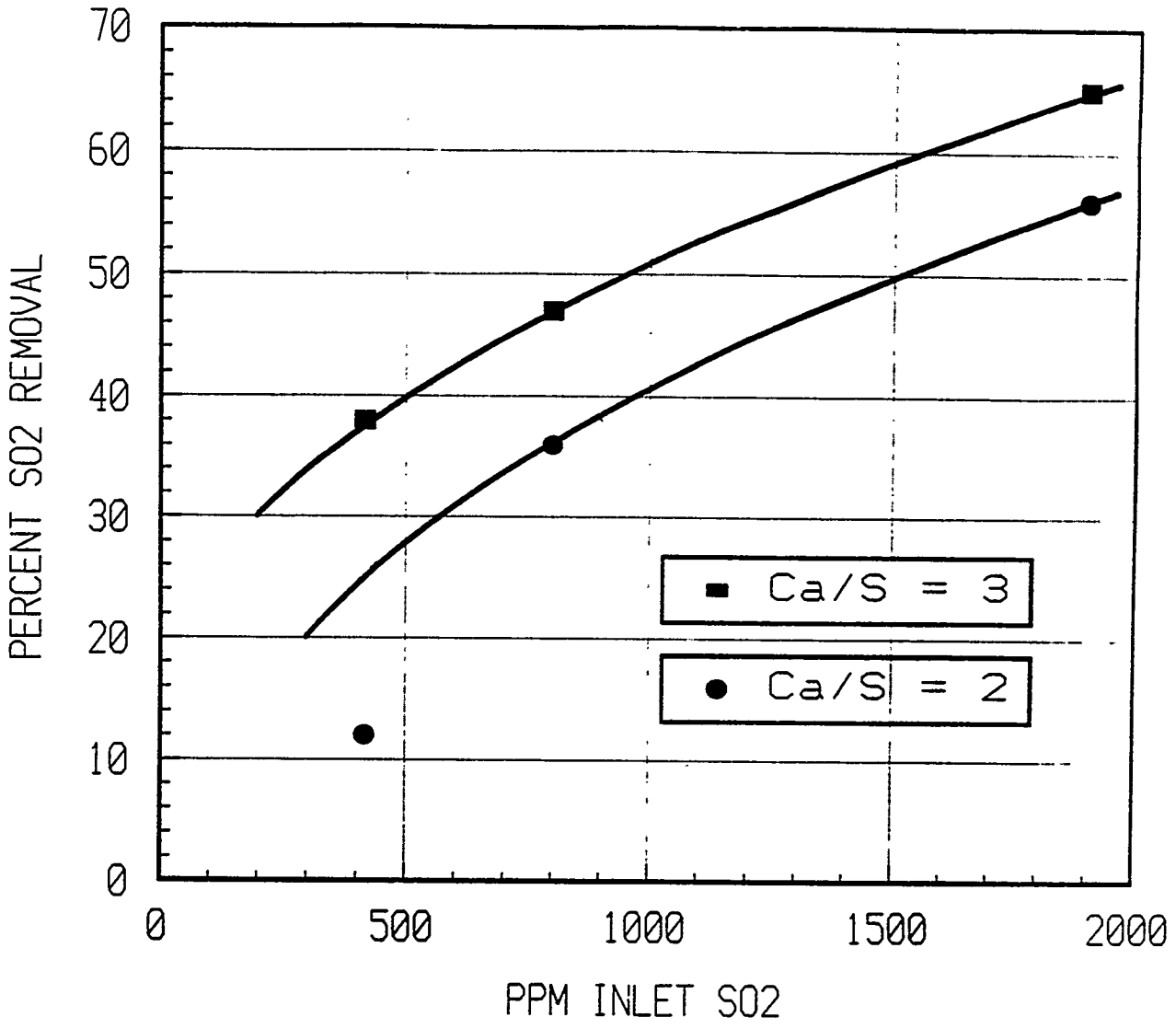


Figure 7-9 Effect of Sorbent Injection on SO_2 Outlet Concentration

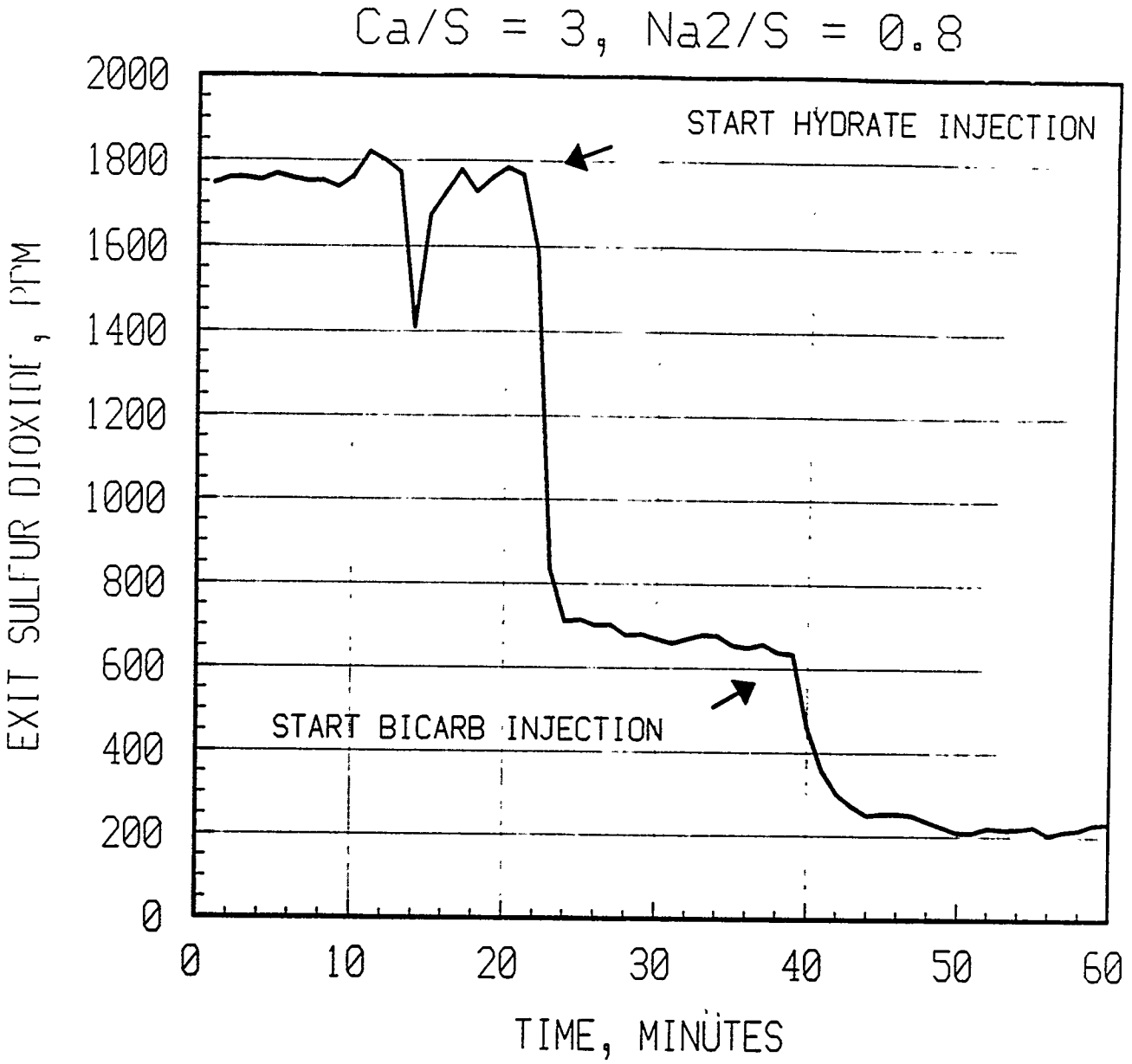


Figure 7-10 Incremental SO_2 Removal by Sodium Sorbents

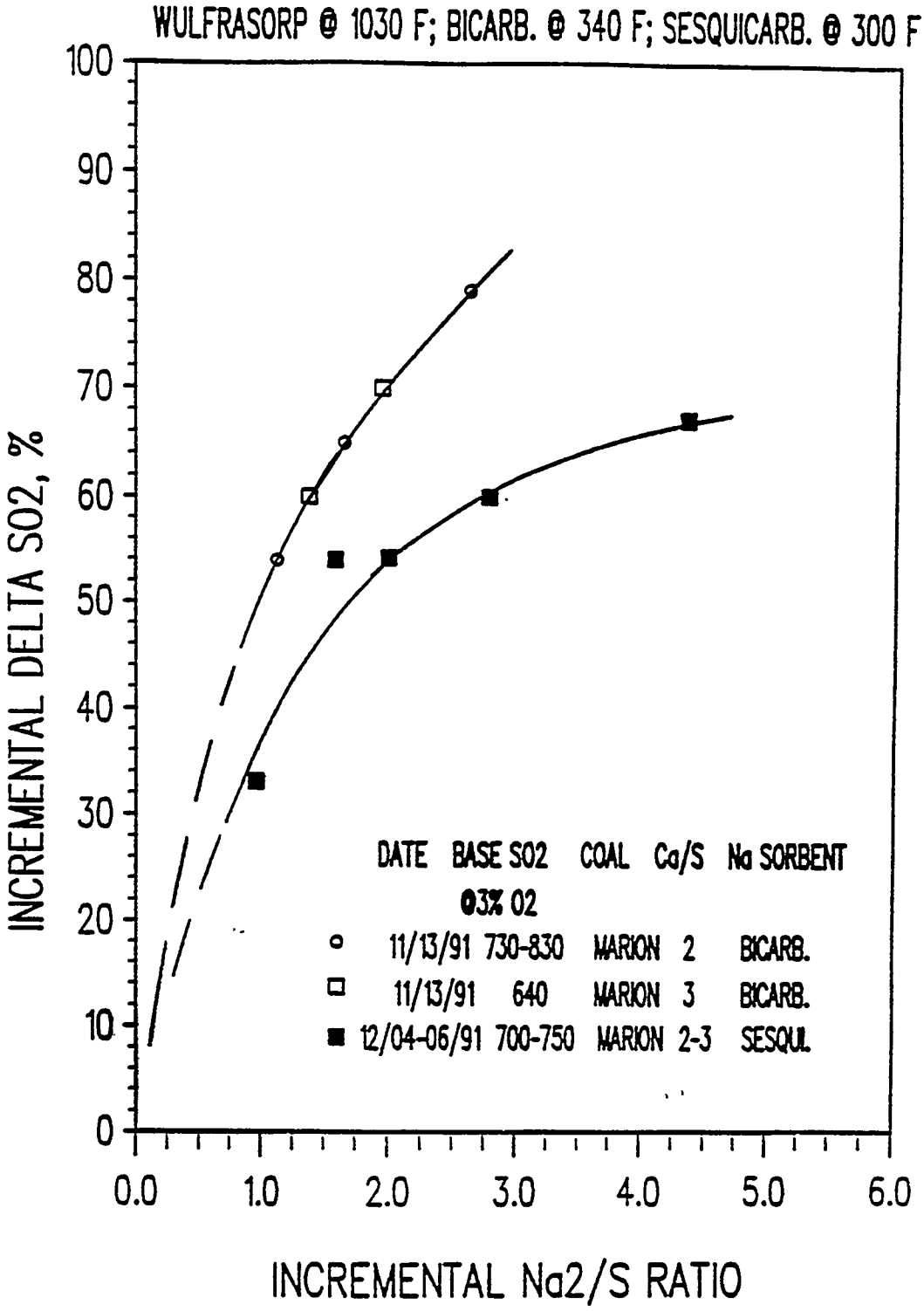
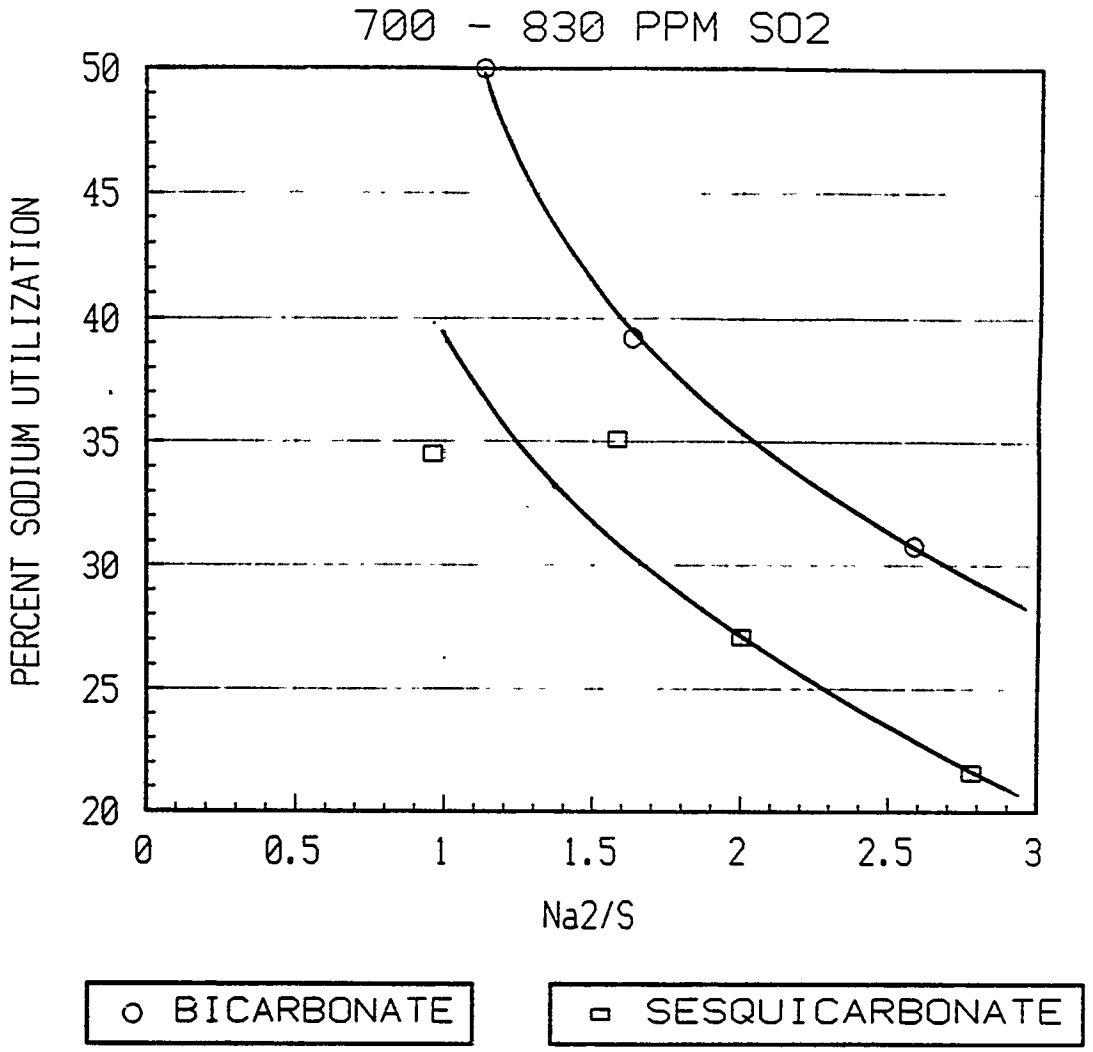


Figure 7-11 Utilization of Sodium Sorbents



Figures 7-12 and 7-13 give the SO_2 concentration downstream of the precipitator as a function of sodium injection temperature for bicarbonate and sesquicarbonate respectively. As expected, SO_2 removal by sodium bicarbonate improves with increasing temperature, going from 350 ppm (52% removal) at 270°F to 250 ppm (66% removal) at 350°F. The sesquicarbonate exhibits an opposite temperature dependence, and SO_2 concentration decreases from 525 ppm (36% removal) at 370°F to 460 ppm (44% removal) at 260°F. This difference in temperature dependence between sodium bicarbonate and sesquicarbonate has also been observed by Muzio, et al[5] but has not been explained.

The incremental SO_2 removal for sodium bicarbonate injection as a function of Na_2/S mole ratio is given in Figure 7-14 for three SO_2 concentrations. This Figure demonstrates how percent SO_2 removal improves with increasing SO_2 concentration, a result also found for hydrate injection and an indication that removal is controlled by gas phase diffusion.

Figure 7-15 gives the overall percent SO_2 removal across the system as a function of Na_2/S ratio (based on sulfur at the system inlet) for different SO_2 concentrations. Again it is seen that high percent SO_2 removals are favored by high SO_2 concentration, and large Ca/S and Na_2/S ratios are required to achieve greater than 70% removal when the inlet SO_2 concentration is less than 1000 ppm.

The November 13th data of Figure 7-15 is reproduced in Figure 7-16, and the corresponding NO_x removal is included. Fifty percent NO_x removal by the low NO_x burner is taken into account, and therefore Figure 7-16 shows the overall system NO_x removal for the given operating conditions. It is seen that greater than 90% SO_2 removal and 65% NO. removal can be achieved at mole ratios of Ca/S=2 and $Na_2/S=1$.

Figure 7-17 shows the results of the November 14 testing over a 280 minute time period. These tests were performed in order to characterize the effects of lowering the precipitator inlet temperature by humidification on precipitator performance and on overall SO_2 removal. The figure shows precipitator inlet temperature, SO_2 and NO_x removal percents, and precipitator exit opacity, all as functions of operating time. The temperature was decreased in steps from 300° F to 170° F. Hydrate injection at Ca/S=3 was started at 20 minutes and bicarbonate injection at $Na_2/S=2$ was started at 40 minutes. There were four interruptions of the hydrate feed. These occurred at 80, 140, 180, and 230 minutes. The bicarbonate feed was continuous throughout the test. The viewport of the opacity monitor was a longitudinal section of ductwork, and the opacity measurements are not calibrated to a stack but are taken for comparative purposes.

Figure 7-12 Sodium Bicarbonate Performance with Temperature Ramp

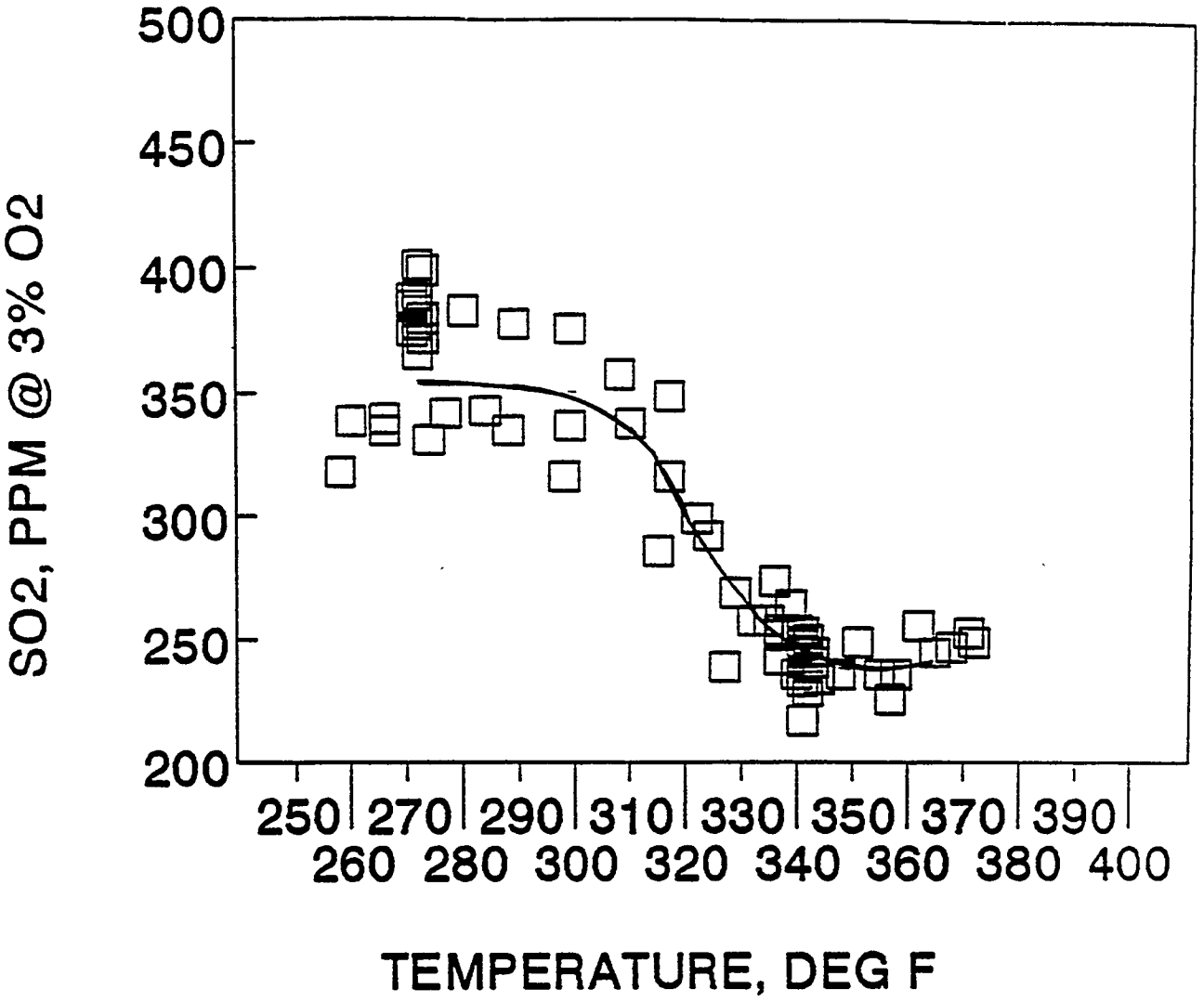


Figure 7-13 Sesquicarbonate Performance with Temperature Ramp

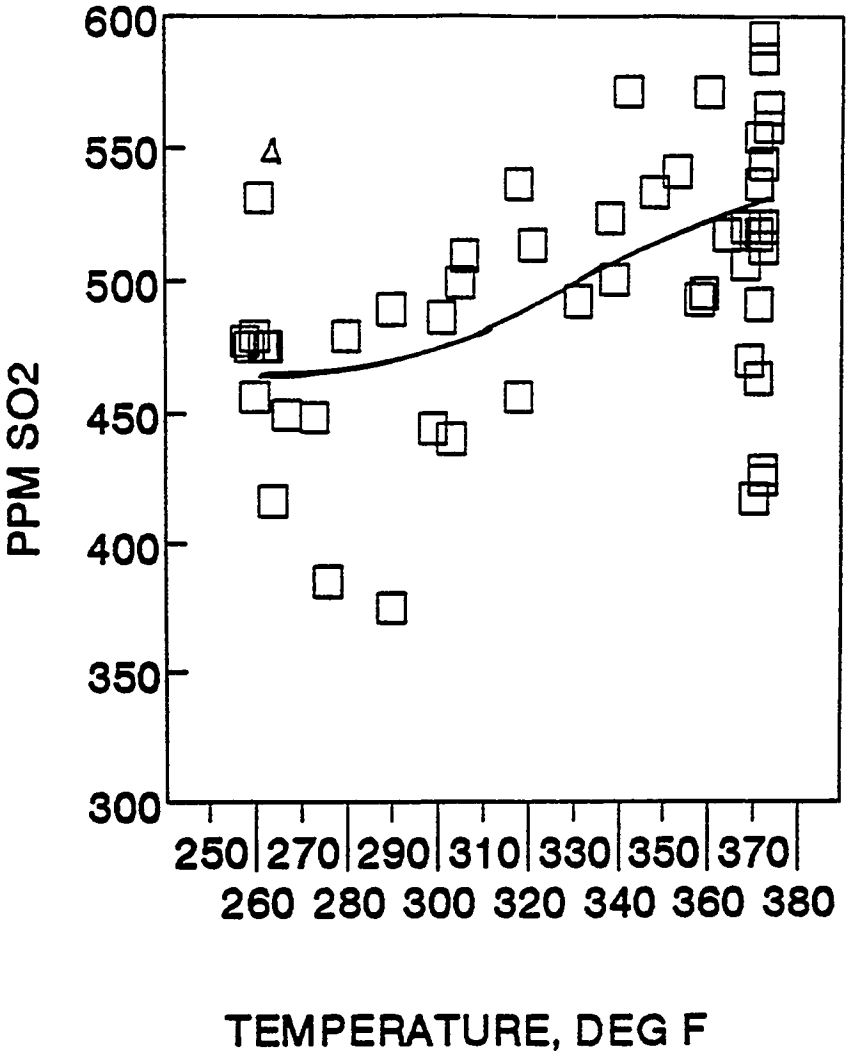


Figure 7-14 Incremental SO_2 Removal vs. Bicarbonate Injection Rate

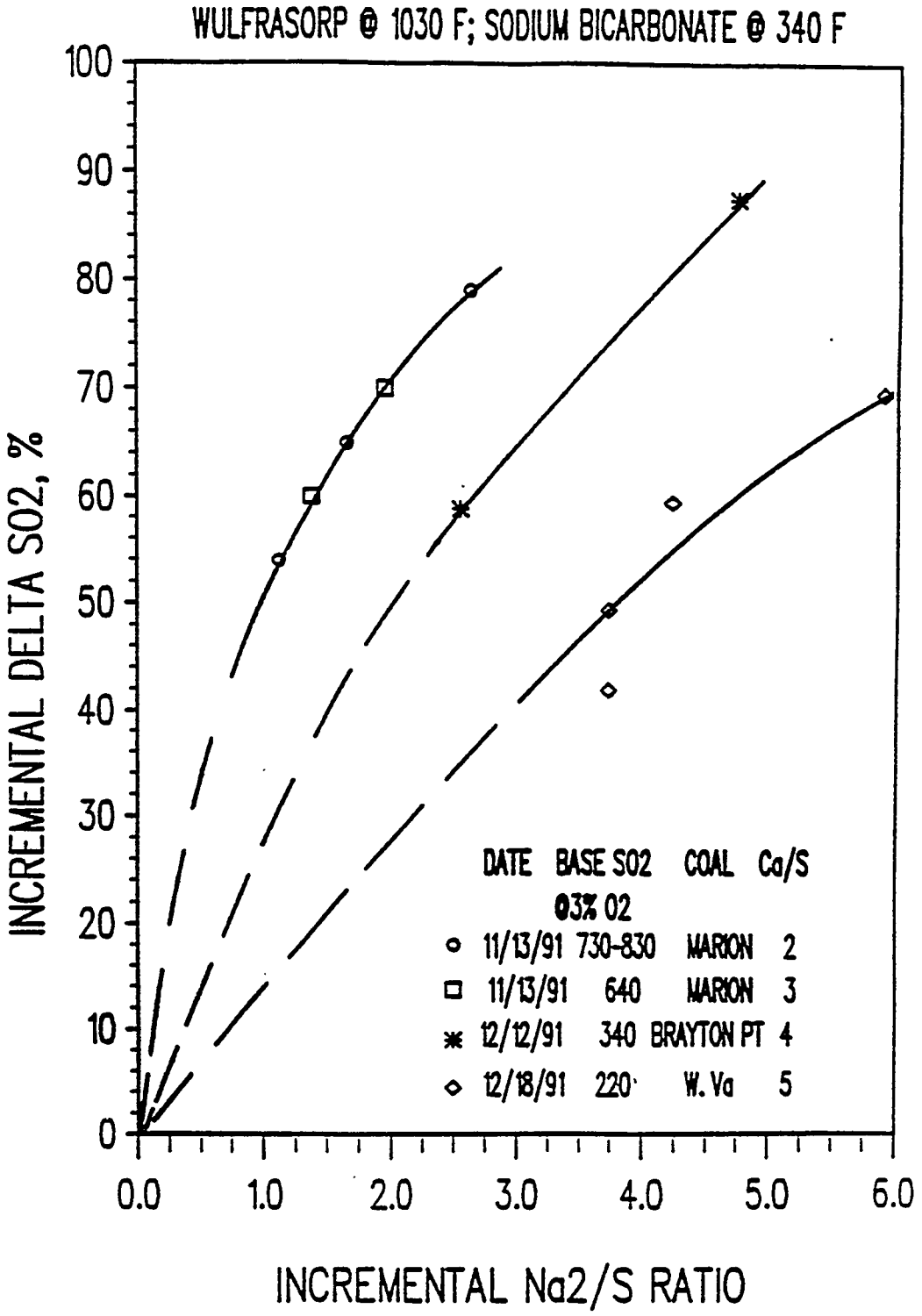


Figure 7-15 Overall SO_2 Removal vs. Bicrbonate Injection Rate

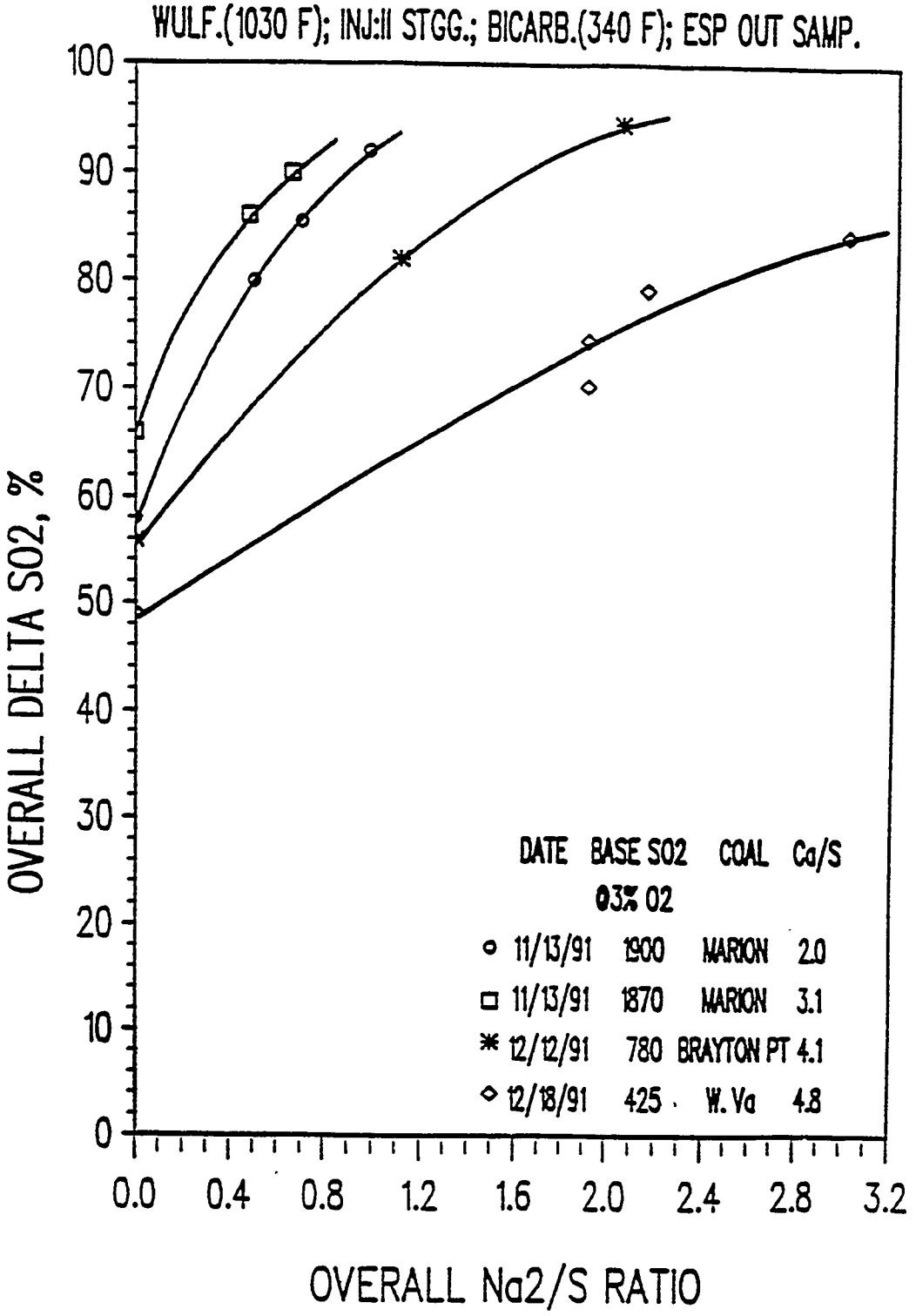


Figure 7-16 Combined SO_2/NO_x Removal vs. Bicarbonate Injection Rate

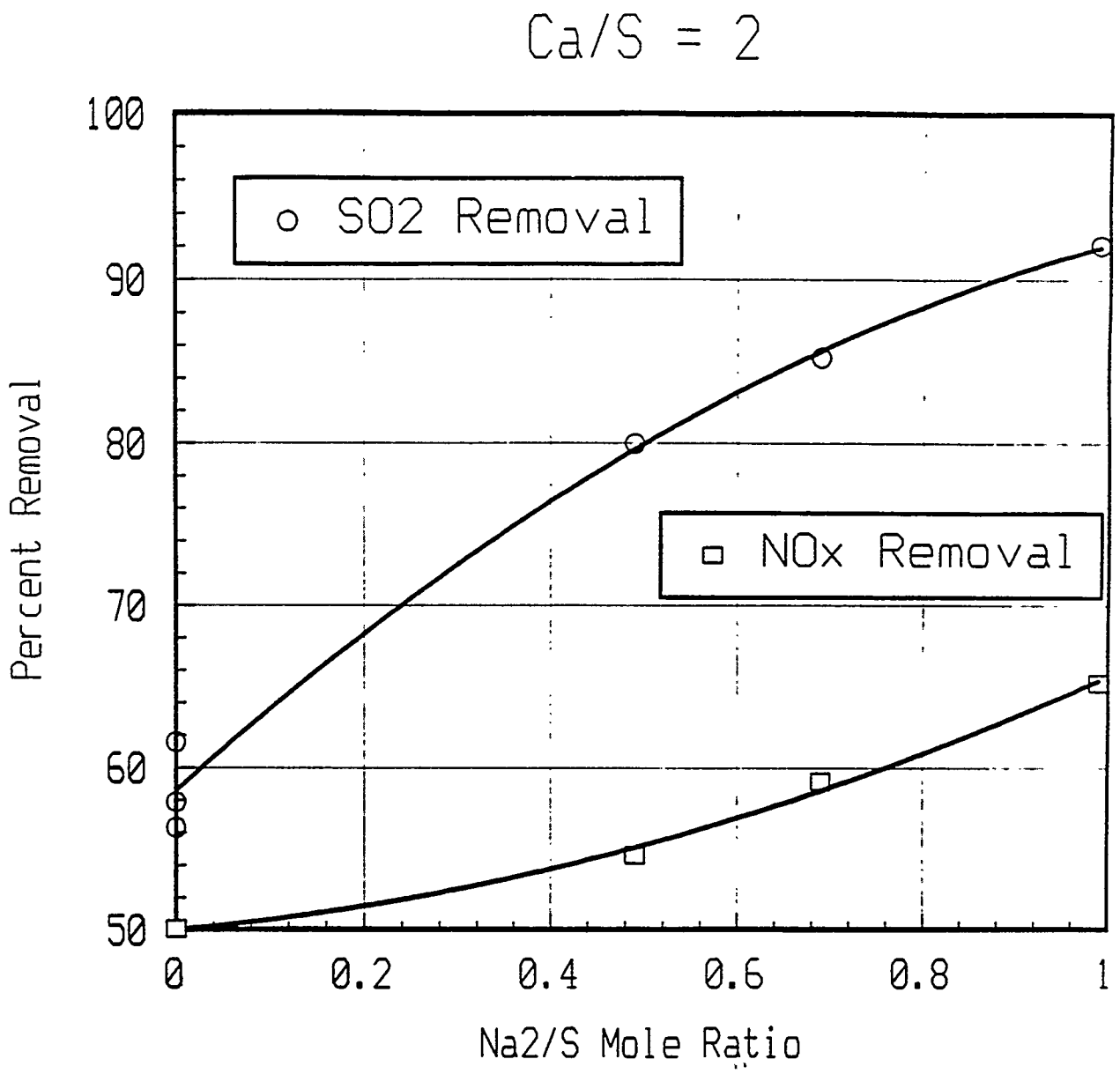
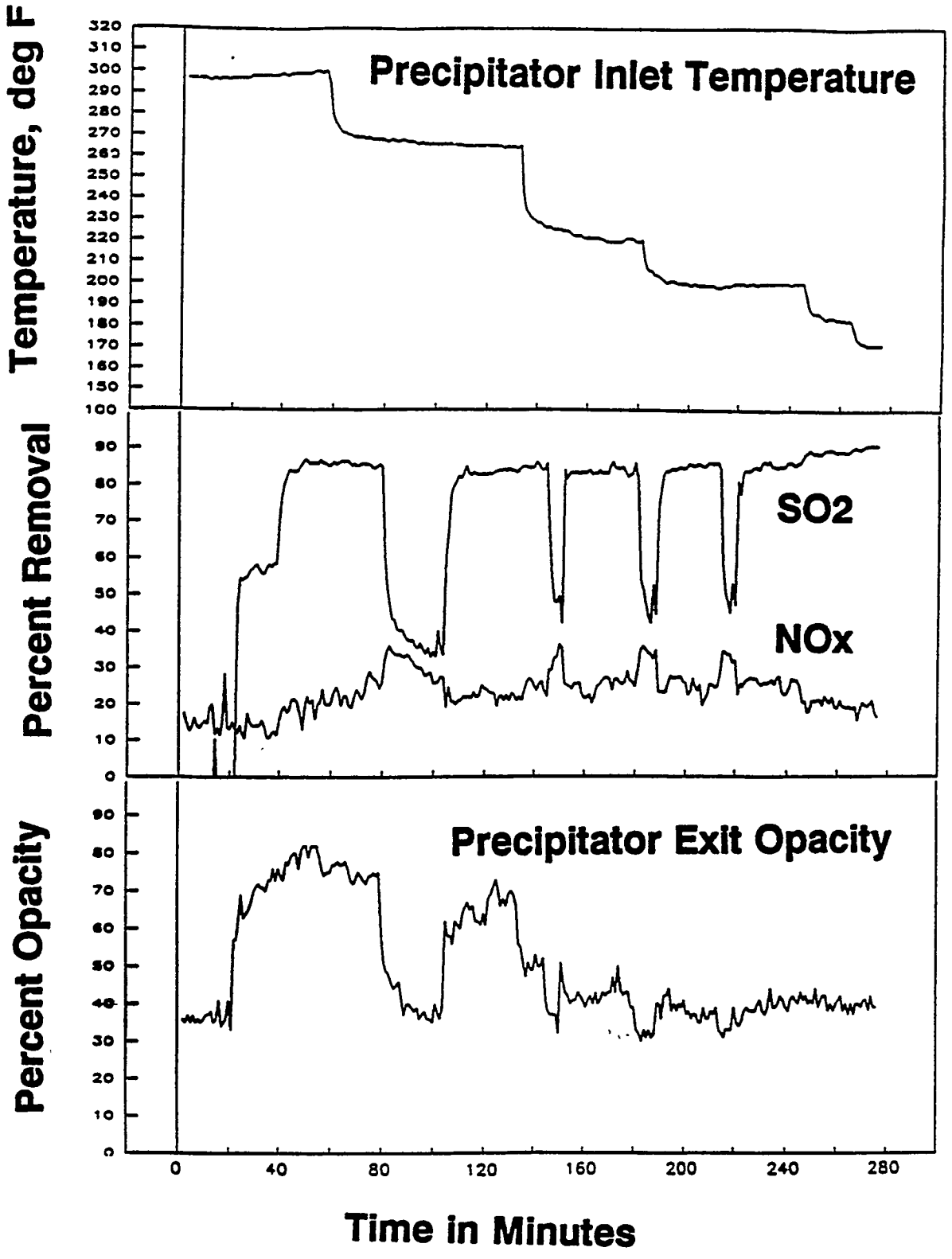


Figure 7-17 Effect of Precipitator Inlet Temperature on Performance



Opacity increases significantly when the hydrate feed is initiated and drops to its original, fly ash only value when the hydrate feed is interrupted, This indicates that precipitator performance is adversely affected by the hydrate but not by the bicarbonate. Near original opacity is recovered when the inlet precipitator temperature is reduced to 220°F, and further temperature lowering has no effect on opacity.

SO_2 removal increases as the temperature is reduced below 200°F, and an additional 5% SO_2 removal can be realized at 170°F. It is likely that SO_2 removal would continue to improve as the gas temperature approaches adiabatic saturation.

Approximately 10% to 20% NO_x removal is achieved, and it is interesting to observe peaks in NO_x removal at those points where the hydrate injection was interrupted. This is because the NO_x reaction with sodium bicarbonate requires the participation of SO_2 and hence the higher SO_2 concentrations resulting from no hydrate injection gave rise to enhanced NO_x removal.

7.3 Electrostatic Precipitator Results

Electrostatic precipitator performance was severely effected by the injection of hydrated lime. Mass loading was at times tripled and resistivity increased by three orders of magnitude.

The second field of the precipitator would normally operate at 41 KV, 35 mA and 10 sparks per minute when handling the coal ash only, at a 300°F inlet temperature. Under these conditions the opacity was 35%. The electrical conditions would decline to 30 KV and 15 mA during hydrate injection, with the opacity at 85%. Water spray evaporation at the precipitator inlet to lower the temperature to 200°F would result in an increase of voltage to 46 KV and current to 45 mA, with the opacity returning to 35%. It should be pointed out that the opacity measurement was made across a length of duct, not the stack, and no instrument calibration was attempted. This was because only relative values of opacity were of interest, for example the opacity with and without sorbent injection.

Three inlet particulate stack tests were done and five outlet stack tests, covering most of the operating conditions of the precipitator. A summary of these tests is given in Table 7-1. The temperature was measured at the precipitator inlet. The inlet flow was 2750 SCFM for all tests, which yields an SCA of 200 at an inlet temperature of 300°F.

Table 7-1 Summary of Particulate Tests

Condition	Location	Temperature Degree F	Gr./DSCF @3% O_2
Ash only	Inlet	280	2.60
"	Outlet	245	0.18
"	Outlet	244	0.24
"	Inlet	279	2.65
"	Outlet	243	0.09
Ca/S=3 Na_2/S=.7	Inlet	190	7.09
"	Outlet	190	0.23
"	Outlet	190	0.32

The precipitator behavior as a function of sorbent injection and humidification can be summarized in Figure 7-18. This Figure shows precipitator energization power (voltage x current) and exit opacity as a function of inlet temperature as controlled by evaporative cooling. The ash-only opacity was 38% at 300°F, and under those conditions the precipitator operated at 96% efficiency. Large changes in energization and opacity occur as the inlet temperature is reduced from 300° to 200°F, and pre-sorbent injection opacity is almost restored at 200°F.

The Research-Cottrell EPIC electrostatic precipitator computer model was used to verify the measured precipitator response to sorbent injection and gas cooling and to help explain the observed effects. The model starts with the assumption that the basic Deutsch premise applies, i.e. complete turbulent mixing of particulate in the gas stream, so that precipitation is from a uniform particulate concentration across the boundary layer to the collection surface. The model deviates from the Deutsch model by recognizing that the migration velocity of particles across the boundary layer is dependent on particle size. The size dependence results from the fact that the migration velocity depends on a balance of electrical and drag forces on the particle and these forces in turn depend on size. Corrections for submicron particulate are included in the model, i.e., the Cunningham correction for slip and a correction for diffusion charging of fine particulate.

To determine overall collection efficiency, the efficiency for each size is numerically integrated over the particle size distribution. A log-normal form is assumed for the size distribution. However, if the actual size distribution is not lognormal, the computer model can represent it as a series of lognormal segments.

Charging field strength is calculated as an average field strength existing on the maximum field line between discharge and collecting electrode when corona suppression does not limit the particle charging process.

The model also calculates current-voltage relationships based on the modified Townsend equation by integrating local currents over the area served by a discharge point. Average and local maximum current densities and operating voltage are needed in calculating power consumption and the high resistivity breakdown limit. Dust layer resistivity is calculated from coal and ash compositions using a model developed by Bickelhaupt.

When the EPIC model is used to calculate dust layer resistivity as a function of humidified gas temperature, Figure 7-19 results. The resistivity of the fly ash-sorbent mixture can be lowered to the original fly ash only resistivity by cooling to 180° F.

Figure 7-18 Effect of Humidification on Precipitator Performance

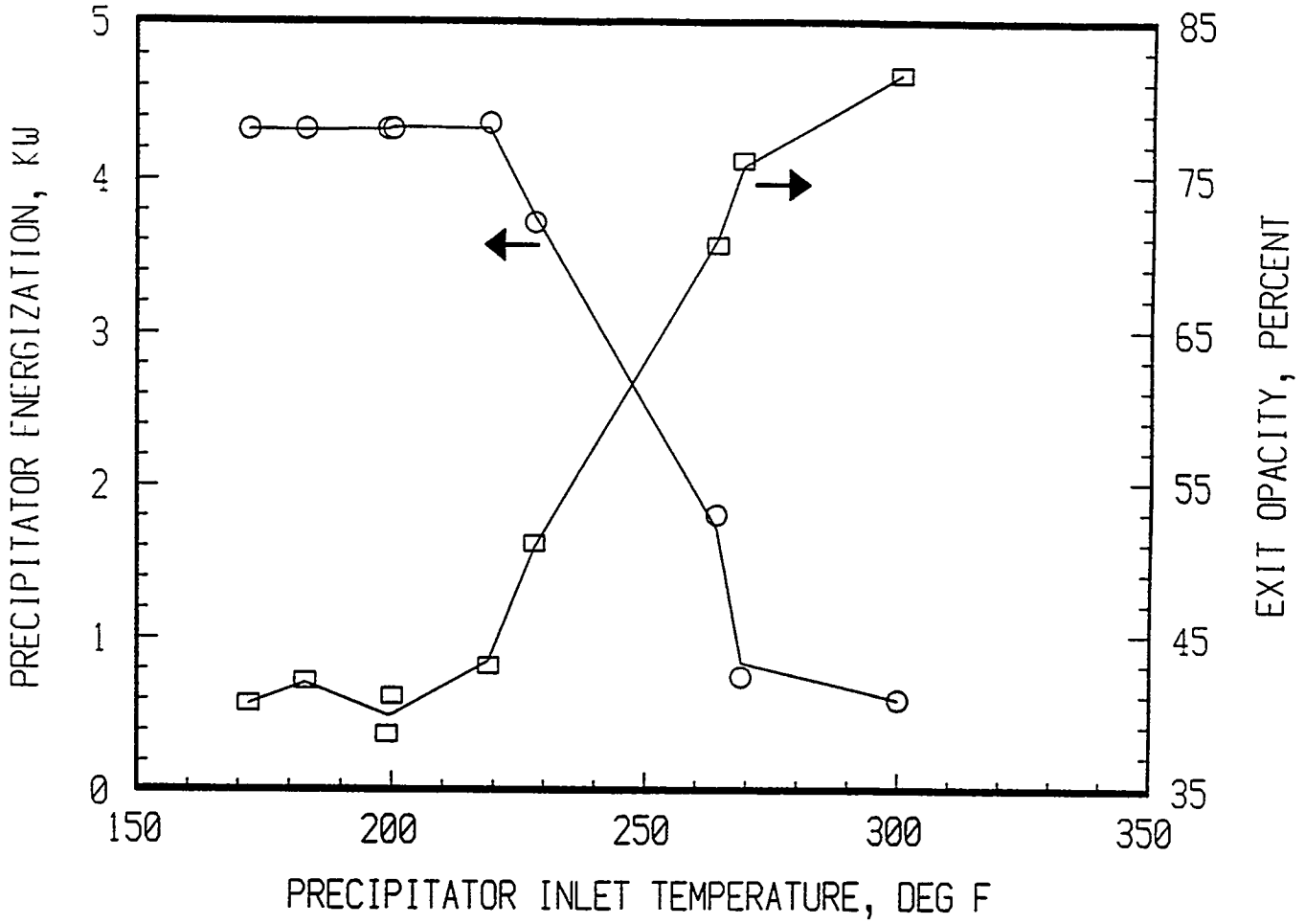


Figure 7-19 Particulate Resistivity vs. Humidified Gas Temperature

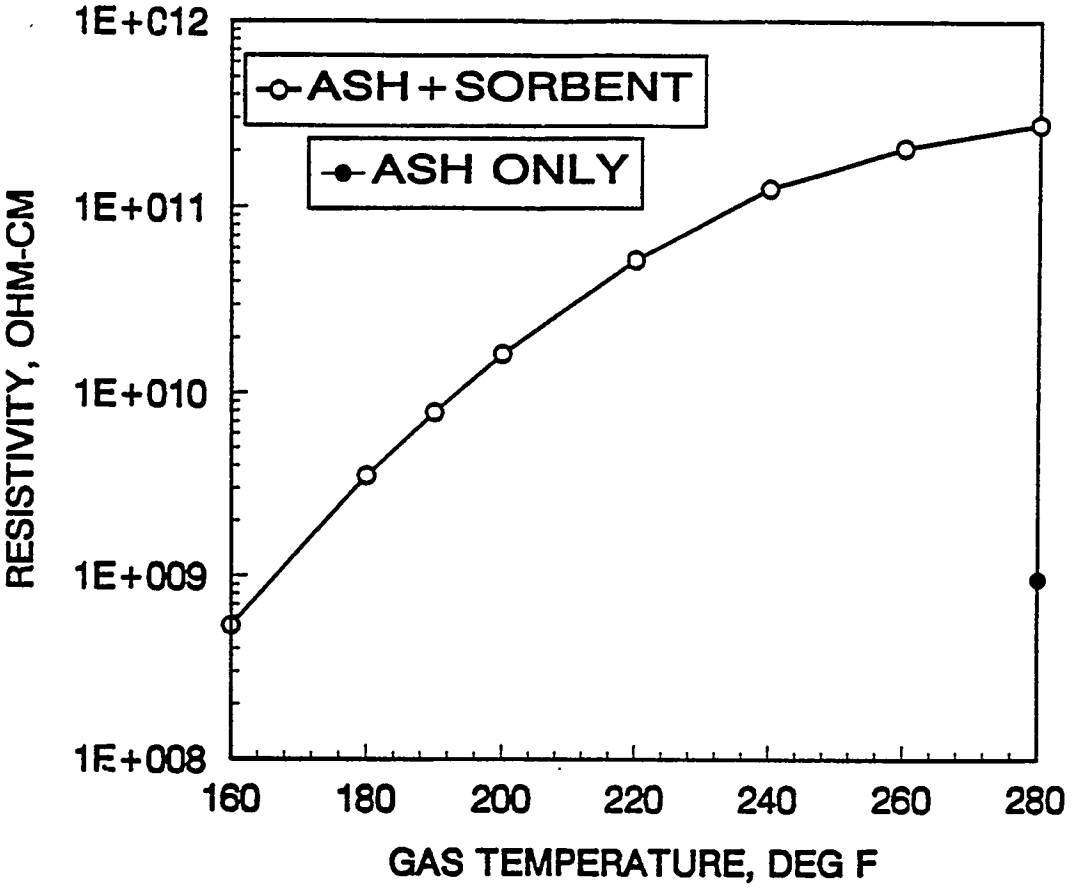
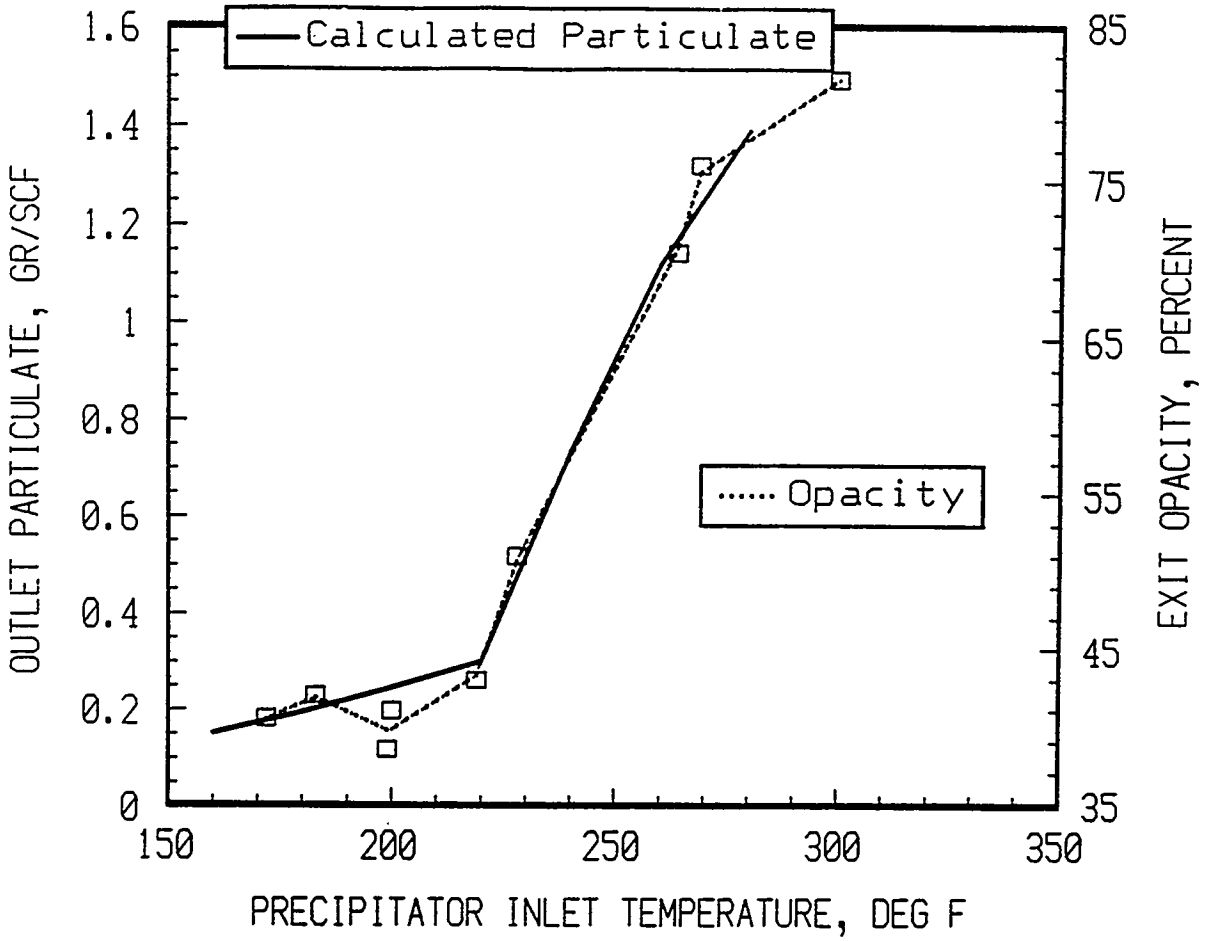


Figure 7-20 Calculated Outlet Particulate Compared with Opacity



If the curve of calculated outlet particulate loading is superimposed on the measured opacity curve of Figure 7-18, then Figure 7-20 results. The curves match quite well, although this is largely due to judicious selection of graph origins and scales. Nevertheless, the break in the curves at 220°F, and the relative curve slopes above and below this break do not depend on scale and indicate successful model prediction.

7.4 Material Balance

The precipitator inlet mass train samples provided total particulate loading for baseline operation and one test condition with sorbent injection. These samples were also analyzed in order to verify the sorbent utilization determined by gas analysis. Gas analysis was the sole measure of sorbent utilization for most of the tests in the program.

7.4.1 Total loading: The solids analysis is first examined for recovery or throughput. That is, the total loading and composition of the samples are normalized to the system input to determine recovery at the precipitator inlet. Ash recovery is based on the loading of SiO_2 at the precipitator inlet compared to the SiO_2 loading calculated from the coal ash analysis. Calcium and sodium loadings are compared to the loading calculated from the injection rate and flue gas rate. Table 7-2 gives analyses of precipitator inlet ash samples for cases with and without sorbent injection.

Note that in Case 1, all three recoveries noted are based on the corresponding component in coal ash. The recoveries of calcium and silica are similar, indicating both representative ash throughput from the furnace, and little contamination from preceding sorbent injection tests. Another way to look at this is that the Ca/SiO_2 ratio in the ASTM coal ash was 0.080 vs 0.089 in the precipitator sample.

In Case 2, SiO_2 is again based on coal ash input, with calcium and sodium recoveries based on injected material (the correction for ash-derived Ca and Na was made, but amounts to less than one percentage point in recovery).

A very rough estimate of ash loss within the furnace, based on furnace cleanout after project completion, is 30%. This implies that about 50% of the remaining ash is lost within the test loop ductwork, not very different from the indicated 60% loss for sorbent. This high loss was initially ascribed to settling within the duct, but estimates of the total test loop input suggest that no more than 5-15% loss could be accounted for given the limited amount of deposition observed (deposit depths were not mapped or measured quantitatively).

Table 7-2 Precipitator Inlet Samples

	ESP INLET SAMPLES	
Case	1	2
Sample No.	42923	42924
Condition	No Sorbent	Ca/S=3, Na_2/S=0.7
Total gr/dscf @3% O_2	2.60	7.09
wt% SiO_2	40.90	13.73
wt% Ca	3.62	20.96
wt% Na_2	0.22	5.09
wt% S	0.89	6.14
SiO_2 recovery, %	36	33
Ca recovery, %	40	39
Na recovery, %	20	37

Furthermore, the total ash collected from the baghouse and precipitator discharges (which are combined in a common vacuum transport system and discharged to a single container) is of the order of the estimated system input for the full test program. Therefore, the most likely explanation for the low recovery is that material was not collected representatively with the precipitator intake nozzle. Recall that the precipitator stream was split off from the main duct just upstream of the baghouse. The precipitator inlet scoop was designed to operate at the main stream velocity. However, the total system flow was reduced because of heat exchanger limitations. The precipitator gas volume was fixed by collector geometry. As a consequence, the velocity of the precipitator intake was about twice that of the main pipe. This velocity ratio would be expected to cause high losses, predominately in larger size particles.

Although particle loadings to the precipitator were low, note that: 1. precipitator performance with sorbent and humidification was based on relative, not absolute, measurement of opacity; 2. the fine particle size range limiting precipitator performance was probably not affected as much as the total; and 3. the chemical composition, governing resistivity, was representative.

7.4.2 Utilization: The available chemical analysis gives total sulfur, calcium, and sodium content in the sample. Comparison of the solids utilization to that indicated by gas phase measurements must therefore be based on the composite utilization $S/(Ca+Na_2)$. The test conditions were as follows:

- $Ca/S = 3.0$
- $Na_2/S = 0.70$
- Overall capture - 91% from gas measurement
- Solids utilization implied from capture = $91/(3 + 0.7) = 24.6\%$

The utilization calculated from the composition of the ESP inlet sample is:

$$(6.14/32x100)/(20.96/40 + 5.09/46) = 30.2\%$$

This utilization is about 22% higher than that indicated by gas analysis. A similar calculation for a bulk sample of ash taken from the combined precipitator and baghouse discharge container yields a solids utilization of 26.7% $S/(Ca+Na_2)$, about 8.5% higher than gas analysis indicated. The difference between the combined sample and the ESP sample is consistent with the explanation put forth above for low ESP loading, namely that the ESP stream may have been biased toward fine particles due to velocity effects. The finer material would be expected to have a higher utilization.

8.0 WASTE CHARACTERIZATION

The waste material produced by IDIP consists primarily of fly ash, calcium hydroxide, calcium sulfite, calcium sulfate, calcium nitrate, calcium carbonate, sodium sulfate, sodium nitrate, and sodium carbonate. Due to the solubility of calcium nitrate (1000 times greater than calcium sulfate) and the sodium salts, and because primary water standards limit the nitrate and sulfate concentration in groundwater, some stabilization prior to disposal is necessary for solids containing nitrates and sodium salts.

The means by which soluble chemicals contained in dry FGD waste enter the environment is through leaching. Rainwater collected above landfill material seeps through the material, absorbing soluble chemicals. This leachate then permeates the soil directly below the disposal site, eventually reaching the groundwater.

There are several methods for reducing the flow of leachate. One method is to place an impermeable barrier between the soil and the FGD waste. This method is commonly used for lining the bottoms of ponds containing wet FGD wastes. Another method is to make the waste product itself relatively impermeable, and this can be done by either encapsulation or fixation. Encapsulation involves enclosing the waste in impermeable shells, while fixation transforms the wet or dry granular waste into a solid mass which can be landfilled. We considered fixation as the disposal method of choice for the subject waste material.

The fixation technique proposed for the waste product is one which exploits the natural pozzolanic reactions between the alumina-silica compounds of the fly ash and the lime compounds provided by hydrate injection. Water is added to the dry waste product until maximum density is achieved. The resulting soil-like product is placed in a landfill in a manner that minimizes the possibility of subsequent rainwater collection. When the pozzolanic reactions are complete (1-10 days) a solid, concrete-like substance remains, which is very impermeable.

Fixated samples for analysis were prepared in accordance with the ASTM 0698-70 procedure, in which water is mixed with the dry waste and the resulting grout-like material is compacted into a 1-1/8" diameter cylindrical mold to a depth of 2". This molded material was then allowed to cure for 28 days prior to testing. The solid cylinders thus produced were subsequently broken by hammer blows to pieces that would pass through a 3/8" screen prior to being used for the leaching test described below. For compressive strength testing, the solid cylinders were subjected to axial compressive stress to the point of structural failure. The applied stress at the point of structural failure is called the unconfined compressive strength.

The ASTM Shake Test was used to determine the leaching characteristics of the fixed and unfixed waste materials. Shake tests determine the immediate surface washing and the time dependent diffusion-controlled contributors to leaching from a waste material. Shake tests have the advantage over other types of agitation tests in that they can be used to evaluate leaching properties of stabilized and unstabilized wastes in the physical form in which they will be disposed or contained.

The ASTM Shake Test, in particular, is suitable for a wide range of waste materials, ranging from sludges and free-flowing particulates to monolithic stabilized materials. The ASTM shake test is extremely useful in that it is relatively rapid, easy to perform, uses a relatively small amount of sample, and can be easily modified for many materials to provide leach rate data if required. This test is performed by contacting a material of known weight with a specified amount of deionized water. Water to solid ratio is 4 ml water to 1 gram of wet material, typically 1400 ml to 350 grams. The water and material are placed in a container on a reciprocating platform shake apparatus and oscillated for 48 hours at a rate of 60-70 one inch strokes per minute. The water is then analyzed for calcium, sodium, sulfates, and nitrates.

In addition to limits on the amount of nitrate and sulfates which can be leached out, lower limits are also assigned to the compressive strength of materials placed in a landfill. As a minimum, the fill material must be able to support its own weight at the design height of the fill. The material should also develop enough strength to allow passage of earth moving equipment and trucks. The common test used for this characterization is the unconfined compressive strength. This test is indicative of bearing capacity of the landfill. We can assume that, as a lower limit, the unconfined compressive strength should be at least of sufficient magnitude that the material support its own weight. For a typical landfill, this would require a compressive strength of 25 psi.

Waste material extracted from the precipitator hopper when operating the system under high sorbent injection rates ($Ca/S=3$, $Na_2/S=1$) was used for leaching and strength tests. For comparative purposes, the fly ash from operation without sorbent injection was also subjected to the leaching test.

Three fixated samples were prepared for testing. The amount of added water to each sample differed from the other two samples, so that the effect of amount of added water on strength and leachability could be determined. In addition, unfixated samples of the fly ash alone and the fly ash-sorbent mix were also subjected to the leaching test.

The results of the unconfined compressive strength testing is shown in Figure 8-1. The results indicate the importance of adequate water addition to the dry waste material for the production of a strong fixated material. The compressive strengths on the order of a few hundred psi are attained, and this value is typical for calcium-based duct injection and spray dryer wastes. The demonstrated compressive strengths would allow the material to be safely landfilled but do not appear to be adequate for construction purposes.

The results of the leaching tests are given in Table 8-1 and Figure 8-2. Compared to the ash only, concentrations of Ca, Na, SO_4 and NO_3 all increased in the ash-sorbent mixes, both fixated and unfixated. pH is also increased in the ash-sorbent mixes, reflecting the large alkali contents of these materials. The increase in sulfate and nitrate concentrations in the mixed materials reflect the sorbent-absorbed SO_2 and NO_x in the materials. There is a slight decrease in leaching of all species as the percentage of added water increases. This can be expected, since more water indicates a stronger fixated material, as shown in Figure 8-1. Finally, the drinking water standards are given for those species for which standards exist and they are exceeded, even by the fly ash alone.

These tests indicate that the waste from the Integrated Dry Injection Process is structurally acceptable for landfill, but may not be chemically acceptable. Drinking water standards are clearly exceeded under the conditions of the ASTM leaching test; however, this test represents maximum possible concentrations of leachable species. Actual groundwater concentrations of these species would depend on the local meteorological and geological conditions and on the natural aging of the structural integrity of the landfilled material.

Figure 8-1 Ash + Sorbent Solids Compressive Strength

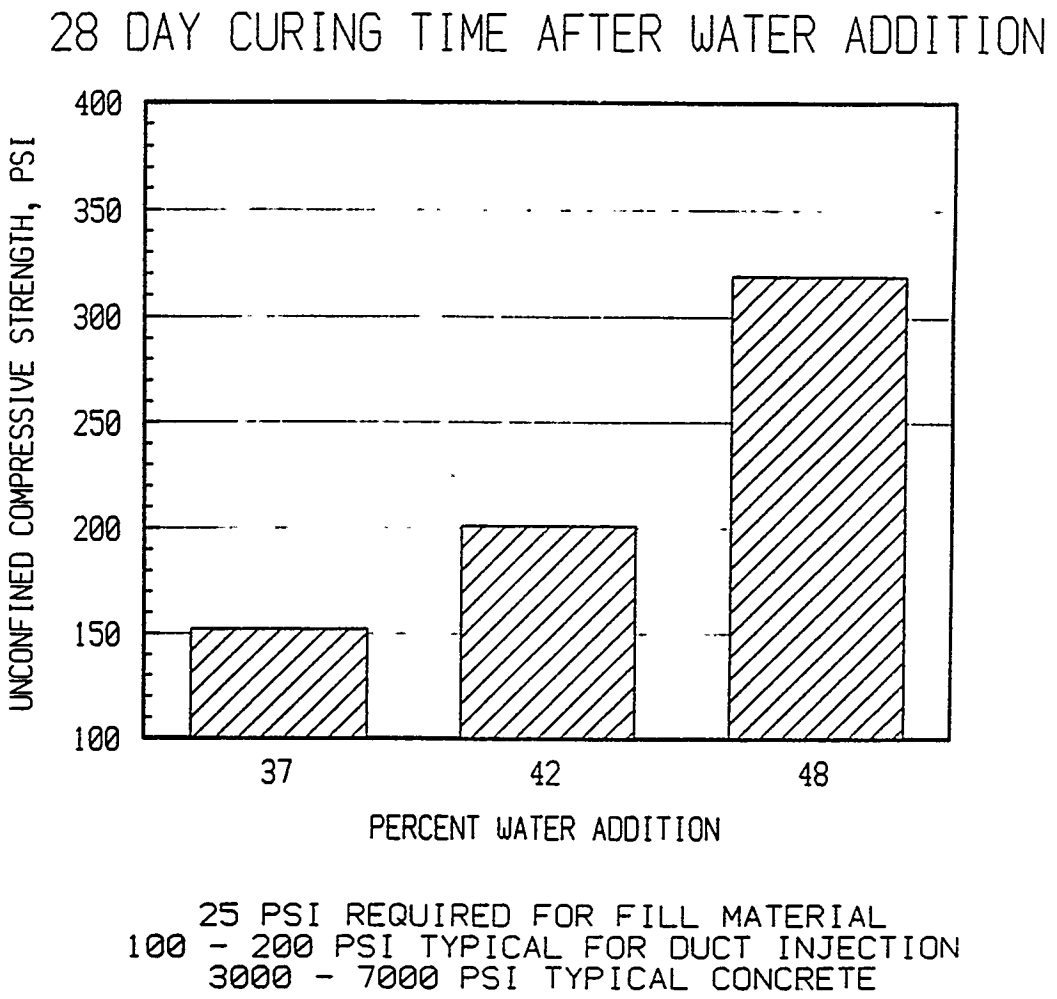
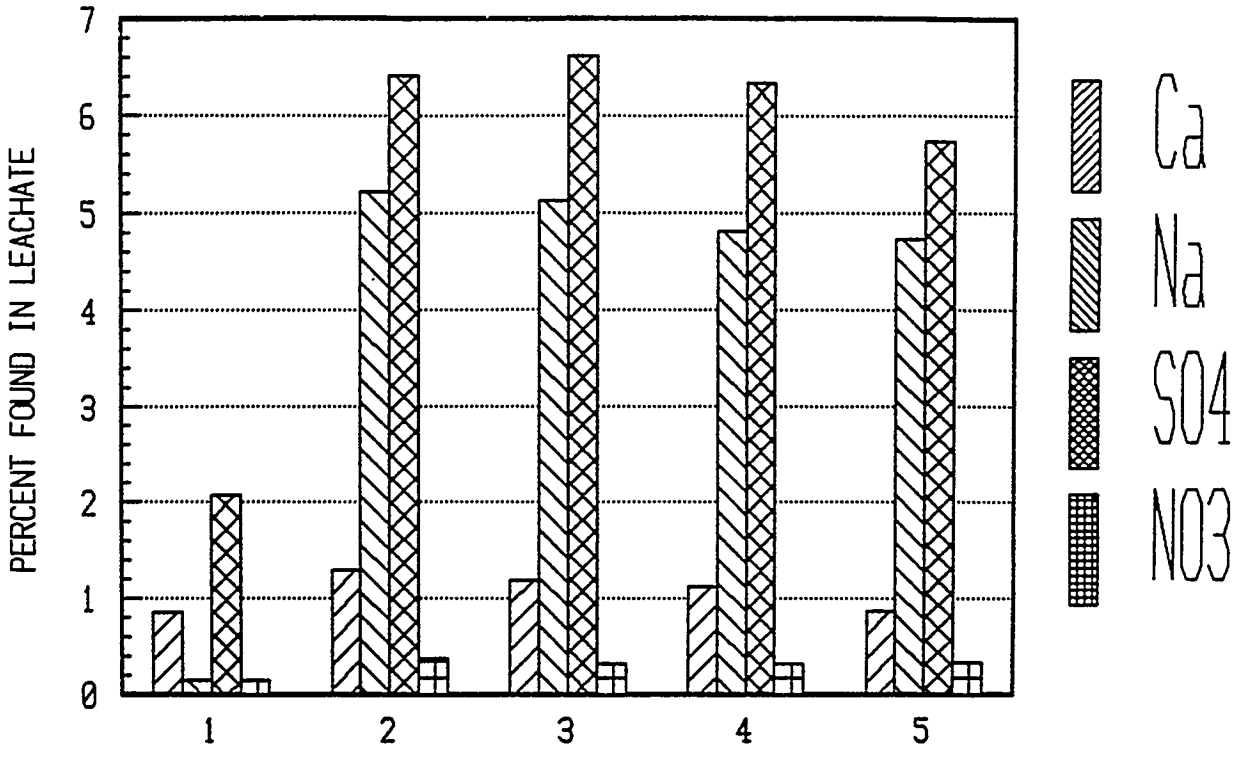


Table 8-1 Contaminant Concentrations in Leachate

Concentrations in mg/l

	Ca	Na	SO4	NO3	pH
Ash Only	430	72	1038	69	10.95
Ash + Sorbent	647	2614	3212	186	12.30
Solid, 37% Water	597	2565	3309	160	12.25
Solid, 42% Water	561	2419	3176	159	12.25
Solid, 48% Water	427	2350	2843	163	12.30
Water Standard	—	—	250	44	8.5

Figure 8-2 Leaching Properties of Waste Materials



1 Ash Only
2 Ash+Sorbent
3 Stabilized Ash+Sorbent
4 Stabilized Ash+Sorbent
5 Stabilized Ash+Sorbent

9.0 ECONOMIC EVALUATION

A general purpose comparative economics computer program was used to calculate the capital and operating costs of the Integrated Dry Injection Process, as depicted in Figure 2-1. For comparison, the costs of a conventional limestone scrubber were also calculated. These calculations were made for several operational and economic conditions in order to determine the conditions most favorable to the IDIP technology.

The LOTUS format computer program for economic evaluation calculates capital cost and operating costs based on user supplied inputs regarding economic factors, such as interest rate and plant lifetime, on equipment inputs, such as a Claus system, and on process inputs, such as reagent mole ratio. The program calculates process equipment capital cost based on pre-assigned values for each equipment item. The total of non-process capital costs, such as contingencies and general facilities, is assumed to approximately equal the process capital cost. This assumption has been found to be true for a wide variety of pollution control economic analyses[6,7]. These capital costs are modified by the input plant size, to reflect higher capital cost per KW for smaller plants.

The first year operating cost is the sum of utility, maintenance, operating, reagent, and capital recovery costs, minus the sale of any byproducts produced. This cost is given in $/yr/scfm and in terms of $/ton of pollutant removed. The calculated operating cost is the first year cost, not the annualized cost over the life of the plant. Annualized cost can be calculated from the first year operating cost by multiplying by a levelization factor based on interest rate and plant life.

Tables 9-1 and 9-2 are the program outputs for the capital and operating cost calculations for the installation of low NO_x burners and a hydrated lime injection system on a 300 MW plant. The capital cost is calculated to be $94/KW and the first year operating cost is $560/ton of total SO_2 and NO_2 removed. Similar calculations for the low NO_x burner plus limestone scrubber are shown in Tables 9-3 and 9-4.

The base case economic assumptions are given by Table 9-5. Unless otherwise noted, these are the values used in the following calculations. The costs for various utilities and reagents are given in Table 9-6. These values were obtained from vendor quotes and EPRI guidelines[6] and are used in all of the following calculations. All cost comparisons will be in terms of first year operating cost, in units of $/ton SO_2+NO_x removed. This value takes into account all costs, including capital.

Table 9-1 Capital Costs of Low NOx Burner + Hydrate Injection

COMPARATIVE ECONOMICS	LNB + HYDRATE INJECT		
PLANT SIZE, MW	300	PPM SO2	2000
ANNUAL INTEREST, %	5	PPM NOX	500
PLANT LIFE, YR	10	% SO2 REMOVAL	60
ELECT COST, $/KWHR	0.05	% NOX REMOVAL	50
HOURS PER YEAR	6000	CAPITAL $/KW	94
		$/TON SO2+N	560

CAPITAL COSTS

	NO. OF UNITS		$/SCFM	$/KW
CAPITAL EQPMT	0	REACTION VESSEL	0.00	0
	0	VESSEL INTERNALS	0.00	0
	0	SORBENT PREP	0.00	0
	1	SORBENT HANDLING	9.81	20
	0	SLURRY RECIRC SYSTEM	0.00	0
	0	SORBENT RECIRC SYSTEM	0.00	0
	0	CATALYST (3000/HR)	0.00	0
	0	FG HEAT EXCHANGER	0.00	0
	0	CLAUS SYSTEM	0.00	0
	0	ACID PLANT	0.00	0
	0	AMMONIA INJECTION	0.00	0
	1	HUMIDIFICATION	4.90	10
	0	SCR REACTOR	0.00	0
	1	BURNER	4.90	10
	0	PRECIPITATOR	0.00	0
	0	BAGHOUSE	0.00	0
	1	WASTE HANDLING	3.43	7
		TOTAL PROCESS CAPITAL	23.05	47
		OTHER CAPITAL	23.05	47
		TOT CAPITAL INVESTMENT	46.1	94

Table 9-2 Operating Costs of Low NOx Burner + Hydrate Injection

				$/YR/SCFM	
OPERATING COSTS:			POWER USAGE	2.4	
			MAINTENANCE	1.4	
			DISPOSAL	1.3	
			CATALYST	0.0	
	NORMALIZED MOLE RATIO				
	SO2	NOX		SO2	NOX
REAGENT	0	0	LIME	0.0	0.0
	2	0	HYDRATE	11.2	0.0
	0	0	LIMESTONE	0.0	0.0
	0	0	SODA ASH	0.0	0.0
	0	0	BICARB	0.0	0.0
	0	0	AMMONIA	0.0	0.0
	0	0	METHANE	0.0	0.0
	0	0	CARBON	0.0	0.0
	0 OR 1				
BYPROD	0	0	SULFUR	0.0	0.0
	0	0	SULFURIC ACID	0.0	0.0
	0	0	GYPSUM	0.0	0.0
	0	0	AMMONIUM BISULFIT	0.0	0.0
	0	0	POTASSIUM SULFAT	0.0	0.0
FIRST YEAR COST:			OPERATING	5.1	
			REAGENTS	11.2	
			CAPITAL RECOVERY	6.0	
			BYPRODUCT SALES	0.0	
			TOTAL	22.2	$/YR/SCFM
			=	560	$/TON

Table 9-3 Capital Costs of Low NOx Burner + Limestone Scrubber

COMPARATIVE ECONOMICS	LNB + LIMESTONE SCRUBBER		
PLANT SIZE, MW	300	PPM SO2	2000
ANNUAL INTEREST, %	5	PPM NOX	500
PLANT LIFE, YR	10	% SO2 REMOVAL	90
ELECT COST, $/KWHR	0.05	% NOX REMOVAL	50
HOURS PER YEAR	6000	CAPITAL $/KW	184
		$/TON SO2+N	341

CAPITAL COSTS

	NO. OF UNITS		$/SCFM	$/KW
CAPITAL	2	REACTION VESSEL	9.81	20
EQPMT	1	VESSEL INTERNALS	4.90	10
	1	SORBENT PREP	4.90	10
	1	SORBENT HANDLING	9.81	20
	1	SLURRY RECIRC SYSTEM	7.36	15
	0	SORBENT RECIRC SYSTEM	0.00	0
	0	CATALYST (3000/HR)	0.00	0
	0	FG HEAT EXCHANGER	0.00	0
	0	CLAUS SYSTEM	0.00	0
	0	ACID PLANT	0.00	0
	0	AMMONIA INJECTION	0.00	0
	0	HUMIDIFICATION	0.00	0
	0	SCR REACTOR	0.00	0
	1	BURNER	4.90	10
	0	PRECIPITATOR	0.00	0
	0	BAGHOUSE	0.00	0
	1	WASTE HANDLING	3.43	7
		TOTAL PROCESS CAPITAL	45.12	92
		OTHER CAPITAL	45.12	92
		TOT CAPITAL INVESTMENT	90.2	184

Table 9-4 Operating Costs of Low NOx Burner + Limestone Scrubber

				$/YR/SCFM	
OPERATING COSTS:			POWER USAGE	2.6	
			MAINTENANCE	2.7	
			DISPOSAL	1.2	
			CATALYST	0.0	
	NORMALIZED MOLE RATIO				
	SO2	NOX		SO2	NOX
REAGENT	0	0	LIME	0.0	0.0
	0	0	HYDRATE	0.0	0.0
	1	0	LIMESTONE	1.4	0.0
	0	0	SODA ASH	0.0	0.0
	0	0	BICARB	0.0	0.0
	0	0	AMMONIA	0.0	0.0
	0	0	METHANE	0.0	0.0
	0	0	CARBON	0.0	0.0
	0 OR 1				
BYPROD	0	0	SULFUR	0.0	0.0
	0	0	SULFURIC ACID	0.0	0.0
	0	0	GYPSUM	0.0	0.0
	0	0	AMMONIUM BISULFIT	0.0	0.0
	0	0	POTASSIUM SULFAT	0.0	0.0
FIRST YEAR COST:			OPERATING	6.4	
			REAGENTS	1.4	
			CAPITAL RECOVERY	11.7	
			BYPRODUCT SALES	0.0	
			TOTAL	19.5	$/YR/SCFM
			=	341	$/TON

Table 9-5 Base Case Economic Assumptions

- 300 MW Plant
- 5% Inflation Rate
- 10 Year Plant Life
- 6000 Hour/Year Operation
- 2000 ppm Sulfur Dioxide
- 500 ppm Nitrogen Oxides

Table 9-6 Cost of Consumables

Consumable	Rate
Electricity	$0.05/KWhr
Hydrated Lime	$84/ton
Limestone	$15/ton
Sodium Bicarbonate	$200/ton
Waste Disposal	$8/ton

We will first examine the cost effectiveness of the hydrated lime, sodium bicarbonate injection system. This is done by comparing the cost of dual injection with the cost of hydrated lime injection only and with the cost of sodium bicarbonate injection only. Figure 9-1 shows these costs as a function of percent $S0_2$ removal, as applied to a 100 MW plant. The sorbent mole ratios used for the cost calculations in Figure 9-1 are appropriate to the SO_2 removals. For example, a hydrated lime to sulfur mole ratio of 5 is used for 80% removal. It was assumed that 50% NO_x removal is contributed by the use of a low NO_x burner, and that additional NO_x removal can result from bicarbonate injection, if used. A minimum cost is obtained at 60% SO_2 removal and dual sorbent injection costs are almost identical to hydrate injection only. Sodium bicarbonate injection only is generally high in cost, except above 80% removal, when it becomes lower in cost than dual injection. This result indicates that lime hydrate only injection at 60% efficiency is the most cost effective option. Accordingly, this technology will be used in the following cost comparisons.

Figures 9-2 through 9-5 compare hydrate injection costs with limestone scrubbing costs as functions of SO_2 concentration, plant size, plant life, and yearly operating hours, respectively. Except at the small end of the parametric ranges, hydrate injection is always more costly than limestone scrubbing. This occurs principally because hydrated lime is significantly more expensive than limestone, and because higher mole ratios must be used. Hydrate injection can be less costly than limestone scrubbing when two or more of the following conditions exist:

- The plant is small (less than 100 MW)
- Yearly operating hours are small (less than 3000)
- The remaining plant lifetime is small (less than 10 years)

These criteria are most likely to be satisfied by industrial boilers, as opposed to utility boilers.

Figure 9-1 Cost of SO_2/NO_x Removal vs. Percent SO_2 Removal

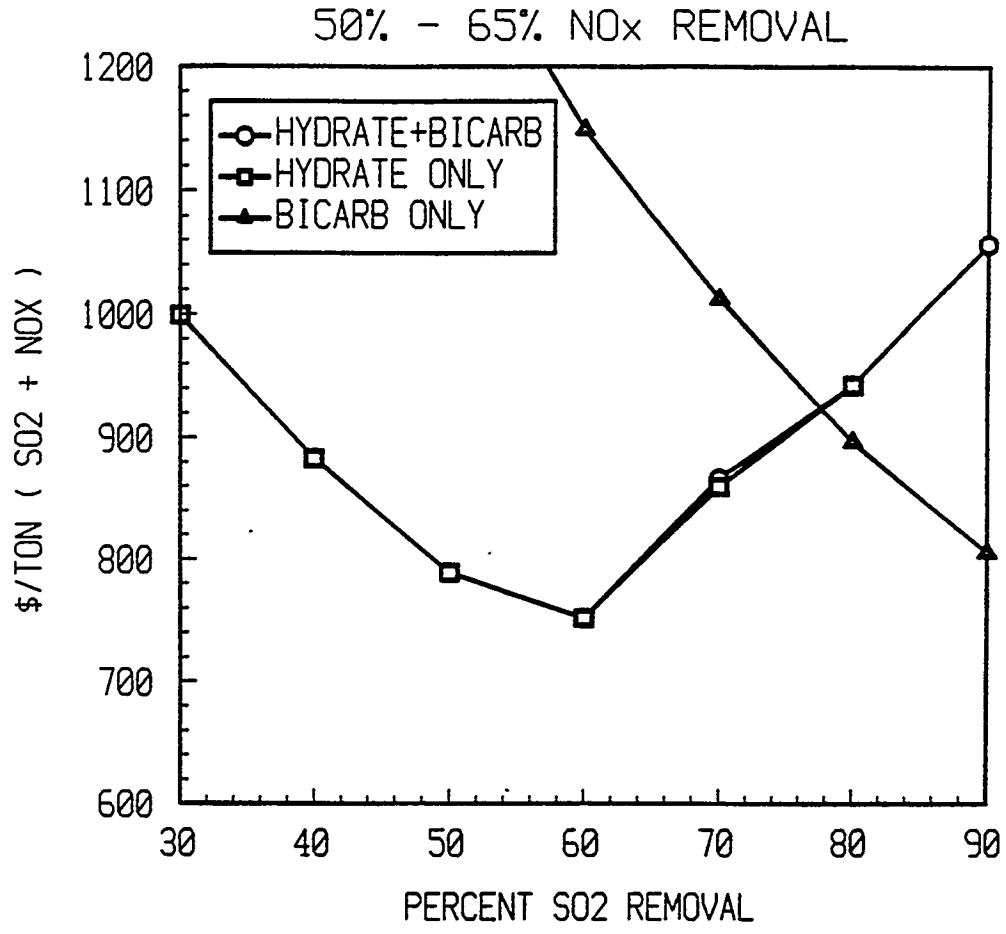


Figure 9-2 Operating Cost vs. SO_2 Concentration

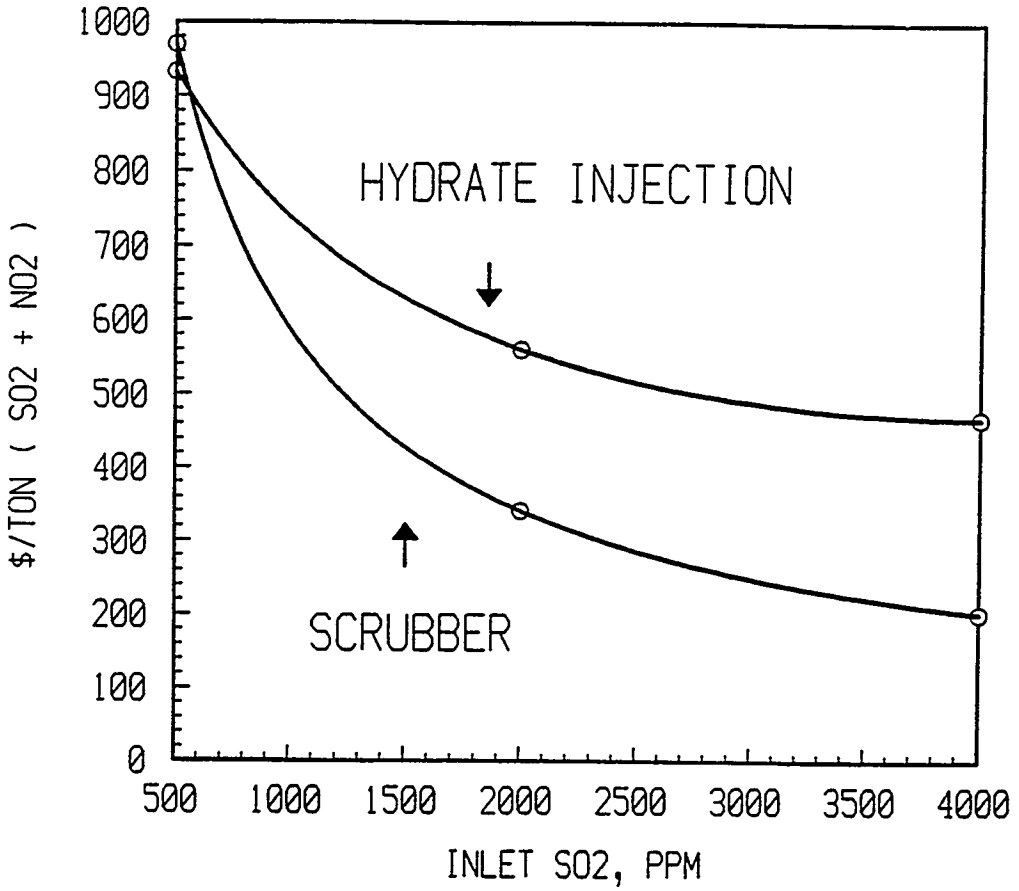


Figure 9-3 Operating Cost vs. Plant Size

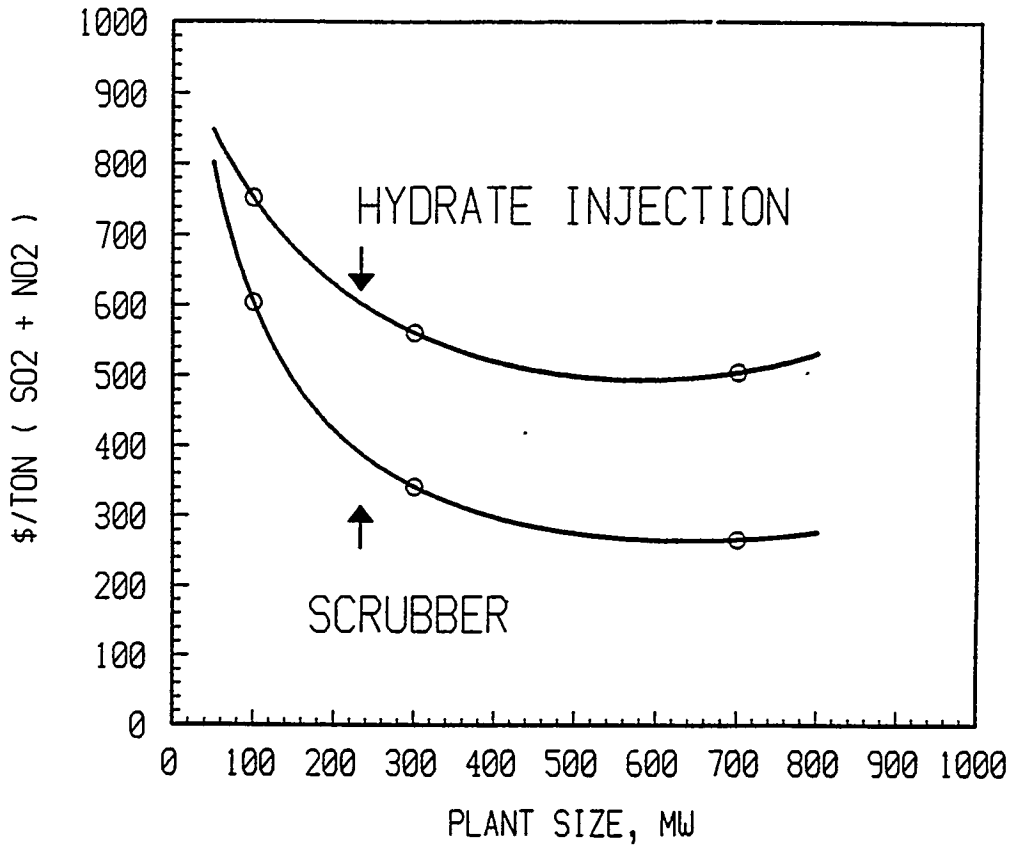


Figure 9-4 Operating Cost vs. Operating Hours

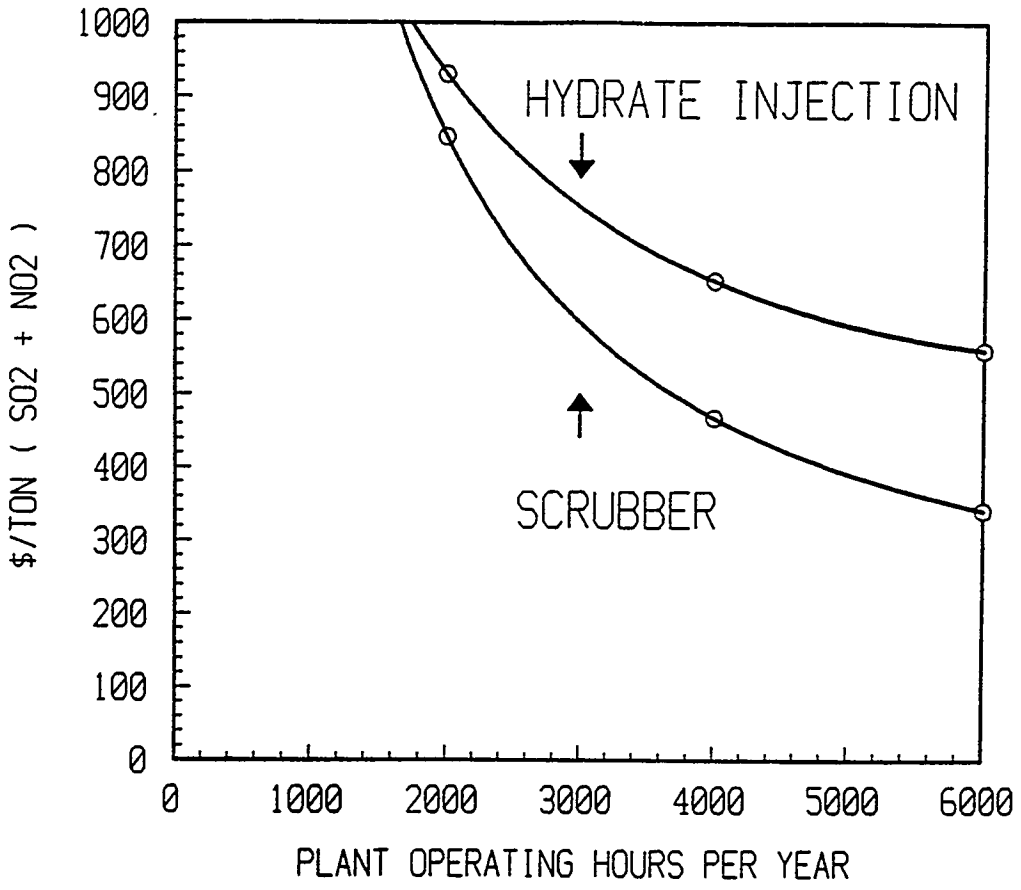
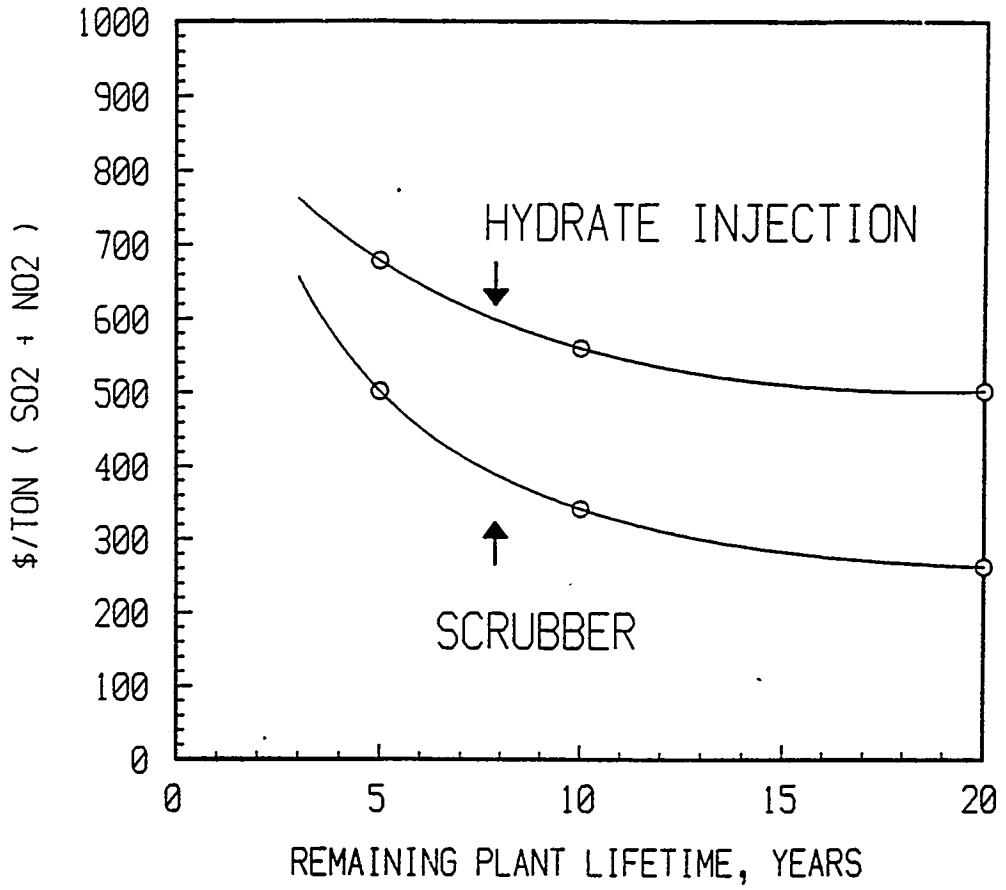


Figure 9-5 Operating Cost vs. Plant Lifetime



10.0 CONCLUSIONS

The work performed in the subscale and proof of concept testing confirmed the process mechanisms and the importance of certain parameters. In general the process behaved as expected and there were no surprises. Such an assessment of the technology was the overall objective of the program, with a secondary objective being a quantitative determination of the effects of flue gas and sorbent properties. Overall, the proof of concept demonstration showed that 90% SO_2 and 65% NO_x removal can be accomplished through the use of a combination of low NO. burner, calcium to sulfur mole ratio of 2, and normalized sodium to sulfur mole ratio of 1. Furthermore this can be accomplished while maintaining precipitator efficiency to pre-sorbent injection levels through the use of evaporative cooling.

When economically compared to conventional limestone slurry scrubbing, the dry injection process shows lower capital cost but higher operating cost. The dry injection process can yield lower operating cost for small, older plants.

A large number of specific conclusions regarding individual process parameters have been derived. These are identified below.

The most important characteristic of the hydrated lime sorbent is surface area, with SO_2 removal proportional to surface area. Also lime hydrated with a water-methanol mix is the highest surface area hydrate commercially available.

Both the subscale and proof of concept tests showed that maximum SO_2 removal occurs when hydrated lime is injected between 950°F and 1050°F.

The use of high surface area alcohol-water hydrated lime at a calcium to sulfur ratio of 2 and approximately 1000 ppm inlet SO_2 yielded 70% removal in the subscale tests and 60% removal in the proof of concept tests.

The subscale tests showed that sodium bicarbonate was slightly more effective than sodium sesquicarbonate for incremental SO_2 removal. The proof of concept tests demonstrated a more significant difference.

The SO_2 removal by sodium bicarbonate injection is 70% for a normalized sodium to sulfur level of 2 and an SO_2 concentration of approximately 700 ppm.

NO_x removal by sodium bicarbonate injection varied between 10% and 30% as the sodium to inlet sulfur mole ratio varied between .5 and 1.

Particulate resistivity and precipitator efficiency can be restored to pre-sorbent injection levels by means of evaporative cooling to 200°F.

The sorbent loaded waste material can be fixated through water addition to a structurally acceptable landfill material, but the leaching of sodium compounds may preclude its acceptability in many landfills.

When applied to a 300 MW plant burning 2.5% sulfur coal, the combined dry injection process with low NO. burner has a capital cost of $95/KW and an operating cost of $560/ton SO_2. The costs for a limestone scrubber plus low NO_x burner applied to the same plant are $184/KW and $341/ton SO_2 respectively.

The operating cost difference narrows as plant size decreases and becomes zero at a plant size of 50 MW.

11.0 REFERENCES

1. R. Beittel, et al., "Effects of Injection Temperature and Quench Rate on Sorbent Utilization", Proceedings of the 1986 Joint Symposium on Dry SO_2 and Simultaneous SO_2/NO_x Control Technologies, June, 1986.

2. S. J. Bortz, et al., "Dry Hydroxide Injection at Economizer Temperatures for Improved SO_2 Control", Proceedings of the 1986 Joint Symposium on Dry SO_2 and Simultaneous SO_2/NO_x Control Technologies, June, 1986.

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4. J. M. Markussen, et al., "Enhanced Removal of Nitrogen Oxides in a Spray Dryer Using Lime Slurry Containing Sodium Hydroxide", AIChE Spring National Meeting, April, 1986.

5. L. J. Muzio, et al., "22 MW Coal-Fired Demonstration of Dry SO_2 Scrubbing with Sodium Sorbent Compounds", Second Fabric Filter Conference, 1984.

6. D. M. Shattuck, et al., "Retrofit FGD Cost-Estimating Guidelines", EPRI Report CS-3696, October, 1984.

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APPENDIX I

SUBSCALE SODIUM INJECTION

TABULAR RESULTS

NORMALIZED NO_x REMOVALS AND NO_2 INCREASE DURING NO_2 ADDITIVE TESTS WITH SESQUICARBONATE

Test No.	Na_2/S Ratio	$\blacktriangle SO_2$ ppm	Na_2 Ut. %	$\blacktriangle NO$ ppm	$\blacktriangle NO_2$ ppm	NO_x ppm	$\blacktriangle NO/\blacktriangle SO_2$	$\blacktriangle NO_x/\blacktriangle SO_2$	$\blacktriangle NO_2/\blacktriangle SO_2$	Na Injection Temp., °F	Baghouse Temp.,°F
1	1.0	794	80.0	143	74	69	0.18	0.08	0.09	320	225
2	1.2	608	74.9	141	84	57	0.23	0.09	0.14	350	240
3	1.0	547	60.0	111	14	97	0.20	0.18	0.02	250	190
4	1.0	631	62.8	160	79	81	0.25	0.13	0.12	350	240
5	1.6	586	41.4	129	12	117	0.22	0.20	0.02	250	190
6	1.2	707	65.5	132	54	78	0.19	0.11	0.08	340	230
7	1.3	617	55.5	109	39	70	0.17	0.11	0.06	350	240
8	1.0	699	70.6	134	62	72	0.19	0.10	0.09	350	240
9	1.0	588	61.0	69	17	52	0.12	0.09	0.03	270	190
10	1.0	500	58.5	60	15	46	0.12	0.09	0.03	270	190

SO_2 AND NO_x REMOVALS DURING NO_2 ADDITIVE TESTS WITH SESQUICARBONATE

Test Ratio	Ca/S Ratio	Na_2/S Ratio	Na Type	Additive Type/wt%	Na Inj. Temp. °F	% SO_2 Reduction Ca Only	% SO_2 Reduction Ca + Na	% NO_x Reduction Ca + Na
1	2.1	1.0	Ses.	--	320	61.4	92.3	19.6
2	--	1.2	Ses.	--	330	---	76.7	16.7
*3	2.2	1.0	Ses.	--	250	57.4	82.9	27.7
*4	2.4	0.9	Ses.	5% Urea	350	58.0	85.0	21.6
*5	2.2	1.6	Ses.	5% Urea	250	65.4	90.2	35.5
6	2.4	1.2	Ses.	--	350	65.0	89.0	21.6
7	2.4	1.3	Ses.	5% Carbon	350	68.0	86.0	22.1
8	2.3	1.0	Ses.	--	350	62.0	87.0	20.7
9	2.1	1.0	Ses.	--	270	66.1	83.9	14.9
10	2.1	1.0	Ses.	5% Urea	270	66.1	85.9	13.2

* NO_x results assumed to be incorrect due to erratic inlet NO concentration.

SO_2 AND NO_x REMOVALS DURING NO_2 ADDITIVE TESTS WITH BICARBONATE

Test No.	Ca/S Ratio	Na_2/S Ratio	Na Type	Additive Type/wt%	Na Inj. Temp. °F	% SO_2 Reduction Ca Only	% SO_2 Reduction Ca + Na	% NO_x Reduction Ca + Na
1	2.5	1.5	Bicarb.	---	350	70	88.3	21.2
2	2.5	1.5	Bicarb.	5% Urea	350	72.2	93.7	21.9
3	2.5	1.4	Bicarb.	---	250	69.0	98.6	18.2
4	2.5	1.5	Bicarb.	---	450	69.6	98.0	15.0
5	1.8	1.0	Bicarb.	---	474	65.0	88.5	7.5
6	1.8	0.8	Bicarb.	4/1 NH_3/NO	494	55.6	80.2	17.7
7	1.8	0.9	Bicarb.	5% Carbon	507	63.9	87.5	14.7
8	1.8	0.9	Bicarb.	5% Urea	481	59.0	90.0	36.9
9	1.8	1.2	Bicarb.	---	240	61.0	93.5	23.7

NORMALIZED NO_x REMOVALS AND NO_2 INCREASE DURING NO_2 ADDITIVE TESTS WITH BICARBONATE

Test No.	Na_2/S Ratio	$\blacktriangle SO_2$ ppm	Na_2 Ut. %	$\blacktriangle NO$ ppm	$\blacktriangle NO_2$ ppm	NO_x ppm	$\blacktriangle NO/\blacktriangle SO_2$	$\blacktriangle NO_x/\blacktriangle SO_2$	$\blacktriangle NO_2/\blacktriangle SO_2$	Na Injection Temp., °F	Baghouse Temp.,°F
1	1.5	461	40.9	103	41	62	0.22	0.134	0.09	350	236
2	1.6	533	48.4	110	43	67	0.21	0.126	0.08	350	234
3	1.4	773	68.2	82	18	64	0.11	0.08	0.02	250	190
4	1.5	752	62.9	111	58	54	0.15	0.07	0.08	450	290
5	1.0	619	66.9	73	51	25	0.12	0.04	0.08	474	316
6	0.8	569	60.0	88	26	60	0.15	0.11	0.05	494	314
7	0.9	628	72.4	97	48	49	0.15	0.08	0.08	507	315
8	0.9	780	81.4	128	17	112	0.16	0.14	0.02	481	296
9	1.2	858	69.9	96	13	83	0.11	0.10	0.02	240	190

APPENDIX II

PROOF OF CONCEPT TESTING

CONDENSED NUMERIC DATA

OCT. 2, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1 All data on this sheet were taken on OCT 02, 1991.
2 CBTF SO2 Cor. is w/ a correction factor of (1630/1730).
3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	12:14	944	719	301	297	266	262	243	0	3.9	4.1	47	2725	2263	2030	115	267	2067	191	4987
2	12:15	944	719	301	298	266	262	243	0	3.9	4.1	48	2728	2324	1979	112	262	2093	191	5052
3	12:16	944	719	302	298	266	262	243	0	3.9	4.2	45	2700	2300	2001	110	260	2097	191	4999
4	12:17	945	719	301	298	266	262	243	0	3.9	4.1	44	2708	2336	1965	111	259	2098	193	5044
5	12:18	945	719	301	297	266	262	243	0	3.9	5.9	47	2720	2360	1948	82	257	2099	194	5080
6	12:19	944	719	301	298	266	262	243	0	3.9	5.5	43	2723	2250	2105	148	255	2091	195	4973
7	12:20	946	720	302	298	266	262	243	0	3.8	5.4	42	2723	2275	2170	136	251	2075	197	4998
8	12:21	945	720	301	298	266	262	243	0	3.8	5.6	43	2701	2336	2139	149	249	2084	200	5037
9	12:22	947	720	301	297	266	262	243	0	3.8	5.6	49	2710	2360	2137	156	246	2106	199	5070
0	12:23	945	720	301	297	266	262	243	0	3.8	5.6	43	2706	2300	2141	158	250	2117	200	5004
1	12:24	946	720	301	298	266	262	243	0	3.8	5.6	39	2700	2312	2135	158	260	2112	201	5011
2	12:25	946	720	302	298	266	262	244	0	3.8	5.6	66	2701	2324	2121	160	265	2110	200	5025
3	12:26	946	720	301	297	266	262	244	0	3.8	5.7	41	2691	2324	2088	164	267	2107	198	5015
4	12:27	946	720	301	297	266	262	243	0	3.8	5.6	58	2696	2324	2104	159	272	2095	197	5020
5	12:28	946	721	301	298	266	262	244	0	3.9	5.6	40	2669	2336	2143	157	277	2094	198	5003
6	12:29	946	721	301	298	266	262	244	0	3.8	5.5	43	2721	2312	2125	155	274	2093	195	5033
7	12:30	950	722	301	297	266	262	244	0	3.8	5.6	40	2739	2312	2139	163	274	2111	195	5051
8	12:31	948	722	301	298	266	262	244	0	3.8	5.7	73	2711	2312	2123	160	275	2120	197	5023
9	12:32	949	722	301	297	266	262	244	0	3.8	5.7	44	2703	2287	2127	160	277	2118	199	4990
0	12:33	950	723	300	297	266	262	244	0	3.9	5.5	45	2683	2286	2189	137	283	2118	200	4968
1	12:34	950	723	301	298	266	262	244	0	3.9	5.5	48	2694	2322	2175	145	286	2127	200	5017
2	12:35	949	723	302	298	266	262	244	0	3.8	5.6	46	2706	2298	2157	146	277	2137	199	5004
3	12:36	948	723	301	298	266	262	244	0	3.8	5.7	42	2666	2198	2139	146	274	2145	199	4964
4	12:37	948	723	301	298	266	262	243	0	3.8	5.8	41	2686	2322	2135	154	271	2138	201	5008
5	12:38	950	723	302	299	266	262	244	0	3.9	5.6	40	2716	2322	2168	151	273	2136	203	5038
6	12:39	951	724	301	298	266	262	244	0	3.9	5.4	39	2664	2273	2156	140	278	2132	201	4937
7	12:40	951	724	301	297	266	262	244	0	3.9	5.4	45	2674	2298	2164	135	279	2136	202	4972
8	12:41	950	724	301	297	266	262	244	0	3.7	5.6	45	2691	2310	2148	143	270	2127	198	4953
9	12:42	950	724	302	298	266	263	244	0	3.7	5.8	42	2718	2298	2108	151	263	2138	196	5016
0	12:43	950	724	301	298	266	263	244	0	3.8	5.6	70	2730	2322	2166	147	264	2143	202	5052
1	12:44	950	725	301	297	266	263	244	0	3.8	5.6	41	2698	2322	2071	145	270	2130	204	5020
2	12:45	951	725	300	297	266	263	244	0	3.8	5.6	60	2699	2310	2086	149	273	2132	199	5010
3	12:46	952	725	302	299	266	263	244	0	3.8	5.8	40	2696	2236	2208	151	270	2133	200	4932
4	12:47	952	726	302	299	266	262	244	0	3.8	5.8	40	2654	2310	2141	149	270	2130	201	4964
5	12:48	951	726	301	298	266	262	244	0	3.8	5.9	35	2701	2322	2152	152	269	2130	202	5023
6	12:49	948	725	300	297	266	262	243	0	3.8	6	74	2683	2322	2140	144	271	2127	199	5005
7	12:50	950	725	302	299	266	262	244	0	4	5.9	51	2720	2309	2125	146	276	2143	203	5028
8	12:51	951	725	303	299	266	262	244	0	4.1	5.7	49	2756	2334	2108	142	279	2141	205	5090
9	12:52	950	726	301	297	266	262	244	0	4.1	5.8	47	2718	2296	2099	124	276	2123	205	5014
0	12:53	950	726	301	298	266	262	244	0	4.1	7.5	46	2739	2322	2104	126	273	2113	206	5062
1	12:54	951	726	302	299	266	263	244	0	4.1	7.6	47	2677	2310	2100	129	270	2112	208	4988
2	12:55	950	726	301	298	266	262	244	0	4	7.7	39	2721	2358	2082	123	266	2103	208	5079
3	12:56	952	726	301	297	266	262	244	0	3.9	7.7	40	2674	2286	2110	137	266	2097	200	4960
4	12:57	951	721	301	298	266	262	244	0	3.9	7.6	38	2706	2345	2097	133	269	2111	199	5051
5	12:58	951	714	302	299	266	262	244	0	3.8	7.4	45	2688	2345	2086	134	270	2109	201	5032
6	12:59	952	709	302	299	266	262	244	0	3.9	7.4	48	2713	2329	2086	134	270	2123	202	5041
	13:00	950	707	302	299	266	262	244	0	3.9	7.6	44	2684	2341	2090	131	271	2119	205	5025
	13:01	951	708	301	298	266	262	244	0	3.8	7.5	71	2733	2329	2061	124	267	2111	201	5062
	13:02	952	709	302	298	266	262	244	0	3.9	7.5	44	2742	2316	2066	130	269	2116	205	5058
	13:03	953	711	302	299	266	262	244	0	3.8	7.6	63	2733	2329	2058	133	265	2108	203	5062
	13:04	953	713	301	298	266	262	244	0	3.8	7.4	47	2725	2341	2078	129	265	2115	204	5066
	13:05	954	714	301	298	266	262	244	0	3.7	7.5	51	2758	2343	2096	132	267	2106	202	5101

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 02, 1991.
CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
3	13:06	956	716	301	298	266	262	244	0	3.8	7.5	43	2748	2330	2089	131	270	2126	208	5079
4	13:07	956	718	302	298	266	262	244	0	3.8	7.4	76	2762	2341	2072	125	272	2127	210	5103
5	13:08	954	719	301	298	266	262	244	0	3.8	7.5	47	2711	2292	2089	123	271	2127	216	5003
6	13:09	953	719	300	297	266	262	244	0	3.8	7.6	45	2677	2341	2061	129	270	2126	216	5018
7	13:10	954	720	301	298	266	262	244	0	3.8	7.6	50	2725	2343	2071	133	270	2116	219	5067
8	13:11	955	721	302	299	266	263	244	0	3.9	7.5	47	2697	2341	2063	131	273	2121	223	5036
9	13:12	954	722	301	297	266	263	244	0	3.9	7.6	44	2699	2341	2019	133	277	2116	227	5028
0	13:13	956	723	301	297	266	263	244	0	3.9	7.7	43	2758	2353	2042	136	278	2110	222	5111
1	13:14	957	724	301	298	266	263	244	0	3.9	7.5	43	2747	2329	2042	127	280	2097	225	5075
2	13:15	956	725	301	298	266	263	244	195	3.9	7.4	59	2735	2329	1900	127	280	2096	226	5064
3	13:16	957	726	301	298	266	263	244	192	3.8	7.3	62	2730	2316	1728	124	278	2099	224	5046
4	13:17	957	727	301	298	266	263	245	187	3.7	7.3	69	2750	2341	1689	128	275	2103	225	5091
5	13:18	957	727	302	298	266	263	245	189	3.7	7.6	64	2728	2341	1663	131	274	2114	229	5069
6	13:19	959	728	302	298	266	263	245	191	3.8	7.8	83	2733	2292	1589	134	275	2134	230	5025
7	13:20	958	729	301	297	266	262	245	196	3.9	7.4	69	2753	2316	1599	127	281	2143	233	5069
8	13:21	957	728	301	298	266	262	245	185	3.9	7.5	82	2735	2316	1400	123	285	2129	234	5051
9	13:22	958	728	301	298	266	262	245	189	3.8	7.5	64	2728	2279	1463	124	279	2111	229	5093
0	13:23	957	727	301	298	266	262	245	191	3.9	7.6	68	2726	2353	1521	128	273	2123	236	5079
1	13:24	958	727	301	298	266	262	245	181	3.9	7.5	84	2741	2316	919	126	273	2125	237	5058
2	13:25	958	727	301	297	266	262	245	192	3.9	7.4	92	2775	2304	1090	122	276	2128	237	5079
3	13:26	958	727	301	298	266	262	245	191	3.9	7.5	86	2728	2341	955	122	275	2129	236	5069
4	13:27	958	726	301	298	266	263	245	195	3.8	7.5	79	2728	2401	1249	120	270	2124	234	5129
5	13:28	959	726	301	297	266	262	244	186	3.9	7.5	78	2726	2304	1337	123	269	2141	239	5030
6	13:29	958	725	301	298	266	263	245	185	3.9	7.2	88	2723	2292	1327	115	266	2138	241	5014
7	13:30	958	725	302	298	266	262	245	201	3.8	7.5	85	2751	2377	1079	114	263	2129	242	5128
8	13:31	958	724	301	298	266	262	245	187	3.9	7.4	84	2711	2316	1159	110	259	2157	242	5027
9	13:32	959	724	301	297	266	262	245	188	3.9	7.4	83	2740	2341	1152	114	265	2177	248	5081
0	13:33	961	724	302	298	266	262	245	198	3.8	7.5	88	2738	2341	1457	112	251	2174	248	5079
1	13:34	960	725	302	298	266	262	245	182	3.8	7.3	86	2713	2316	1073	113	252	2163	252	5029
2	13:35	960	725	302	298	266	262	245	199	3.8	7.3	85	2758	2365	1166	113	251	2145	248	5123
3	13:36	961	726	301	297	266	262	245	185	4	7.3	89	2716	2353	1117	115	218	2162	251	5069
4	13:37	961	726	301	297	266	262	245	196	4.1	7.5	98	2723	2353	1065	118	201	2169	254	5076
5	13:38	960	726	301	297	266	261	245	190	4.3	7.4	89	2731	2329	1139	117	178	2191	254	5060
6	13:39	961	727	301	297	266	261	245	183	4.4	7.6	97	2733	2316	1110	124	156	2200	256	5049
7	13:40	960	726	301	298	266	261	245	201	1.8	7.5	87	2680	2365	1185	122	121	1896	220	5045
8	13:41	962	727	302	298	266	261	245	183	1.8	7.6	90	2701	2353	1201	127	108	1498	220	5054
	13:42	964	727	302	297	266	261	245	192	1.5	7.5	88	2723	2355	1070	122	97	1663	218	5077
	13:43	963	727	301	296	265	261	244	194	3	7.5	98	2704	2329	1173	120	153	1320	170	5033
	13:44	961	727	301	297	265	261	244	196	3	7.5	90	2737	2377	1117	118	80	1323	171	5114
	13:45	964	727	302	298	266	260	244	190	4	7.5	96	2724	2369	1115	122	74	840	143	5114
	13:46	963	726	303	298	266	261	245	194	7.3	7.3	91	2713	2341	629	116	50	361	46	5053
	13:47	964	727	301	296	265	261	245	187	7.9	7.3	91	2743	2330	1202	115	8	241	16	5073
	13:48	962	727	300	295	265	261	244	194	8.1	7.3	90	2726	2330	1183	108	0	148	0	5058
	13:49	962	726	301	297	265	261	244	198	7.4	7.4	87	2740	2343	1164	105	3	298	17	5082
	13:50	961	725	303	297	266	261	245	186	7.9	7.4	86	2741	2318	1260	105	19	151	4	5059
	13:51	963	725	301	296	265	261	245	192	8	7.5	87	2776	2367	1302	115	0	188	0	5143
	13:52	965	725	300	295	265	261	244	192	8.2	7.3	89	2731	2343	1281	112	3	95	1	5074
	13:53	963	724	301	296	265	261	245	199	8.2	7.3	91	2758	2343	1150	112	6	334	4	5101
	13:54	963	724	302	297	265	261	245	183	5.1	7.5	93	2736	2355	979	115	61	1504	49	5091
	13:55	961	723	302	296	265	261	244	183	2.5	7.6	98	2720	2391	966	118	190	1716	86	5110
	13:56	965	724	300	296	265	261	245	183	2.1	7.5	93	2726	2369	982	120	229	1715	88	5115
	13:57	963	725	301	296	265	260	244	183	2	7.5	99	2762	2403	970	119	156	1779	93	5164

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on OCT 02, 1991.
CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
)	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	13:58	963	725	302	297	265	260	245	189	5	7.5	93	2730	2330	994	119	276	2011	86	5060
6	13:59	965	726	301	296	265	260	244	191	4.2	7.5	91	2692	2343	1002	114	292	2046	64	5035
7	14:00	965	726	301	296	264	260	244	196	3.9	7.5	92	2721	2343	1133	115	293	2102	68	5064
9	14:01	964	726	301	296	264	260	244	197	3.7	7.5	98	2745	2318	1011	112	288	2129	98	5063
9	14:02	964	726	301	296	264	260	244	183	3.7	7.5	91	2726	2403	1089	115	283	2143	152	5129
0	14:03	964	727	301	296	265	260	244	191	3.7	7.4	92	2706	2367	1006	107	284	2149	227	5073
1	14:04	964	727	301	296	264	260	244	198	3.8	7.5	93	2680	2367	1010	111	286	2163	288	5047
2	14:05	964	726	300	295	264	260	244	186	3.7	7.3	91	2740	2330	1012	112	279	2141	323	5070
3	14:06	964	726	300	295	264	260	244	193	3.8	7.4	90	2742	2355	1083	106	285	2152	353	5096
4	14:07	964	726	301	296	264	260	244	189	3.8	7.4	90	2720	2306	1265	95	283	2164	371	5025
5	14:08	965	726	300	295	264	260	244	193	3.7	7.3	89	2760	2330	1085	103	273	2170	368	5090
8	14:09	965	726	299	295	264	260	244	182	3.7	7.5	89	2763	2343	1180	107	267	2190	367	5106
7	14:10	966	726	299	295	264	260	244	190	3.7	7.3	88	2745	2332	1100	108	273	2204	366	5077
8	14:11	967	726	300	296	264	260	244	195	3.8	7.3	90	2718	2332	1200	108	277	2209	371	5050
9	14:12	966	725	299	295	264	260	244	185	3.6	7.5	91	2703	2318	1059	111	274	2182	363	5021
0	14:13	966	725	298	295	264	260	244	198	3.6	7.6	96	2720	2330	1071	110	272	2200	364	5050
	14:14	967	725	298	295	264	260	244	189	3.6	7.3	90	2711	2318	1041	106	272	2208	357	5029
2	14:15	967	724	298	295	264	260	244	193	3.6	7.4	94	2716	2379	1087	101	272	2199	350	5095
1	14:16	967	724	299	295	264	260	244	184	3.7	7.5	89	2697	2332	1162	106	271	2204	352	5019
	14:17	967	723	298	295	264	260	244	188	3.7	7.4	91	2750	2344	1287	102	271	2213	346	5094
	14:18	966	723	298	295	264	259	244	196	3.7	7.5	91	2735	2332	1062	106	267	2208	336	5139
	14:19	966	723	298	295	264	259	244	184	3.8	7.4	95	2770	2332	1014	102	269	2213	329	5102
	14:20	966	723	298	295	264	259	244	186	3.8	7.3	91	2713	2307	1191	96	269	2207	320	5020
	14:21	966	722	297	295	263	259	244	186	3.8	7.3	91	2725	2344	1144	96	264	2211	319	5069
	14:22	966	722	297	295	263	259	243	186	3.7	7.2	92	2732	2356	1033	95	254	2225	307	5088
	14:23	967	722	298	295	263	260	244	187	3.8	7.2	93	2720	2320	1032	89	259	2240	306	5039
	14:24	968	723	297	295	263	260	243	187	3.8	7.2	93	2697	2307	1095	82	253	2230	299	5005
	14:25	966	722	297	295	263	260	243	191	3.8	7.2	92	2777	2360	994	86	244	2222	297	5157
	14:26	964	722	297	295	263	259	243	189	3.7	7.3	92	2762	2394	954	84	238	2210	288	5156
	14:27	971	723	298	295	263	259	243	189	3.9	7.3	91	2732	2404	1095	86	243	2226	294	5136
	14:28	979	725	297	295	263	259	243	182	3.9	7.2	91	2745	2307	1130	86	241	2231	294	5053
	14:29	985	727	297	295	263	259	243	191	3.8	7.3	91	2725	2406	1219	88	240	2250	283	5131
	14:30	993	730	298	294	264	256	244	230	3.7	7.4	92	2718	2106	998	95	241	2260	279	4624
	14:31	997	730	298	296	263	259	243	190	3.7	7.5	94	2735	2321	1119	102	251	2263	261	5056
	14:32	1002	730	298	296	263	259	243	190	3.6	7.4	92	2703	2271	1124	103	259	2246	273	4974
	14:33	1005	728	297	295	263	259	243	191	3.6	7.4	93	2689	2307	986	107	269	2243	271	4996
	14:34	1010	726	297	295	263	259	243	199	3.5	7.6	92	2732	2358	1038	110	272	2242	261	5090
	14:35	1016	725	298	296	263	259	243	192	3.5	7	93	2754	2284	1122	109	277	2241	256	5038
	14:36	1020	724	298	295	263	259	243	187	3.2	7.1	93	2757	2346	1116	106	282	2246	232	5103
	14:37	1022	723	297	295	263	259	243	189	3.1	7.2	96	2708	2334	959	111	281	2258	226	5041
	14:38	1025	722	298	296	263	259	243	197	3.1	7.2	92	2730	2346	1054	112	284	2259	232	5076
	14:39	1026	722	298	296	263	259	243	192	3.2	7.1	92	2708	2321	1017	110	289	2252	235	5029
	14:40	1027	721	298	295	263	259	243	185	3.2	7.1	93	2698	2321	1121	113	290	2246	236	5019
	14:41	1028	721	297	295	263	259	243	197	3.3	7.5	92	2725	2334	1046	119	294	2257	239	5058
	14:42	1030	722	298	296	263	259	243	184	3.5	7.7	94	2703	2370	983	125	303	2254	256	5073
	14:43	1032	722	299	297	263	259	243	189	3.8	7.5	93	2704	2382	982	118	319	2264	265	5087
	14:44	1033	723	299	296	263	259	243	198	3.6	7.4	94	2710	2394	1024	115	315	2260	246	5104
	14:45	1034	724	298	296	263	259	243	189	3.5	7.6	94	2725	2298	985	121	307	2258	238	5023
	14:46	1037	725	298	296	263	259	243	193	3.6	7.3	93	2749	2271	1087	117	308	2269	241	5020
	14:47	1040	725	299	296	263	259	244	187	3.5	7.3	94	2760	2382	1112	115	310	2305	235	5142
	14:48	1047	726	299	296	263	259	243	191	3.4	7.4	94	2765	2384	1183	114	307	2339	231	5149
	14:49	1053	727	299	296	263	259	243	194	3.5	7.4	97	2730	2311	1130	113	303	2341	236	5041

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on OCT 02, 1991.
CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	14:50	1059	728	300	296	263	259	244	187	3.5	7.5	94	2747	2396	1155	115	303	2315	236	5142
8	14:51	1064	729	301	297	263	259	243	200	3.6	7.3	98	2710	2372	1012	113	305	2303	235	5081
9	14:52	1066	730	301	297	263	259	244	188	3.4	7.3	96	2721	2382	981	112	302	2285	225	5103
0	14:53	1069	730	301	296	263	259	244	182	3.4	7.5	96	2767	2347	1048	116	300	2274	223	5114
1	14:54	1073	730	301	296	263	259	243	188	3.6	7.4	93	2720	2323	1107	114	305	2277	231	5043
2	14:55	1075	730	302	297	263	259	244	193	3.6	7.5	97	2703	2286	976	119	308	2262	228	4988
3	14:56	1078	730	302	297	263	259	244	189	3.7	7.4	94	2715	2323	1150	114	310	2272	228	5037
4	14:57	1082	731	302	296	263	259	243	191	3.6	7.3	97	2679	2347	1098	112	307	2274	216	5026
5	14:58	1087	732	302	296	263	259	243	197	3.4	7.2	97	2703	2347	1060	112	301	2257	208	5050
6	14:59	1092	733	302	297	263	259	243	186	3.4	7.1	95	2735	2396	1045	108	300	2249	205	5131
7	15:00	1096	735	302	296	263	259	244	190	3.5	7.5	94	2785	2311	1166	116	299	2262	202	5096
8	15:01	1100	736	302	296	263	259	244	198	3.7	7.5	93	2760	2309	1083	114	307	2279	207	5069
9	15:02	1105	740	301	295	263	259	244	185	3.7	7.3	92	2785	2370	1171	108	309	2297	204	5155
0	15:03	1106	742	300	295	263	259	243	193	3.5	7.5	91	2745	2286	1218	110	302	2297	193	5031
1	15:04	1109	743	300	295	263	259	243	190	3.6	7.6	92	2698	2335	1188	118	301	2314	191	5033
2	15:05	1113	745	301	295	263	259	243	186	3.8	7.4	93	2720	2347	1070	113	311	2306	198	5067
3	15:06	1116	747	300	295	263	259	243	197	3.8	7.4	93	2737	2347	1106	112	315	2292	192	5084
4	15:07	1118	748	299	294	262	259	243	189	3.7	7.4	93	2692	2360	1189	111	309	2274	182	5052
5	15:08	1119	750	300	295	262	259	243	191	3.6	7.5	92	2725	2335	1172	110	307	2275	178	5060
6	15:09	1121	752	301	295	263	259	243	187	3.7	7.5	93	2740	2347	1186	110	307	2283	171	5088
7	15:10	1123	754	300	295	263	259	243	186	3.7	7.3	94	2720	2335	890	111	309	2263	164	5055
8	15:11	1122	755	299	294	263	259	243	195	3.7	7.4	93	2755	2335	1107	110	310	2246	159	5087
9	15:12	1125	758	299	294	263	259	243	188	3.7	7.3	93	2737	2335	1154	109	311	2227	153	5072
0	15:13	1127	759	299	295	263	259	243	190	3.7	7.3	94	2755	2347	1263	108	312	2231	149	5103
1	15:14	1129	761	300	295	263	259	243	181	3.6	7.3	93	2730	2347	1197	106	308	2246	143	5077
2	15:15	1130	763	300	295	263	259	243	199	3.6	7.3	94	2720	2347	1233	107	304	2266	143	5067
3	15:16	1131	764	299	295	263	259	243	199	3.6	7.2	94	2749	2347	1082	107	305	2267	145	5096
4	15:17	1131	766	299	294	263	259	243	199	3.6	7.4	96	2742	2360	1181	110	307	2262	144	5101
5	15:18	1132	767	299	294	262	259	243	190	3.6	7.2	96	2742	2347	1077	103	306	2266	142	5089
6	15:19	1132	767	299	294	263	259	243	197	3.5	7.5	94	2794	2419	1093	107	306	2252	141	5213
7	15:20	1132	768	300	295	263	259	243	187	3.6	7.4	94	2780	2372	1193	107	305	2264	142	5152
8	15:21	1134	769	300	295	263	259	243	187	3.7	7.7	93	2718	2408	1145	113	310	2251	143	5126
9	15:22	1134	770	300	294	262	259	243	191	3.9	7.4	93	2740	2384	1146	110	318	2245	145	5124
0	15:23	1134	771	299	294	262	259	243	199	3.8	7.4	94	2727	2347	1261	151	320	2230	141	5074
	15:24	1133	771	299	294	262	259	243	189	3.8	5.6	93	2738	2360	996	156	318	2228	141	5098
	15:25	1133	772	299	295	263	259	243	186	3.8	5.5	95	2704	2347	1102	156	319	2211	142	5052
	15:26	1129	771	300	295	263	259	243	190	3.8	5.6	94	2686	2323	957	164	319	2208	140	5008
	15:27	1123	770	301	295	263	258	243	195	3.8	5.8	97	2715	2311	776	165	318	2209	140	5025
	15:28	1119	769	300	295	262	258	243	189	3.8	5.7	97	2740	2335	927	161	320	2217	139	5075
	15:29	1114	767	299	294	262	258	242	190	3.8	5.5	94	2686	2360	931	152	319	2223	140	5045
	15:30	1110	765	300	295	262	258	243	192	3.7	5.6	94	2735	2311	913	157	313	2243	136	5046
	15:31	1105	763	300	295	262	258	242	192	3.7	6.2	96	2723	2324	962	126	308	2261	136	5041
	15:32	1103	761	300	295	262	258	243	195	3.7	7.6	96	2701	2360	1079	132	308	2242	137	5061
	15:33	1100	759	299	295	262	258	242	185	3.7	7.4	94	2740	2273	1150	123	309	2246	139	5013
	15:34	1095	757	300	295	262	258	242	194	3.6	7.3	95	2732	2384	1096	124	309	2226	137	5116
	15:35	1093	756	300	295	262	258	242	184	3.6	7.4	96	2715	2311	1118	123	306	2236	132	5025
	15:36	1090	755	300	295	262	258	242	0	3.6	7.6	95	2706	2312	864	128	308	2244	132	5019
	15:37	1086	752	299	294	262	258	242	0	3.7	7.8	90	2718	2372	1084	131	315	2249	136	5090
	15:38	1086	751	299	294	261	258	242	0	3.9	7.4	83	2747	2347	1409	123	322	2241	138	5095
	15:39	1084	749	299	295	261	258	242	0	3.8	7.4	79	2754	2347	1807	117	323	2202	133	5101
	15:40	1083	747	300	295	262	258	242	0	3.8	7.4	80	2742	2373	1939	117	316	2206	132	5115
	15:41	1082	746	300	295	262	258	242	0	3.8	7.3	73	2759	2349	2044	115	308	2225	135	5106

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on OCT 02, 1991.
CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
)	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	15:42	1081	744	300	294	261	258	242	0	3.6	7.3	68	2759	2361	2065	115	301	2216	131	5120
0	15:43	1079	743	299	295	261	258	242	0	3.6	7.5	90	2751	2349	2079	119	301	2228	131	5100
1	15:44	1078	741	300	295	261	258	242	0	3.6	7.6	70	2754	2300	2039	121	304	2203	132	5042
2	15:45	1077	739	301	296	261	257	242	0	3.8	7.5	89	2713	2361	2069	119	311	2218	133	5074
3	15:46	1077	739	300	295	261	258	242	0	3.8	4.1	61	2734	2361	1867	131	315	2222	134	5095
4	15:47	1077	738	299	295	261	257	242	0	3.7	3.9	60	2744	2275	1962	130	312	2237	131	5018
5	15:48	1077	738	299	294	260	257	241	0	3.5	3.7	55	2719	2326	2010	122	301	2222	132	5045
6	15:49	1076	737	299	294	260	257	242	0	3.4	4	84	2757	2351	2033	132	296	2231	131	5108
7	15:50	1075	736	300	295	260	257	241	0	3.4	3.9	64	2712	2340	2151	131	290	2261	133	5052
8	15:51	1075	736	300	295	260	257	242	0	3.5	3.9	58	2729	2352	2143	126	297	2264	137	5081
9	15:52	1075	736	300	295	260	257	241	0	3.4	5.2	67	2729	2352	1911	147	299	2268	133	5081
0	15:53	1076	736	300	294	260	257	242	0	3.5	5.4	56	2698	2326	2162	152	300	2294	137	5024
1	15:54	1075	736	301	295	260	257	241	0	3.5	5.1	62	2720	2351	2150	144	301	2289	138	5071
2	15:55	1076	737	302	295	260	257	241	0	3.4	5.4	60	2754	2375	2169	151	301	2270	135	5129
3	15:56	1076	737	301	294	260	257	242	0	3.5	5.4	56	2747	2314	2141	151	300	2275	139	5061
4	15:57	1076	736	302	294	261	257	242	0	3.5	5.4	60	2745	2312	2187	141	303	2268	140	5058
5	15:58	1079	735	302	294	260	257	241	0	3.7	6.8	63	2778	2338	2092	74	310	2287	140	5116

OCTOBER 4, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
) All data on this sheet were taken on OCT 04, 1991.
) KVB & CBTF SO2 Cor. is w/ a correction factor of (1630/1730).
3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2 Cor	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	10:46	892	685	302	292	280	248	231	0	5.9	6.2	87	2755	2382	2072	331	365	2193	214	5137
2	10:47	890	685	301	291	280	248	231	0	6.1	6.1	87	2733	2346	2093	330	374	2205	214	5106
3	10:48	894	685	302	292	280	248	231	0	6.1	6.0	87	2750	2347	2058	316	376	2198	212	5098
4	10:49	893	685	303	293	280	248	231	0	6.1	6.5	87	2735	2335	2153	338	371	2192	215	5096
5	10:50	896	685	302	291	280	248	231	0	6.3	6.5	88	2745	2347	2126	346	364	2208	213	5092
6	10:51	897	686	301	291	280	249	231	0	6.3	6.1	87	2764	2335	2121	316	364	2217	208	5099
7	10:52	898	686	302	292	280	249	231	0	6.3	6.1	87	2752	2335	2062	350	364	2233	201	5087
8	10:53	899	687	302	293	280	249	231	0	6.2	6.1	87	2736	2347	2039	357	367	2207	191	5070
9	10:54	900	687	302	292	280	249	231	0	6.2	6.0	88	2753	2324	2053	318	369	2197	192	5078
10	10:55	906	686	301	291	280	249	232	0	6.1	5.6	87	2753	2337	1979	338	377	2178	181	5090
1	10:56	901	688	301	291	280	249	232	0	5.9	6.2	87	2726	2337	2113	334	374	2185	178	5064
2	10:57	904	689	303	293	280	249	232	0	6.0	5.7	87	2804	2349	2051	349	381	2191	171	5153
3	10:58	907	690	302	292	280	249	232	0	5.9	11.4	87	2764	2349	1573	320	379	2196	177	5113
4	10:59	906	691	301	291	280	249	232	0	5.8	8.3	87	2786	2349	2081	335	382	2211	172	5135
5	11:00	906	692	301	291	280	249	232	0	5.6	8.3	87	2722	2337	2100	338	383	2229	165	5073
6	11:01	901	691	302	292	280	249	232	0	5.5	8.7	87	2736	2349	2124	330	385	2221	165	5087
7	11:02	902	691	303	293	280	250	232	0	6.0	8.9	87	2764	2349	2102	363	386	2236	174	5097
8	11:03	906	692	302	292	280	250	232	0	6.1	8.9	87	2799	2349	2139	358	386	2232	178	5148
9	11:04	907	693	301	290	280	250	232	0	6.0	8.5	87	2774	2337	2118	345	386	2248	166	5111
0	11:05	905	693	301	291	280	250	232	0	5.8	8.8	88	2762	2349	2145	342	381	2236	160	5111
1	11:06	909	693	303	292	280	250	232	0	6.0	8.7	87	2762	2361	2103	351	381	2242	166	5123
2	11:07	911	694	303	292	280	250	232	0	5.8	8.5	87	2782	2361	2088	336	377	2227	162	5114
3	11:08	915	696	301	290	280	250	232	0	5.6	8.3	87	2748	2361	2072	335	373	2208	160	5109
4	11:09	914	697	301	291	279	250	232	0	5.5	8.1	87	2732	2361	2094	316	368	2212	156	5093
5	11:10	914	697	302	292	280	250	233	0	5.3	8.2	87	2727	2349	2127	321	358	2216	155	5076
6	11:11	911	697	302	291	280	250	233	0	5.2	8.1	89	2765	2336	1918	324	355	2225	155	5101
7	11:12	914	697	301	290	279	250	233	0	5.3	8.2	88	2751	2361	2083	328	355	2243	155	5129
8	11:13	916	698	301	291	279	250	233	0	5.3	8.4	88	2734	2349	2073	334	356	2240	158	5083
9	11:14	914	698	302	292	280	250	233	0	5.3	8.1	87	2743	2361	2109	322	356	2238	158	5104
0	11:15	915	698	302	292	280	250	233	0	5.3	8.3	88	2768	2349	2057	331	355	2224	158	5117
1	11:16	915	699	302	291	280	250	233	0	5.3	8.0	87	2782	2361	2126	329	355	2236	162	5143
2	11:17	917	700	301	290	279	250	233	0	5.2	8.2	88	2750	2349	2134	330	355	2249	156	5164
3	11:18	918	701	301	291	279	250	233	0	5.2	8.2	90	2765	2361	2131	334	349	2259	155	5126
4	11:19	918	701	303	292	280	250	233	0	5.4	8.1	94	2770	2361	1320	327	356	2273	159	5131
5	11:20	920	702	302	291	280	250	233	0	5.3	7.9	89	2743	2361	2004	319	355	2249	157	5104
6	11:21	920	703	300	290	280	251	233	0	5.1	8.0	88	2750	2361	2112	318	350	2243	150	5110
7	11:22	919	703	301	291	280	251	234	0	5.1	8.1	88	2760	2361	2137	320	348	2258	150	5112
8	11:23	918	703	303	292	280	251	234	0	5.1	8.1	43	2783	2336	2145	324	350	2279	150	5120
9	11:24	917	703	302	291	280	251	234	0	5.2	8.2	40	2713	2349	2163	338	355	2306	150	5061
0	11:25	917	703	300	290	279	251	234	0	5.3	8.5	43	2773	2361	2169	346	364	2315	153	5134
1	11:26	916	703	301	291	280	251	234	0	5.6	8.4	37	2783	2349	2199	344	377	2336	157	5132
2	11:27	916	703	302	292	280	252	235	0	5.6	8.3	40	2778	2349	2214	340	378	2340	158	5136
3	11:28	919	704	302	291	280	252	235	0	5.5	8.5	41	2756	2336	2189	352	377	2327	152	5092
4	11:29	917	704	301	290	280	252	235	0	5.6	8.2	23	2749	2349	2151	335	380	2323	154	5098
5	11:30	920	705	301	291	280	252	235	0	5.6	8.4	30	2734	2361	1784	347	379	2309	151	5094
6	11:31	917	705	302	291	280	252	235	0	5.6	8.1	26	2781	2349	1368	326	380	2298	152	5130
7	11:32	914	704	302	291	280	252	235	0	5.5	8.6	26	2727	2361	1415	351	378	2285	151	5065
8	11:33	921	706	301	291	280	252	235	0	5.8	8.8	26	2766	2373	1440	364	384	2290	155	5139

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on OCT 04, 1991.
KVB & CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

I #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2 Cor	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	11:34	923	706	301	290	280	252	236	0	5.7	8.2	14	2762	2361	1887	333	384	2301	160	5123
0	11:35	921	707	302	292	280	252	236	0	5.5	8.0	14	2725	2373	2092	329	377	2300	148	5125
1	11:36	919	706	302	291	280	252	236	0	5.4	8.5	13	2733	2361	2086	332	374	2287	147	5094
2	11:37	926	707	301	291	280	252	236	0	5.7	8.6	12	2769	2349	2081	345	376	2291	150	5118
3	11:38	928	708	302	291	280	252	236	0	5.7	8.5	12	2803	2349	2103	332	373	2268	159	5152
4	11:39	928	710	303	292	280	252	236	0	5.6	8.2	33	2750	2365	1917	321	366	2257	149	5136
5	11:40	930	711	302	291	280	252	236	0	5.4	8.4	17	2778	2349	1180	326	359	2232	143	5111
6	11:41	933	712	300	289	279	252	236	0	5.5	8.2	15	2836	2445	1929	313	356	2236	145	5282
7	11:42	931	713	301	290	279	252	236	0	5.4	8.3	19	2764	2397	1990	305	350	2209	144	5165
8	11:43	924	711	301	291	280	252	236	0	5.6	8.8	19	2737	2299	2024	306	344	2207	147	5035
9	11:44	921	710	302	292	280	252	236	0	6.2	9.4	17	2745	2397	2000	341	348	2218	157	5143
0	11:45	917	708	302	291	280	252	236	0	6.7	9.6	17	2745	2349	1983	364	362	2214	173	5094
1	11:46	917	707	301	290	279	252	236	0	7.0	9.7	22	2735	2349	1662	368	360	2200	179	5084
2	11:47	911	706	301	290	279	252	236	0	7.1	9.6	21	2718	2365	1552	372	366	2176	176	5148
3	11:48	910	705	302	291	279	252	236	0	7.1	9.5	22	2750	2311	1592	366	392	2173	176	5062
4	11:49	912	706	303	292	280	252	237	0	7.0	9.0	32	2764	2397	1499	390	395	2180	170	5161
5	11:50	906	707	302	290	279	252	237	0	6.5	8.9	20	2745	2409	1084	367	396	2183	165	5165
6	11:51	907	707	299	288	278	252	236	0	6.4	9.0	18	2716	2299	1484	373	390	2175	154	5015
7	11:52	905	707	300	289	278	252	236	0	6.5	8.9	15	2749	2361	1678	380	392	2172	162	5109
8	11:53	912	707	302	291	279	252	237	0	6.4	9.0	12	2772	2324	1814	385	391	2142	163	5096
9	11:54	910	708	303	291	279	252	237	0	6.3	8.0	12	2754	2365	1937	341	392	2168	161	5139
0	11:55	907	707	301	289	279	252	237	0	5.7	8.7	16	2777	2397	1938	368	382	2163	146	5175
1	11:56	906	706	301	289	278	252	237	0	6.0	8.9	47	2774	2324	1969	385	381	2204	149	5096
2	11:57	908	706	302	290	279	252	236	0	6.3	9.0	42	2768	2324	1988	390	396	2228	163	5098
3	11:58	908	706	302	291	279	252	236	0	6.3	8.7	55	2721	2273	2007	384	403	2222	163	4995
4	11:59	905	705	302	290	279	252	237	0	6.2	8.9	59	2733	2397	2025	385	407	2224	161	5130
5	12:00	905	704	301	289	279	253	236	0	6.3	9.0	50	2725	2324	1979	390	407	2224	159	5074
6	12:01	904	703	301	289	278	253	236	0	6.4	9.0	17	2711	2349	1977	381	411	2214	160	5059
7	12:02	902	702	303	290	279	253	237	0	6.5	9.2	13	2711	2361	1952	369	413	2198	167	5071
8	12:03	901	701	303	290	279	253	237	0	6.6	9.2	12	2711	2349	1950	396	416	2178	170	5059
9	12:04	907	702	302	289	278	253	237	0	6.7	9.1	13	2765	2311	1960	394	419	2180	174	5077
0	12:05	905	702	301	289	278	253	237	0	6.6	8.8	14	2724	2266	1997	377	422	2156	171	5026
	12:06	904	702	303	290	279	253	237	0	6.4	9.0	23	2784	2409	2008	379	418	2163	162	5194
2	12:07	904	702	303	290	279	253	236	0	6.4	8.8	18	2748	2397	1975	380	414	2166	164	5146
3	12:08	905	702	301	289	278	253	236	0	6.4	8.8	19	2781	2361	1992	376	415	2167	163	5141
4	12:09	904	701	301	289	278	253	236	0	6.4	8.9	18	2786	2336	2003	374	415	2167	164	5123
5	12:10	903	701	303	290	279	253	236	0	6.4	8.9	16	2777	2399	2036	374	415	2171	164	5159
	12:11	903	701	303	290	279	253	236	0	6.4	9.2	18	2760	2387	2011	382	415	2175	169	5147
	12:12	903	700	302	289	279	253	237	0	6.6	9.1	16	2774	2387	2001	378	418	2182	171	5161
	12:13	905	701	301	289	278	253	236	0	6.6	9.0	19	2767	2313	1987	381	419	2166	175	5080
	12:14	906	700	302	289	278	253	236	0	6.6	9.0	15	2731	2411	1993	372	421	2169	170	5142
	12:15	907	701	302	290	279	253	236	0	6.6	9.0	13	2765	2325	1988	375	418	2173	170	5067
	12:16	905	700	302	290	279	253	237	0	6.5	8.8	36	2697	2313	1977	365	414	2160	173	5009
	12:17	905	700	303	290	279	253	237	0	6.3	8.9	19	2714	2313	2052	362	413	2163	166	5027
	12:18	906	700	301	288	278	253	236	0	6.3	8.9	14	2740	2387	2093	368	407	2201	163	5127
	12:19	904	700	301	288	278	253	236	0	6.4	8.8	19	2762	2336	2065	365	406	2237	170	5100
	12:20	905	700	302	290	279	253	239	0	6.4	8.9	14	2758	2336	2047	368	409	2236	170	5072
	12:21	905	700	303	290	279	253	239	0	6.3	8.8	11	2782	2336	2035	368	406	2209	170	5120

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on OCT 04, 1991.
KVB & CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

I #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2 Cor	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	12:22	905	700	301	269	278	253	238	0	6.3	8.9	15	2762	2399	2001	373	407	2186	169	5161
8	12:23	907	700	301	269	278	253	238	0	6.4	8.9	12	2747	2399	1998	374	412	2179	172	5146
9	12:24	908	701	302	269	278	253	238	0	6.4	8.8	13	2767	2325	2025	376	414	2171	173	5092
0	12:25	910	702	302	269	278	253	238	0	6.3	8.5	41	2760	2399	2024	361	414	2173	170	5133
1	12:26	910	702	302	269	278	253	237	0	6.0	8.4	43	2719	2313	2086	351	404	2171	163	5032
2	12:27	909	702	302	269	278	253	237	0	5.8	8.6	42	2747	2350	2068	358	392	2188	158	5097
3	12:28	907	702	301	269	278	253	237	0	5.9	8.8	39	2743	2338	2078	359	390	2212	160	5081
4	12:29	909	702	301	269	278	253	237	0	6.2	8.9	39	2728	2338	2020	371	395	2231	169	5066
5	12:30	907	702	302	269	278	253	237	0	6.1	8.8	12	2731	2375	2028	357	392	2196	173	5142
6	12:31	906	702	303	290	278	253	236	0	6.2	8.9	33	2728	2367	2017	379	391	2186	168	5115
7	12:32	910	702	302	269	278	253	236	0	6.4	8.8	28	2801	2365	2017	377	394	2186	175	5186
8	12:33	916	704	301	269	278	253	236	0	6.3	8.5	15	2804	2373	1991	362	397	2165	172	5177
9	12:34	908	704	301	269	278	253	239	0	5.9	8.3	14	2799	2373	2043	337	398	2138	161	5172
0	12:35	905	703	303	290	278	253	239	0	5.8	8.9	15	2811	2371	2041	362	375	2156	151	5153
1	12:36	905	702	302	269	278	253	239	0	6.2	9.1	13	2789	2359	2037	361	377	2191	166	5147
2	12:37	907	702	302	269	278	253	239	0	6.5	9.2	14	2763	2363	2048	366	387	2202	178	5147
3	12:38	912	703	302	269	278	253	239	0	6.6	9.0	13	2746	2359	2029	361	392	2192	182	5106
4	12:39	907	703	302	269	278	253	239	0	6.4	8.3	12	2724	2359	2052	347	390	2177	173	5082
5	12:40	914	704	301	269	278	253	239	0	6.0	8.8	14	2773	2371	2039	359	384	2159	154	5145
6	12:41	912	704	301	269	278	254	239	0	6.0	8.2	14	2768	2359	2069	336	377	2160	160	5104
7	12:42	909	704	301	269	278	254	239	0	5.8	8.5	16	2767	2371	2069	349	372	2189	156	5136
8	12:43	906	703	302	269	278	254	239	0	5.9	8.9	18	2734	2396	1995	371	374	2189	156	5130
9	12:44	908	703	302	269	278	254	239	0	6.3	9.1	14	2734	2334	2043	362	385	2189	172	5068
0	12:45	916	704	302	269	278	254	239	0	6.5	8.8	12	2768	2408	2106	377	397	2206	178	5176
1	12:46	912	705	302	269	278	254	239	0	6.3	8.3	11	2790	2383	2096	347	397	2220	174	5174
2	12:47	909	704	301	269	278	254	239	0	5.9	8.7	12	2763	2346	2020	355	387	2200	155	5110
3	12:48	905	704	301	269	278	254	238	0	6.0	9.0	12	2786	2408	1977	376	381	2177	156	5193
4	12:49	908	704	302	269	278	253	239	0	6.4	9.0	16	2806	2396	1973	382	391	2172	170	5201
5	12:50	912	705	302	269	278	254	239	174	6.6	8.4	17	2758	2408	1975	359	406	2157	175	5166
6	12:51	910	705	301	268	277	254	239	181	6.1	8.5	18	2765	2359	1686	352	399	2131	168	5195
7	12:52	907	704	301	268	277	254	239	173	6.0	8.9	22	2763	2371	1610	365	389	2129	154	5134
8	12:53	908	704	302	269	278	253	239	179	6.3	9.1	19	2746	2371	1562	376	391	2151	164	5117
9	12:54	907	704	303	269	278	253	239	174	6.5	8.9	23	2797	2371	1598	370	397	2146	173	5168
0	12:55	906	703	302	269	278	253	239	186	6.4	9.0	24	2717	2359	1203	373	400	2124	172	5075
1	12:56	908	704	301	268	277	253	239	176	6.6	9.0	25	2746	2371	1070	379	404	2135	173	5123
2	12:57	910	704	301	268	277	253	238	177	6.6	8.8	23	2765	2371	1277	367	406	2118	174	5136
3	12:58	907	704	301	268	277	253	238	177	6.4	8.8	30	2781	2371	1391	367	405	2107	167	5152
4	12:59	908	704	302	269	277	253	238	178	6.2	9.0	35	2801	2371	1029	376	396	2109	162	5172
5	13:00	912	706	302	269	277	253	238	174	6.4	8.8	35	2796	2383	991	376	400	2155	167	5179
6	13:01	911	706	302	268	277	253	238	184	6.2	8.3	34	2746	2371	1111	348	393	2151	167	5117
7	13:02	908	706	301	267	277	253	238	169	6.1	8.7	29	2775	2371	1200	365	389	2156	156	5147
8	13:03	909	706	301	267	276	253	238	181	6.2	8.9	32	2789	2371	1213	377	384	2157	164	5160
9	13:04	910	706	302	268	277	252	237	177	6.4	8.9	48	2767	2359	1133	365	389	2171	173	5191
0	13:05	910	706	302	268	277	252	237	165	6.4	8.9	35	2757	2422	1124	367	391	2161	172	5178
1	13:06	911	706	301	267	276	252	236	184	6.4	9.0	37	2731	2348	1165	369	390	2159	167	5079
2	13:07	911	706	301	266	276	252	237	168	6.4	8.8	40	2760	2348	1139	371	388	2149	167	5108
3	13:08	909	706	301	267	276	251	237	174	6.3	8.9	38	2783	2335	1149	365	385	2127	167	5118
4	13:09	911	706	301	267	276	251	236	183	6.4	9.0	39	2750	2365	1179	23	385	2123	167	5144

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1) All data on this sheet were taken on OCT 04, 1991.
2) KVB & CBTF SO2 Cor. is w/ a correction factor of (1630/1730).
3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2 Cor	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15	13:10	911	706	302	287	276	251	237	166	6.4	8.9	45	2776	2348	998	1	384	2103	170	5124
16	13:11	910	706	301	286	276	251	237	179	6.4	9.1	48	2779	2409	965	599	379	2097	169	5189
17	13:12	906	706	301	286	276	251	237	181	6.3	9.1	45	2786	2409	973	596	378	2085	164	5197
18	13:13	902	704	301	286	276	251	237	179	6.5	9.4	41	2786	2360	1034	363	380	2096	168	5148
19	13:14	902	703	301	287	276	251	237	0	6.7	9.3	38	2789	2373	1105	380	382	2088	175	5162
50	13:15	900	703	301	286	276	251	237	0	6.8	9.2	45	2762	2373	1032	366	381	2081	169	5135
51	13:16	901	702	301	286	276	251	237	0	6.8	9.3	42	2722	2373	1034	372	381	2073	162	5095
52	13:17	903	703	301	286	276	252	238	0	6.8	8.8	44	2750	2348	1137	362	378	2065	178	5098
53	13:18	902	703	301	287	276	253	237	0	6.7	8.8	56	2796	2360	1069	358	373	2066	178	5157
54	13:19	899	702	302	287	276	253	238	0	6.4	9.1	50	2796	2373	1026	350	367	2055	168	5161
55	13:20	902	703	302	287	276	254	238	0	6.6	9.3	52	2796	2362	983	369	367	2078	168	5158
56	13:21	902	703	301	286	276	254	238	0	6.8	9.1	46	2799	2360	1036	366	375	2086	182	5160
57	13:22	907	704	301	286	276	254	238	0	6.7	9.0	38	2781	2360	1084	372	377	2083	176	5141
58	13:23	909	704	301	286	276	254	238	0	6.4	8.9	45	2779	2373	1023	342	375	2084	172	5152
59	13:24	903	704	301	286	276	254	237	0	6.4	8.5	41	2705	2348	1034	339	373	2114	164	5121
60	13:25	902	703	301	287	276	254	238	0	6.3	9.1	45	2753	2350	1079	360	369	2114	168	5103
61	13:26	901	703	302	287	276	255	238	0	6.6	9.2	45	2722	2374	1064	364	373	2127	171	5096
62	13:27	904	704	301	286	276	255	238	0	6.8	9.1	44	2722	2360	1023	373	382	2121	182	5083
63	13:28	908	705	301	286	275	254	237	0	6.6	9.2	46	2759	2360	1074	367	383	2078	182	5119
64	13:29	905	705	301	286	275	254	237	0	6.5	8.6	53	2760	2360	1046	351	383	2089	173	5146
65	13:30	905	705	302	287	276	254	238	0	6.3	9.0	47	2816	2373	959	356	380	2074	167	5189
66	13:31	911	707	302	287	276	255	238	0	6.4	9.0	49	2789	2385	1015	366	381	2097	167	5174
67	13:32	914	708	301	287	276	255	238	0	6.4	8.2	42	2765	2397	1100	341	381	2099	173	5162
68	13:33	910	708	300	286	276	255	238	0	5.9	8.4	32	2798	2423	1305	344	376	2072	159	5221
69	13:34	909	708	301	286	276	255	238	0	5.7	8.5	32	2769	2374	1625	352	369	2092	147	5122
70	13:35	904	707	302	287	276	255	238	0	5.8	8.9	30	2804	2362	1824	368	371	2131	154	5166
71	13:36	902	705	302	287	276	255	238	0	6.1	9.3	28	2760	2362	1831	390	386	2149	162	5122
72	13:37	901	704	301	286	276	255	238	0	6.6	9.4	28	2819	2387	1786	408	404	2154	174	5206
73	13:38	911	705	301	286	276	255	238	0	6.9	9.3	24	2772	2399	1863	415	422	2125	183	5171
74	13:39	905	706	301	286	276	255	238	0	6.8	8.3	21	2738	2374	1921	367	425	2107	183	5112
75	13:40	908	705	301	287	276	255	238	0	6.2	9.0	24	2798	2411	1928	387	414	2082	161	5209
76	13:41	906	705	302	287	276	255	238	0	6.3	8.9	20	2784	2360	1940	395	411	2117	157	5144
77	13:42	910	706	302	287	276	255	238	0	6.4	9.1	21	2745	2348	1987	402	414	2138	164	5070
78	13:43	915	707	301	286	276	256	238	0	6.4	8.3	26	2739	2373	1926	367	416	2153	164	5112
79	13:44	919	709	301	286	276	255	238	0	6.0	8.3	25	2726	2350	1925	367	405	2128	155	5075
80	13:45	910	708	301	286	276	255	238	0	5.7	8.4	21	2746	2374	1959	359	389	2122	146	5121
81	13:46	909	708	301	286	276	255	238	0	5.8	9.0	23	2775	2374	1980	382	385	2143	143	5150
82	13:47	903	706	301	286	276	255	238	0	6.2	9.0	19	2758	2362	1963	381	391	2170	160	5094
83	13:48	908	706	301	286	276	255	238	0	6.4	9.3	28	2809	2399	1963	403	396	2157	167	5208
84	13:49	910	707	302	287	276	255	238	0	6.7	8.5	25	2764	2350	1959	384	406	2160	178	5113
85	13:50	915	708	301	286	276	255	239	0	6.1	8.9	21	2794	2387	1985	385	395	2107	167	5179
86	13:51	918	710	301	286	275	255	239	0	6.1	8.2	20	2782	2350	1988	388	393	2138	150	5132
87	13:52	912	717	300	286	275	256	238	0	5.6	8.0	20	2757	2362	2010	388	380	2116	149	5119
88	13:53	908	721	300	286	275	256	238	0	5.6	8.4	23	2734	2362	1999	388	372	2127	138	5096
89	13:54	912	725	301	286	276	256	238	0	6.2	8.7	21	2734	2350	1980	386	379	2189	153	5094
90	13:55	922	729	301	286	276	256	239	0	6.7	8.2	22	2717	2374	1942	390	387	2205	173	5103
91	13:56	920	731	300	286	275	255	238	0	6.4	7.5	18	2774	2337	2006	362	385	2154	170	5111
92	13:57	914	727	299	286	275	255	238	0	5.7	8.3	17	2787	2387	2001	369	372	2116	150	5174

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 04, 1991.
KVB & CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2 Cor	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13	13:58	915	724	300	265	275	255	238	0	6.1	8.6	21	2769	2374	1976	400	379	2173	150	5143
14	13:59	921	723	301	266	276	255	238	0	6.5	8.5	18	2787	2399	1993	406	392	2186	164	5186
15	14:00	925	724	301	266	276	255	238	0	6.5	7.7	16	2770	2413	2024	376	402	2170	168	5097
16	14:01	916	723	300	264	275	255	238	0	6.0	7.7	23	2736	2362	2046	363	393	2147	153	5098
17	14:02	923	723	300	265	275	256	239	0	5.8	8.4	22	2785	2376	2039	400	382	2168	141	5161
18	14:03	919	723	300	266	276	256	239	0	6.1	8.1	22	2762	2388	2023	368	387	2209	154	5150
19	14:04	923	724	301	267	276	256	238	0	6.1	8.4	20	2781	2387	2042	392	389	2194	152	5167
10	14:05	922	719	302	267	276	256	239	0	6.3	8.3	34	2768	2374	2008	385	397	2204	157	5115
11	14:06	917	713	300	264	276	256	239	176	6.2	8.5	28	2773	2387	1451	383	399	2183	152	5160
12	14:07	918	710	299	263	275	255	238	177	6.0	9.1	31	2789	2387	1557	396	398	2170	151	5176
13	14:08	923	709	300	266	275	255	238	170	6.2	8.8	27	2745	2387	1696	395	401	2197	152	5164
14	14:09	921	709	301	267	276	255	239	182	6.1	8.4	26	2743	2362	1696	375	402	2193	155	5105
15	14:10	921	709	301	266	276	255	238	174	5.7	8.8	32	2750	2350	1631	392	393	2172	145	5099
6	14:11	925	710	299	265	275	255	238	177	5.8	8.6	30	2719	2364	1617	360	396	2193	141	5082
7	14:12	927	711	299	265	275	255	238	185	5.8	8.4	33	2736	2376	1590	377	397	2186	146	5112
8	14:13	922	712	301	266	276	256	239	177	5.7	8.1	30	2729	2350	1639	358	396	2176	142	5115
9	14:14	921	712	301	266	276	256	239	178	5.6	8.7	34	2770	2324	1190	387	390	2173	140	5095
0	14:15	926	714	300	265	276	256	238	168	5.8	8.8	39	2767	2374	1353	398	394	2176	145	5141
1	14:16	925	714	299	265	275	255	238	179	5.9	8.2	34	2770	2362	1064	359	400	2170	150	5132
2	14:17	929	716	299	265	275	255	238	181	5.5	8.2	39	2760	2399	1226	364	389	2139	141	5159
3	14:18	923	716	300	266	276	255	238	171	5.4	8.3	40	2798	2324	1242	364	382	2163	139	5152
4	14:19	924	716	300	266	276	255	239	177	5.5	8.8	49	2772	2435	1244	395	378	2172	134	5207
5	14:20	927	717	299	265	276	256	239	181	5.9	8.2	42	2773	2411	1181	364	391	2206	146	5185
6	14:21	928	718	299	266	276	256	239	174	5.8	8.4	42	2737	2350	1196	374	394	2180	147	5123
7	14:22	923	718	300	267	276	256	239	176	5.7	8.2	46	2739	2324	1084	364	386	2178	139	5064
8	14:23	922	718	301	267	277	256	239	174	5.6	8.8	51	2794	2374	1043	391	384	2175	140	5168
9	14:24	925	719	301	267	277	256	239	182	5.9	8.8	49	2792	2423	1072	398	390	2189	142	5215
0	14:25	925	720	300	266	276	256	239	169	6.0	8.4	48	2804	2387	1112	375	396	2171	148	5191
1	14:26	923	720	300	266	276	256	239	187	5.7	8.5	46	2789	2324	1220	375	390	2166	143	5119
2	14:27	923	720	301	267	276	255	238	169	5.7	8.4	57	2787	2447	1221	368	380	2172	134	5234
3	14:28	926	720	301	267	276	255	238	175	5.8	8.7	71	2779	2399	1160	389	383	2189	141	5178
4	14:29	924	720	300	267	276	255	239	180	5.9	8.3	72	2722	2337	1101	374	379	2196	141	5059
5	14:30	927	721	299	266	276	255	238	173	5.9	8.8	69	2741	2423	1131	398	382	2177	144	5164
6	14:31	931	722	299	267	276	255	239	181	5.8	8.5	53	2734	2312	1229	391	385	2151	141	5050
7	14:32	928	722	300	267	276	256	239	180	5.7	8.1	50	2710	2362	1124	364	382	2146	135	5072
8	14:33	932	722	300	267	276	256	239	174	5.6	8.8	49	2751	2362	1132	398	376	2143	136	5113
9	14:34	929	723	299	267	276	255	239	179	5.8	8.2	50	2809	2374	1145	364	382	2161	136	5163
0	14:35	932	723	299	267	276	255	239	180	5.6	8.6	48	2746	2362	1156	383	378	2139	137	5108
1	14:36	934	724	299	267	276	256	239	177	5.7	8.2	46	2744	2374	1210	365	379	2148	134	5157
2	14:37	935	725	299	267	276	255	239	176	5.6	8.0	48	2746	2399	1228	354	376	2145	132	5145
3	14:38	936	726	299	267	276	255	239	177	5.4	8.0	48	2787	2399	1322	346	368	2143	130	5186
4	14:39	936	727	300	266	277	256	240	175	5.3	8.0	50	2832	2387	1186	344	363	2153	127	5219
5	14:40	936	727	299	266	277	256	240	178	5.3	7.9	51	2824	2362	1191	340	359	2176	131	5186
3	14:41	933	726	299	267	276	256	240	185	5.2	8.1	56	2799	2374	1201	359	356	2194	127	5173
7	14:42	932	725	298	267	276	256	239	176	5.3	8.4	54	2736	2362	1186	372	361	2236	129	5098
3	14:43	931	724	298	266	276	255	239	176	5.5	8.5	57	2748	2362	1162	381	371	2249	133	5110
)	14:44	932	722	299	266	277	256	240	185	5.6	8.7	56	2761	2350	1125	364	380	2214	136	5104
)	14:45	931	720	300	266	277	256	239	178	5.8	8.7	70	2756	2364	1142	367	388	2198	135	5120

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
) All data on this sheet were taken on OCT 04, 1991.
) KVB & CBTF SO2 Cor. is w/ a correction factor of (1630/1730).
3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2 Cor	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	14:46	929	719	299	287	276	255	239	170	5.9	8.7	74	2741	2401	1169	392	394	2176	135	5141
2	14:47	926	718	298	287	276	255	239	177	5.9	8.8	79	2748	2337	1133	398	400	2147	137	5085
3	14:48	930	717	299	288	276	255	239	180	6.0	9.0	57	2715	2350	1032	405	404	2131	138	5064
4	14:49	912	717	300	288	277	255	240	172	6.1	8.6	59	2741	2425	1082	396	408	2121	138	5159
5	14:50	896	715	300	288	277	256	240	179	6.0	9.0	61	2741	2339	1124	403	408	2107	138	5079
6	14:51	863	715	299	287	276	256	240	181	6.1	9.0	55	2753	2423	1076	408	411	2116	137	5176
7	14:52	834	716	299	287	276	256	239	173	6.3	9.0	52	2770	2339	1108	402	418	2133	141	5109
8	14:53	828	716	299	288	276	256	240	178	6.3	9.1	57	2775	2425	1244	410	421	2135	145	5200
9	14:54	827	717	300	288	277	256	239	176	6.4	9.2	59	2762	2339	1146	413	423	2154	144	5116
0	14:55	827	717	299	288	277	256	240	183	6.5	9.2	58	2760	2290	1041	419	425	2155	147	5049
1	14:56	827	718	299	288	276	256	240	174	6.6	9.2	56	2765	2353	1166	418	431	2152	151	5118
2	14:57	826	719	299	287	276	256	239	181	6.5	9.2	55	2760	2353	1234	401	425	2129	149	5112
3	14:58	828	719	298	287	276	256	239	173	6.5	9.2	59	2770	2378	1213	402	420	2128	145	5148
4	14:59	827	719	300	288	276	256	240	178	6.5	8.8	68	2766	2390	1122	388	414	2125	150	5141
5	15:00	821	717	299	288	276	256	239	181	6.5	9.0	63	2750	2428	1127	400	413	2130	150	5178
6	15:01	823	717	299	288	276	256	240	168	6.4	9.0	59	2751	2342	1135	376	412	2138	148	5123
7	15:02	822	717	299	288	276	256	239	182	6.5	9.2	58	2746	2416	1149	405	414	2160	148	5162
8	15:03	814	715	299	287	276	256	239	184	6.5	9.4	68	2799	2367	1093	422	410	2143	150	5166
9	15:04	817	715	299	288	276	256	239	174	6.6	9.7	63	2884	2367	1215	432	417	2141	150	5260
0	15:05	825	717	301	289	276	256	239	177	6.7	9.4	63	2826	2418	1205	425	424	2143	155	5244
1	15:06	863	717	300	288	275	255	238	175	6.7	9.2	66	2784	2331	1186	416	426	2141	155	5120
2	15:07	894	718	299	288	275	255	239	175	6.7	9.1	61	2807	2361	990	413	427	2165	154	5188
3	15:08	893	715	298	287	274	255	238	176	6.6	9.5	63	2750	2370	1069	410	417	2189	149	5120
4	15:09	886	711	299	288	274	255	238	182	6.9	10.4	59	2762	2347	1126	442	418	2206	154	5124
5	15:10	879	707	301	289	274	254	238	174	7.6	11.1	66	2739	2434	1084	460	435	2230	178	5173
6	15:11	878	705	301	289	274	254	238	176	8.5	11.1	62	2739	2409	1036	460	458	2239	224	5193
7	15:12	875	703	300	288	274	254	238	183	8.7	10.9	59	2710	2311	1133	474	465	2192	255	5020
8	15:13	875	702	299	288	273	254	238	174	8.7	10.8	60	2729	2375	1082	469	478	2169	249	5104
9	15:14	873	700	300	289	273	253	238	178	8.6	10.9	62	2713	2363	1149	470	482	2157	236	5076
0	15:15	872	699	301	289	272	253	238	174	8.5	10.8	58	2685	2339	1070	466	482	2149	227	5024
1	15:16	873	698	301	289	273	253	237	182	8.5	10.6	72	2760	2426	1107	473	484	2156	225	5173
2	15:17	873	698	301	288	272	253	238	175	8.4	10.4	69	2762	2451	1039	457	483	2149	228	5213
3	15:18	870	697	301	288	272	252	238	174	8.1	10.4	72	2772	2440	1185	462	475	2121	218	5212
4	15:19	866	695	300	288	272	252	238	186	8.1	10.9	74	2779	2341	1179	462	477	2130	208	5125
5	15:20	859	692	301	288	272	252	238	168	8.4	11.0	70	2774	2365	1186	445	478	2151	219	5129
6	15:21	856	690	301	289	272	252	238	178	8.8	11.2	64	2775	2343	1074	439	476	2161	251	5118
7	15:22	858	688	301	288	272	252	237	185	9.1	11.2	74	2741	2317	1104	434	467	2167	261	5058
8	15:23	855	686	301	289	272	252	237	173	3.7	10.9	72	2719	2432	1000	392	312	1469	202	5150
9	15:24	824	676	300	287	271	252	237	181	3.4	11.4	77	2722	2405	817	358	302	1436	194	5164
0	15:25	787	664	300	287	271	252	238	176	3.5	13.4	76	2739	2395	694	301	282	1347	158	5095
1	15:26	752	648	301	289	271	252	238	171	4.4	15.0	81	2779	2419	537	279	233	1172	321	5198
2	15:27	722	631	302	289	272	252	237	177	5.2	15.9	79	2788	2370	462	251	177	966	–	5157
3	15:28	696	616	301	288	272	252	238	180	5.7	16.4	82	2767	2395	423	215	134	739	–	5162
4	15:29	676	602	300	288	271	252	238	180	5.9	16.9	95	2814	2393	300	161	113	547	273	5226
5	15:30	658	589	300	288	271	252	238	173	5.9	17.2	97	2809	2317	278	145	13	554	274	5126
6	15:31	620	571	299	287	271	252	238	174	5.8	17.3	97	2745	2344	257	109	6	562	271	5089

OCT. 17, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on OCT 17, 1991.
CBTF SO2 Cor. is w/ a correction factor of (1630/1730).

3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	14:47	912	725	302	286	275	255	239	0	5.9	8.2	14	2742	2396	2023	371	397	2106	221	5140
2	14:48	913	726	301	286	275	255	239	0	5.8	8.4	17	2745	2421	2069	372	399	2101	217	5166
3	14:49	911	726	301	285	275	255	239	0	5.8	8.2	16	2750	2421	2025	362	394	2100	226	5171
4	14:50	912	725	301	286	275	255	239	0	5.9	8.2	16	2742	2397	2075	354	394	2099	232	5157
5	14:51	914	726	301	286	275	255	239	0	6.0	8.4	16	2737	2297	2033	384	394	2097	238	5034
6	14:52	909	726	302	286	275	255	239	0	5.9	8.2	14	2732	2322	2065	376	405	2053	230	5054
7	14:53	911	726	302	286	275	255	239	0	6.0	8.5	15	2737	2347	2152	390	410	2050	227	5084
8	14:54	911	726	301	285	275	255	239	0	5.9	8.1	15	2762	2360	2082	389	413	2043	232	5122
9	14:55	911	726	301	286	275	255	239	0	5.5	8.0	15	2752	2409	2083	399	422	1948	210	5161
0	14:56	908	725	301	286	275	255	239	0	5.7	8.1	16	2750	2398	2050	394	430	1948	207	5149
1	14:57	908	725	302	287	276	255	239	0	5.9	8.2	14	2754	2433	2054	403	442	1976	214	5178
2	14:58	904	724	301	286	276	255	239	0	6.0	8.4	15	2740	2335	2053	408	449	1996	216	5105
3	14:59	908	724	301	286	275	255	239	0	6.0	8.4	15	2749	2384	2068	407	449	1996	211	5132
4	15:00	904	724	302	286	276	255	240	0	6.0	8.2	15	2749	2371	2039	400	448	1992	214	5120
5	15:01	905	725	302	286	276	255	240	0	6.0	8.3	14	2776	2371	2074	399	448	1997	208	5147
6	15:02	904	725	301	286	276	255	239	0	6.2	8.5	15	2775	2396	2066	407	449	2028	213	5171
7	15:03	904	725	301	285	275	255	240	0	6.2	8.4	15	2773	2371	2074	402	444	2030	211	5146
8	15:04	906	726	301	285	276	255	239	0	6.3	8.5	15	2773	2371	2067	404	439	2045	221	5144
9	15:05	905	727	302	286	276	255	240	0	6.1	8.4	15	2780	2409	2105	398	435	2029	212	5188
0	15:06	903	726	302	286	276	255	240	0	6.2	8.3	16	2778	2346	2104	388	432	2034	209	5124
	15:07	901	726	301	286	276	255	240	0	6.3	8.6	15	2773	2433	2123	399	432	2049	217	5205
	15:08	902	726	301	286	276	255	240	0	6.5	8.7	16	2783	2346	2136	408	435	2080	223	5129
	15:09	906	727	302	286	276	256	240	176	6.5	8.5	15	2773	2371	2129	394	441	2078	221	5144
	15:10	906	727	301	286	276	256	240	177	6.2	8.3	16	2783	2433	2112	386	430	2041	207	5216
	15:11	906	727	301	285	275	256	240	187	6.0	8.4	16	2764	2433	2128	394	423	2025	207	5198
	15:12	908	727	301	285	275	255	240	179	6.1	8.4	20	2763	2359	2023	395	428	2042	212	5121
	15:13	904	726	301	286	276	255	240	179	6.1	8.3	20	2769	2320	1853	394	434	2044	212	5090
	15:14	898	724	301	286	276	255	239	181	6.2	8.7	22	2761	2396	1897	408	441	2056	216	5157
	15:15	896	722	301	285	275	255	239	185	6.6	8.9	20	2754	2433	1929	400	453	2122	232	5187
	15:16	900	724	301	285	275	255	239	178	6.9	9.1	20	2759	2396	1758	422	455	2160	248	5141
	15:17	900	725	302	285	275	255	239	182	6.5	8.7	20	2766	2396	1764	402	446	2078	224	5161
	15:18	899	726	301	285	275	255	239	177	6.5	8.7	24	2756	2384	1771	401	444	2069	224	5140
	15:19	899	727	302	285	275	254	239	186	6.6	8.8	28	2759	2384	1661	413	444	2083	234	5143
	15:20	896	727	302	286	275	254	239	182	6.6	8.7	30	2783	2421	1414	408	441	2086	234	5204
	15:21	897	727	302	285	275	254	239	184	6.7	8.8	30	2790	2445	1160	407	442	2107	237	5236
	15:22	898	726	301	285	275	254	239	179	6.6	8.7	30	2777	2433	1250	411	439	2088	235	5210
	15:23	897	726	301	285	275	254	239	186	6.6	8.8	30	2780	2384	1320	413	438	2078	235	5164
	15:24	896	725	301	286	276	254	239	182	6.6	8.8	30	2785	2384	1272	417	444	2074	238	5169
	15:25	898	724	302	286	276	254	239	175	6.7	9.0	31	2783	2373	1354	426	449	2082	247	5156
	15:26	893	723	301	285	275	254	239	178	6.8	8.9	32	2795	2396	1298	421	458	2095	249	5165
	15:27	893	723	301	285	275	254	239	186	7.0	9.3	32	2770	2384	1264	435	465	2118	261	5153
	15:28	894	724	302	286	276	254	239	176	7.1	9.2	32	2773	2384	1227	434	466	2117	263	5157
	15:29	893	725	301	285	276	254	239	190	6.8	8.8	31	2785	2384	1176	416	461	2047	245	5148
	15:30	894	726	301	285	276	253	239	178	6.7	9.0	34	2780	2346	1315	408	461	2029	238	5126
	15:31	893	727	302	286	276	253	239	182	6.9	9.0	31	2775	2322	1271	421	460	2054	254	5097
	15:32	897	727	301	286	276	254	239	176	6.7	8.8	33	2768	2371	1243	422	455	2011	242	5139
	15:33	900	728	301	285	275	254	239	181	6.6	8.8	33	2768	2384	1216	429	457	2004	240	5152
	15:34	906	729	301	286	276	254	239	183	6.5	8.6	32	2765	2373	1230	419	459	2003	247	5137

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
) All data on this sheet were taken on OCT 17, 1991.
) CBTF SO2 Cor. is w/ a correction factor of (1630/1730).
3) Calcium Injector Type is I
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
49	15:35	902	728	302	286	276	254	239	183	6.0	8.2	33	2778	2384	1311	399	446	1945	234	5162
50	15:36	899	726	301	285	276	254	239	172	6.0	8.5	32	2770	2409	1218	410	434	1968	244	5178
51	15:37	890	722	300	285	275	254	238	188	6.3	8.7	36	2770	2409	1208	415	443	2009	267	5177
52	15:38	881	719	301	286	275	253	239	180	6.9	9.4	34	2763	2409	1181	422	459	2051	300	5143
53	15:39	878	718	302	286	276	254	239	181	7.7	9.8	36	2737	2371	1311	431	475	2140	343	5169
54	15:40	870	718	302	286	276	254	239	186	7.9	10.0	36	2758	2384	1287	450	468	2134	340	5149
55	15:41	865	719	301	286	276	253	239	182	8.1	10.3	39	2792	2384	1304	434	486	2164	348	5176
56	15:42	862	720	302	286	276	253	239	190	8.6	10.5	43	2797	2359	1207	449	486	2175	365	5156
57	15:43	859	721	302	286	276	253	239	177	8.7	10.6	42	2790	2421	1192	450	484	2152	355	5211
58	15:44	854	722	301	286	276	253	238	2	8.8	10.8	44	2794	2396	1170	461	487	2145	365	5190
59	15:45	854	723	301	286	276	253	238	2	8.9	10.8	39	2770	2371	1193	450	497	2143	368	5141
60	15:46	856	724	302	286	276	253	239	179	8.9	10.7	34	2787	2396	1262	446	492	2135	376	5183
61	15:47	855	726	302	285	276	253	238	180	8.6	10.3	33	2779	2371	1594	424	482	2068	349	5150
62	15:48	852	726	301	285	275	253	238	178	8.5	10.3	41	2753	2384	1675	419	481	2062	328	5136
63	15:49	853	728	302	286	275	253	238	178	8.7	10.5	36	2763	2360	1608	430	480	2110	358	5123
64	15:50	851	728	303	287	276	253	238	186	8.6	10.4	45	2768	2359	1413	414	470	2098	365	5127
65	15:51	850	727	303	286	276	253	238	180	8.6	10.4	41	2768	2359	1219	423	470	2113	373	5127
66	15:52	849	727	301	285	275	253	238	176	8.6	10.5	42	2767	2421	1201	427	457	2133	390	5188
67	15:53	846	726	301	285	275	253	238	191	8.7	10.5	41	2772	2423	1208	420	465	2140	401	5195
68	15:54	847	725	302	286	276	253	238	175	8.7	10.6	41	2761	2445	1194	424	464	2101	406	5207
69	15:55	845	724	303	286	276	253	238	178	8.8	10.6	45	2763	2371	1220	432	463	2053	411	5115
70	15:56	843	724	302	285	276	253	238	185	8.8	10.7	42	2761	2396	1211	432	463	1988	401	5149
71	15:57	849	725	302	285	275	253	238	180	8.9	10.8	39	2760	2320	1352	434	465	1975	398	5060
72	15:58	859	728	302	286	275	252	238	183	9.1	10.9	50	2765	2421	1418	435	475	1991	402	5186
73	15:59	872	733	303	286	276	252	238	182	9.1	10.9	46	2806	2433	1158	449	476	1999	400	5239
74	16:00	875	735	303	286	276	252	238	178	9.0	10.8	47	2789	2396	1163	448	483	1991	393	5185
75	16:01	879	735	301	285	275	252	238	176	9.1	10.9	46	2792	2384	1287	444	488	2016	386	5176
76	16:02	881	733	301	285	275	252	237	184	9.4	11.2	49	2806	2385	1345	461	498	2077	422	5192
77	16:03	891	731	302	286	275	252	238	172	9.6	11.5	49	2794	2447	1297	484	513	2106	448	5241
78	16:04	899	731	302	285	276	252	238	191	9.6	11.2	48	2828	2359	1098	482	521	2087	458	5187
79	16:05	918	733	301	285	275	252	237	173	3.7	11.0	45	2765	2472	1177	456	355	1358	263	5237

OCT. 23, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on OCT 23, 1991.
Calcium Injector Type is I

3) Calcium Sorbent Type is Wulfrasorp.
4) SO2 Traverse

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
)	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	12:48	998	715	301	291	262	265	251	0	6.1	7.9	24	2751	2418	1834	406	457	1945	345	5166
2	12:49	998	714	301	291	262	265	251	0	5.9	8.6	24	2762	2418	1921	426	448	1932	353	5179
3	12:50	1001	713	302	292	263	265	251	0	6.2	8.2	25	2746	2393	1860	423	448	1973	349	5150
4	12:51	998	713	302	291	263	265	251	0	6.0	7.9	23	2755	2369	1891	405	454	1953	335	5123
5	12:52	998	714	301	291	262	265	251	0	5.9	8.3	23	2743	2381	1875	426	449	1957	356	5124
6	12:53	999	714	300	291	262	264	251	0	6.1	8.3	24	2756	2356	1864	432	451	1976	347	5113
7	12:54	1000	714	302	292	263	264	251	0	6.2	8.3	24	2768	2344	1855	432	458	1965	342	5112
8	12:55	1000	715	302	292	263	264	251	0	6.3	8.3	23	2751	2356	1853	433	461	1957	342	5106
9	12:56	1001	715	301	291	262	264	251	0	6.3	8.3	24	2750	2381	1862	436	459	1947	348	5131
0	12:57	1003	715	301	291	262	264	252	0	6.2	10.2	23	2748	2367	1457	308	457	1945	349	5113
1	12:58	1003	716	302	292	262	264	251	0	6.2	7.6	23	2748	2379	135	402	453	1962	347	5127
2	12:59	1002	716	302	292	262	264	252	0	6.1	7.6	23	2748	2379	116	406	449	1951	348	5119
3	13:00	1003	716	301	291	262	264	252	0	6.0	7.6	24	2760	2342	209	404	447	1939	346	5102
4	13:01	1003	717	302	291	262	265	252	0	6.1	8.0	24	2755	2379	1669	418	448	1953	343	5134
5	13:02	1003	717	302	291	262	264	252	0	6.0	7.5	25	2741	2392	899	387	444	1964	354	5133
6	13:03	997	715	301	291	262	264	251	0	5.8	7.6	24	2746	2393	351	406	437	1990	354	5140
7	13:04	997	715	302	291	262	264	251	0	5.9	7.7	25	2733	2393	437	424	439	2031	358	5126
8	13:05	999	715	302	292	262	264	252	0	6.1	7.6	24	2743	2381	557	421	449	2026	348	5124
	13:06	1000	715	301	291	262	264	252	0	6.1	7.4	24	2746	2381	709	416	456	1990	345	5129
	13:07	1000	715	301	291	262	264	251	0	5.9	7.8	24	2768	2381	858	432	457	1961	350	5149
	13:08	1004	716	301	291	262	264	251	0	5.9	7.3	25	2756	2381	981	420	456	1961	350	5139
	13:09	999	715	302	292	262	264	251	0	5.9	8.0	24	2750	2381	1109	437	458	1956	344	5131
	13:10	998	715	302	291	262	264	251	0	5.9	7.7	24	2736	2369	1193	433	458	1963	350	5105
	13:11	998	715	301	291	262	264	252	0	6.0	7.8	24	2753	2367	1265	437	459	1964	345	5120
	13:12	1002	716	301	291	262	264	251	0	6.1	7.8	24	2753	2392	1319	443	456	1961	347	5145
	13:13	1005	717	301	291	262	264	251	0	6.2	7.6	25	2750	2379	1362	433	458	1958	352	5129
	13:14	1005	717	302	291	262	264	252	0	6.1	7.3	25	2753	2379	1404	420	463	1941	352	5132
	13:15	997	715	301	290	262	264	251	0	5.9	8.2	25	2751	2395	1432	441	456	1937	357	5136
	13:16	998	715	301	291	262	264	252	0	6.1	7.8	25	2778	2397	1410	432	451	1968	364	5175
	13:17	999	715	302	292	262	265	252	0	6.4	7.7	25	2780	2409	1450	427	454	1962	368	5190
	13:18	1004	717	301	291	262	264	252	0	6.3	7.7	25	2772	2385	1496	429	455	1925	364	5154
	13:19	1003	717	301	290	262	264	252	0	6.2	7.4	24	2778	2347	1498	408	453	1929	357	5125
	13:20	997	716	301	290	261	265	252	0	6.0	7.6	25	2773	2334	1507	415	447	1937	369	5104
	13:21	998	715	301	290	262	265	252	0	6.0	7.6	25	2780	2372	1506	416	438	1952	374	5152
	13:22	995	715	301	291	262	264	252	0	6.2	7.7	24	2777	2321	1527	427	444	1973	374	5098
	13:23	999	715	301	290	261	264	252	0	6.2	7.7	24	2765	'2436	1504	426	451	1962	370	5200
	13:24	998	715	301	290	262	264	251	0	6.3	7.8	25	2765	2397	1537	425	459	1958	358	5162
	13:25	1000	715	301	290	261	264	252	0	6.3	7.7	24	2761	2372	1551	420	462	1946	362	5133
	13:26	1000	715	301	290	261	264	251	0	6.3	7.6	25	2753	2372	1554	424	461	1951	363	5125
	13:27	1004	716	302	291	262	264	252	0	6.2	7.5	25	2758	2397	1520	430	459	1951	367	5155
	13:28	1002	717	301	291	262	264	252	0	6.3	7.3	24	2754	2397	1532	416	463	1958	365	5151
	13:29	1001	717	301	290	262	264	252	0	6.1	12.4	24	2761	2359	1923	168	462	1939	365	5099
	13:30	1000	716	301	290	261	264	252	0	6.1	9.3	24	2772	2359	1233	483	461	1957	365	5131
	13:31	1002	717	302	291	262	264	252	0	6.2	7.9	24	2758	2361	1581	438	465	1963	358	5206
	13:32	1004	717	302	290	261	264	251	0	6.2	7.6	25	2767	2411	1572	427	464	1960	360	5178
	13:33	1000	717	301	290	261	264	251	0	6.1	7.7	25	2761	2297	1551	424	457	1942	363	5058
	13:34	997	716	301	290	261	264	252	0	6.0	7.7	24	2773	2348	1546	430	455	1935	368	5122
	13:35	1001	716	302	291	262	264	252	0	6.0	7.5	24	2754	2399	1561	424	449	1940	371	5153

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1 All data on this sheet were taken on OCT 23, 1991.
Calcium Injector Type is I

3) Calcium Sorbent Type is Wultrasorp.
4) SO2 Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	13:36	1000	716	303	291	282	264	252	0	6.0	7.7	25	2778	2297	1576	430	447	1953	356	5075
0	13:37	1002	716	301	290	282	264	252	0	6.0	7.8	24	2770	2399	1526	441	451	1975	358	5169
1	13:38	1002	717	300	289	281	264	251	0	6.1	7.6	25	2780	2323	1584	431	456	1982	350	5103
2	13:39	1000	716	302	290	281	264	251	0	6.0	7.7	24	2763	2374	1559	435	458	1976	359	5137
3	13:40	999	716	302	291	282	264	252	0	6.1	7.6	24	2758	2436	1546	439	462	1996	351	5190
4	13:41	999	716	302	290	282	264	252	0	6.2	7.5	24	2775	2374	1559	433	465	1991	349	5149
5	13:42	999	716	301	289	281	264	252	0	6.1	7.6	25	2765	2411	1548	432	466	1967	346	5176
6	13:43	999	715	301	290	281	264	252	0	6.1	7.6	25	2768	2374	1526	439	469	1969	351	5142
7	13:44	1001	716	301	290	281	264	252	0	6.1	7.5	24	2779	2361	1542	437	468	1948	343	5140
8	13:45	1002	716	301	290	281	264	252	0	6.1	18.8	24	2760	2448	4356	26	470	1938	346	5208
9	13:46	1003	716	301	290	281	264	251	0	6.1	20.4	24	2763	2423	4045	36	472	1934	347	5187
0	13:47	1001	716	301	290	281	264	252	0	6.1	20.4	25	2765	2374	2578	0	469	1928	351	5138
1	13:48	1001	716	300	289	281	264	252	0	6.1	20.5	24	2772	2460	2730	0	469	1922	358	5232
2	13:49	997	714	301	290	281	264	251	0	6.0	20.5	25	2768	2361	2461	0	465	1908	346	5211
3	13:50	999	711	302	290	281	264	251	0	6.1	11.9	25	2760	2411	963	656	463	1924	350	5171
4	13:51	998	713	300	289	281	264	251	0	6.3	7.7	25	2770	2336	1800	440	462	1946	349	5106
5	13:52	1002	715	300	289	280	264	251	0	6.2	7.6	25	2768	2374	1645	444	462	1941	346	5142
6	13:53	1001	716	302	290	281	264	251	0	6.3	7.7	24	2765	2448	1641	443	462	1946	349	5213
7	13:54	999	715	301	289	281	264	251	0	6.2	7.8	24	2779	2386	1698	448	455	1923	345	5165
8	13:55	997	715	300	289	280	264	251	0	6.2	7.7	25	2775	2386	1695	449	457	1923	359	5161
9	13:56	1002	715	301	289	281	264	251	0	6.3	7.4	25	2779	2374	1638	447	461	1951	365	5152
0	13:57	1000	716	301	290	281	264	251	0	6.3	7.5	25	2787	2399	1651	443	462	1953	358	5186
1	13:58	999	715	301	289	280	264	251	0	6.2	7.9	24	2787	2474	1639	445	466	1926	354	5261
2	13:59	1001	716	300	289	280	264	251	0	6.3	7.8	25	2777	2400	1625	441	467	1921	360	5177
3	14:00	1001	716	300	289	280	264	251	0	6.3	7.8	26	2784	2413	1640	445	466	1909	358	5197
4	14:01	1001	716	301	290	281	264	251	0	6.2	7.8	25	2760	2400	1615	435	464	1903	360	5160
5	14:02	999	716	301	290	281	264	251	0	6.2	7.8	26	2763	2413	1608	441	465	1904	365	5176
6	14:03	1000	716	301	289	281	264	251	0	6.2	7.9	24	2773	2388	1528	348	470	1897	359	5174
7	14:04	999	716	300	289	281	264	251	0	6.3	8.3	25	2768	2350	1797	443	468	1904	359	5118
	14:05	999	715	301	290	281	264	251	0	6.3	8.3	24	2772	2350	1838	439	470	1904	362	5122
	14:06	1007	717	302	290	281	264	251	0	6.3	8.4	24	2765	2337	1834	451	473	1910	365	5102
	14:07	999	717	301	289	281	264	252	0	6.3	7.9	24	2755	2438	1833	424	470	1908	358	5192
	14:08	1000	716	300	289	280	264	251	0	6.0	8.3	25	2744	2425	1870	438	458	1891	362	5169
	14:09	998	716	301	290	281	264	251	0	6.1	8.2	25	2768	2375	1824	438	456	1904	357	5144
	14:10	998	715	302	290	281	264	251	0	6.2	8.3	25	2772	2450	1851	436	455	1901	363	5202
	14:11	1000	715	300	289	280	264	251	0	6.3	8.4	24	2765	2350	1880	441	455	1899	365	5115
	14:12	1001	717	301	289	280	264	251	170	6.3	8.3	35	2767	2375	1960	443	459	1894	360	5130
	14:13	1003	719	302	290	281	263	251	167	6.3	8.2	34	2768	2388	1290	440	457	1891	357	5156
	14:14	1000	720	302	289	281	263	251	168	6.1	8.1	36	2756	2337	1130	432	451	1881	356	5093
	14:15	1000	720	300	288	280	263	251	161	6.1	8.2	37	2756	2324	1025	436	454	1901	369	5081
	14:16	999	720	300	288	280	262	250	171	6.1	8.2	40	2758	2350	1016	436	452	1889	359	5108
	14:17	1000	721	301	290	280	262	250	167	6.1	8.2	42	2753	2413	1044	444	455	1892	357	5166
	14:18	1001	721	302	290	281	262	250	161	6.1	8.2	41	2753	2363	1037	443	460	1895	356	5116
	14:19	1001	721	301	289	280	262	250	169	6.0	8.0	42	2786	2352	1034	433	460	1901	358	5137
	14:20	1000	722	300	289	280	262	250	169	6.0	8.1	39	2784	2415	1103	435	463	1909	360	5199
	14:21	998	722	301	290	281	262	250	167	6.1	8.0	43	2779	2324	1032	437	464	1935	357	5113
	14:22	1000	722	301	290	281	261	250	167	6.0	8.3	43	2777	2364	1075	443	469	1935	350	5141
	14:23	1002	723	301	290	281	261	250	160	6.1	8.2	46	2775	2451	967	441	470	1941	350	5227

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 23, 1991.
Calcium Injector Type is I

3) Calcium Sorbent Type is Wulfrasorp.
4) SO2 Traverse

n #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	14:24	997	722	301	290	281	261	250	171	6.1	8.1	44	2781	2425	991	428	466	1924	347	5206
8	14:25	996	721	301	290	281	261	250	165	6.1	8.3	45	2781	2450	980	439	460	1910	353	5230
9	14:26	1000	721	301	291	281	261	250	167	6.3	7.9	49	2782	2400	897	442	459	1908	354	5183
0	14:27	1000	722	301	290	281	261	250	163	6.4	7.8	46	2789	2390	547	441	459	1886	346	5179
1	14:28	1001	723	301	290	281	261	250	166	6.3	7.7	46	2770	2451	529	438	461	1876	345	5222
2	14:29	1002	722	301	290	281	261	250	170	6.3	7.9	44	2772	2415	570	443	459	1876	345	5187
3	14:30	1006	724	301	290	281	261	250	163	6.3	7.4	46	2770	2364	532	439	456	1864	360	5123
4	14:31	996	722	301	290	281	261	250	166	6.1	7.9	45	2767	2402	531	436	450	1869	356	5169
5	14:32	999	722	301	290	281	261	250	170	6.0	7.6	46	2765	2402	598	456	455	1864	359	5167
6	14:33	999	722	301	291	281	261	250	164	6.4	7.5	48	2774	2390	610	457	463	1909	352	5163
7	14:34	998	722	302	290	281	262	250	165	6.3	7.4	48	2757	2402	595	432	457	1869	348	5159
8	14:35	1001	722	301	290	281	262	250	170	6.2	7.9	50	2770	2415	481	452	469	1895	347	5176
9	14:36	1003	723	300	290	281	262	249	166	6.3	7.7	53	2771	2427	441	442	468	1902	351	5197
0	14:37	1000	722	302	291	281	262	250	164	6.3	7.8	51	2767	2377	418	447	470	1897	345	5149
1	14:38	999	721	302	291	281	262	250	164	6.3	8.1	52	2779	2402	399	463	473	1893	340	5181
2	14:39	1000	722	301	290	281	262	249	171	6.5	7.5	52	2769	2402	482	453	484	1903	349	5171
3	14:40	1001	722	301	290	281	262	249	168	6.4	7.5	53	2764	2415	585	449	477	1892	343	5178
4	14:41	1000	722	302	291	281	262	249	165	6.3	7.6	49	2771	2402	569	452	472	1898	347	5173
5	14:42	1001	722	302	291	281	262	250	162	6.2	7.4	51	2767	2390	546	443	469	1890	349	5156
6	14:43	999	716	302	291	281	262	250	158	6.3	7.5	53	2763	2427	585	441	471	1869	359	5190
7	14:44	1001	714	301	291	281	262	249	158	6.4	19.9	52	2771	2451	2524	36	469	1890	358	5211
8	14:45	1004	719	302	291	281	262	250	174	6.4	20.3	52	2762	2377	1999	30	468	1886	353	5139
9	14:46	997	720	302	291	281	262	250	164	6.4	20.4	52	2774	2427	2005	36	470	1897	354	5194
0	14:47	998	720	301	290	281	261	249	166	6.1	20.4	51	2781	2339	1862	36	464	1862	356	5120
1	14:48	1000	721	302	291	281	261	249	168	6.3	8.7	53	2779	2415	562	492	462	1899	360	5197
2	14:49	1001	721	302	291	282	261	249	169	6.2	7.5	52	2764	2451	855	448	462	1881	349	5215
3	14:50	1002	722	302	291	281	261	249	168	6.2	7.2	52	2777	2451	1282	440	464	1891	348	5229
4	14:51	999	721	301	291	281	262	250	167	6.2	7.4	53	2774	2390	866	444	468	1895	342	5163
5	14:52	999	722	301	291	281	262	249	163	6.1	7.6	51	2769	2377	821	455	464	1881	339	5146
6	14:53	998	721	301	291	281	262	249	162	6.1	7.5	57	2776	2439	796	446	464	1875	336	5215
7	14:54	1000	722	302	291	282	262	249	169	6.3	7.5	52	2786	2377	818	441	470	1892	342	5163
8	14:55	1001	723	302	291	282	262	249	169	6.3	7.4	57	2776	2352	854	447	472	1898	336	5127
9	14:56	1001	724	300	290	281	261	249	169	6.2	7.4	56	2776	2500	829	449	466	1897	340	5276
0	14:57	1000	724	301	291	282	261	249	169	6.2	7.4	57	2784	2390	823	443	470	1918	340	5185
1	14:58	1001	724	302	291	282	261	250	169	6.2	7.1	54	2784	2364	944	436	469	1926	342	5148
2	14:59	996	724	301	290	282	261	250	169	6.1	7.0	55	2779	2427	992	428	467	1912	341	5206
3	15:00	994	723	300	289	281	261	249	169	5.9	7.0	54	2788	2427	999	437	459	1889	341	5215
4	15:01	997	723	301	290	282	261	249	169	6.0	7.3	53	2765	2464	1020	440	460	1898	336	5229
5	15:02	997	723	301	290	282	261	250	169	6.1	7.4	59	2782	2326	1036	449	460	1909	335	5106
6	15:03	1001	724	301	290	282	261	250	169	6.2	13.7	52	2775	2427	1783	25	460	1926	331	5202
7	15:04	1000	724	300	290	282	261	250	169	6.0	20.1	55	2772	2415	2842	22	457	1911	324	5187
8	15:05	1000	723	301	290	282	261	249	160	6.1	17.7	58	2772	2364	420	1667	460	1934	337	5137
9	15:06	999	723	300	291	282	261	249	173	6.2	8.0	55	2776	2439	317	435	462	1935	336	5215
0	15:07	998	723	301	291	283	261	250	168	6.1	7.9	56	2770	2427	376	450	463	1911	325	5197
1	15:08	997	723	301	291	282	261	250	169	6.2	7.3	57	2770	2427	387	438	460	1902	325	5197
2	15:09	998	722	299	291	282	261	250	154	6.1	7.3	57	2779	2390	372	448	460	1886	327	5168
3	15:10	1000	723	299	291	282	261	250	173	6.1	7.3	57	2777	2427	315	440	464	1888	327	5204
4	15:11	999	723	299	291	282	261	250	175	6.1	7.2	58	2777	2352	290	426	467	1900	324	5129

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
' All data on this sheet were taken on OCT 23, 1991.
Calcium Injector Type is I

3) Calcium Sorbent Type is Wulfrasorp.
4) SO2 Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15	15:12	995	722	299	291	282	261	250	166	5.9	7.6	59	2784	2415	277	444	464	1908	320	5199
16	15:13	997	722	299	291	282	261	250	166	6.0	7.5	57	2784	2364	255	431	457	1929	323	5148
17	15:14	996	722	299	291	282	261	250	165	6.1	7.5	59	2758	2326	236	423	469	1922	323	5084
18	15:15	996	721	299	291	282	262	250	175	5.9	7.8	58	2789	2441	219	443	466	1907	323	5150
19	15:16	997	721	300	291	282	262	250	169	6.2	7.3	57	2796	2379	193	422	466	1923	319	5175
20	15:17	997	721	299	291	282	261	249	173	6.1	7.5	58	2781	2366	183	437	463	1900	311	5147
21	15:18	996	721	300	292	282	261	250	167	6.1	7.3	58	2772	2366	176	422	468	1913	318	5139
22	15:19	993	721	300	291	282	261	250	170	6.0	7.3	56	2772	2453	192	428	461	1917	317	5225
23	15:20	996	720	300	291	282	261	250	164	6.1	7.2	59	2772	2429	205	422	461	1933	318	5201
24	15:21	995	720	299	291	282	262	250	162	6.1	7.1	58	2767	2366	208	415	455	1933	317	5133
25	15:22	994	720	299	291	282	262	250	170	6.1	7.2	56	2762	2404	213	418	451	1935	323	5165
26	15:23	997	720	300	292	282	262	250	166	6.1	7.3	58	2767	2404	218	424	448	1938	322	5171
27	15:24	998	721	300	292	282	262	250	173	6.1	7.1	57	2767	2404	227	374	448	1924	316	5149
28	15:25	995	722	300	292	282	262	250	167	6.0	7.9	58	2765	2393	821	409	449	1913	314	5158
29	15:26	996	722	299	291	282	262	250	165	5.9	8.0	57	2770	2430	930	422	444	1925	314	5201
30	15:27	996	723	299	292	282	262	250	169	6.0	8.0	57	2760	2368	923	419	444	1931	314	5128
31	15:28	994	723	300	293	282	262	250	170	6.0	7.8	60	2763	2366	967	414	451	1927	311	5129
32	15:29	994	723	301	293	282	262	250	161	5.9	8.1	60	2763	2443	997	431	450	1921	305	5206
33	15:30	995	723	300	292	282	262	250	167	6.0	8.1	60	2763	2430	1109	435	457	1929	305	5194
34	15:31	995	723	299	292	281	262	249	172	6.1	8.1	63	2767	2432	1036	428	464	1941	307	5199
35	15:32	999	724	300	293	281	262	249	159	6.1	8.1	62	2755	2396	993	422	464	1947	306	5151
36	15:33	998	725	301	293	281	262	249	166	6.1	7.8	61	2774	2409	985	404	461	1944	299	5177
37	15:34	995	724	300	293	281	262	250	170	5.9	7.9	58	2750	2409	1020	409	449	1927	305	5158
38	15:35	997	725	300	292	281	261	250	172	5.8	7.8	62	2770	2420	967	403	440	1930	307	5190
39	15:36	995	725	301	293	281	262	250	165	5.8	7.7	57	2763	2369	982	396	435	1930	307	5133
40	15:37	997	726	301	293	281	262	250	163	5.6	7.8	61	2770	2418	985	404	426	1916	304	5186
41	15:38	997	726	301	292	281	261	250	176	5.8	7.8	55	2769	2368	1041	404	429	1944	300	5159
42	15:39	995	726	301	293	281	262	250	167	5.8	7.7	50	2775	2393	1101	396	429	1933	299	5168
43	15:40	996	726	301	293	281	262	250	167	5.8	8.0	56	2784	2355	1320	407	429	1931	299	5163
44	15:41	998	726	302	294	282	262	250	161	5.9	7.8	50	2782	2453	1094	403	433	1927	294	5236
45	15:42	997	726	302	293	282	262	250	169	5.9	7.8	60	2775	2353	1315	402	436	1925	294	5129
46	15:43	1000	727	302	293	282	262	250	177	5.9	7.8	57	2794	2439	1019	402	432	1939	298	5233
47	15:44	999	728	302	293	282	262	250	180	5.8	7.7	61	2779	2439	979	397	426	1930	294	5218
48	15:45	999	728	302	293	282	262	250	180	5.7	7.9	56	2769	2390	998	409	431	1937	291	5158
49	15:46	998	727	302	293	282	262	250	167	5.7	7.7	57	2770	2388	1071	392	433	1934	289	5159
50	15:47	1002	728	302	293	282	262	250	162	5.8	7.7	60	2791	2375	999	396	434	1937	292	5166
51	15:48	1000	728	302	293	282	262	250	177	5.7	7.7	59	2765	2427	1003	389	433	1916	289	5192
52	15:49	1001	728	302	292	282	262	250	170	5.7	7.6	61	2784	2476	984	384	430	1929	293	5133
53	15:50	999	722	302	292	282	262	250	170	5.7	7.6	62	2786	2364	985	384	426	1945	293	5150
54	15:51	1000	723	302	292	282	262	250	164	5.6	7.8	63	2789	2462	1004	384	418	1927	292	5227
55	15:52	1000	725	302	292	282	262	250	170	5.6	7.7	58	2789	2388	1002	386	421	1977	291	5177
56	15:53	1000	727	303	292	283	262	250	175	5.7	7.6	61	2786	2450	981	378	423	1988	289	5235
57	15:54	1000	728	303	292	283	262	250	205	5.6	7.7	65	2772	2450	953	365	414	1988	288	5222
58	15:55	1003	730	302	291	282	262	250	0	5.6	7.5	67	2781	2413	868	369	412	1963	286	5193
59	15:56	997	729	301	291	282	262	250	0	5.6	7.3	66	2763	2400	861	362	407	1947	284	5164
60	15:57	999	730	301	292	282	262	250	0	5.6	7.9	63	2770	2337	796	406	401	1961	288	5107
	15:58	1001	731	302	292	283	262	250	0	5.8	7.8	62	2767	2425	793	404	409	1964	281	5192
	15:59	1003	733	302	292	283	262	250	0	5.9	7.8	64	2767	2375	783	406	427	1961	274	5142

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

IOTE:
) All data on this sheet were taken on OCT 23, 1991.
Calcium Injector Type is I

3) Calcium Sorbent Type is Wulfrasorp.
4) SO2 Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
93	16:00	1003	734	301	291	282	262	250	0	5.9	7.6	56	2779	2400	785	394	437	1948	277	5150
94	16:01	1004	732	300	290	282	261	250	0	5.7	7.7	49	2774	2400	1268	397	431	1925	274	5174
95	16:02	1006	732	301	291	282	261	249	0	5.7	8.7	50	2755	2390	1698	330	432	1942	273	5139
96	16:03	961	719	301	291	282	261	249	0	6.1	9.5	49	2757	2464	1658	320	409	1957	268	5220
97	16:04	938	706	301	290	282	261	249	0	3.0	12.0	45	2750	2451	1669	346	277	1526	240	5201
98	16:05	916	692	300	289	280	261	248	0	3.9	13.0	51	2725	2451	1450	272	258	1357	379	5177
99	16:06	888	677	300	289	280	260	248	0	4.7	15.1	78	2798	2490	1367	253	211	1107	–	5268
00	16:07	856	659	302	290	281	260	248	0	5.7	16.8	90	2783	2465	1183	223	155	887	–	5248
01	16:08	832	642	302	289	281	259	247	0	6.4	17.8	88	2781	2355	993	167	107	664	–	5136
02	16:09	770	616	299	287	279	259	247	0	6.8	18.0	92	2790	2405	716	130	69	461	–	5147
03	16:10	719	588	299	286	278	259	246	0	7.2	19.1	92	2797	2395	855	99	42	333	–	5192
04	16:11	681	562	298	286	278	258	246	0	7.6	19.7	75	2780	2382	1059	90	22	254	–	5156
05	16:12	649	538	298	285	277	257	246	0	7.8	19.9	74	2787	2357	1110	72	10	199	675	5143
06	16:13	623	519	297	284	276	257	246	0	8.0	20.0	67	2766	2382	1154	60	4	168	665	5165

OCT. 24, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1 All data on this sheet were taken on OCT 24, 1991.
2 Calcium Injector Type is Mod I
3) Calcium Sorbent Type is Wulfrasorp.
4) Injector Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	13:39	987	742	300	293	285	256	252	0	6.0	8.4	71	2627	2438	803	410	410	1899	238	5266
2	13:40	999	743	302	294	286	256	253	0	6.6	8.8	68	2655	2464	821	447	418	1949	239	5319
3	13:41	1004	746	303	295	286	256	253	0	7.1	7.8	75	2636	2450	711	396	440	1931	235	5286
4	13:42	997	746	301	294	286	256	253	0	6.3	7.4	87	2632	2462	737	371	430	1800	226	5295
5	13:43	987	741	300	292	285	256	253	0	5.9	8.1	64	2632	2438	769	397	409	1828	234	5271
6	13:44	983	737	300	293	285	256	253	0	6.3	8.7	54	2641	2477	929	436	414	1898	238	5318
7	13:45	987	736	302	294	286	256	253	0	6.8	9.0	49	2606	2451	1015	462	435	1861	227	5261
8	13:46	999	738	302	293	285	256	253	0	7.2	8.3	48	2794	2400	1034	432	461	1888	234	5193
9	13:47	989	735	301	292	285	256	252	0	6.6	7.8	47	2772	2502	1097	396	452	1791	229	5288
0	13:48	987	733	300	292	284	256	252	0	6.3	8.7	42	2640	2438	1190	431	444	1853	242	5278
1	13:49	1003	737	302	293	285	256	252	0	6.5	8.7	45	2813	2360	1219	456	451	1911	244	5174
2	13:50	1004	740	302	293	285	256	253	0	6.8	7.5	44	2620	2464	1204	397	458	1861	235	5284
3	13:51	990	737	301	291	284	256	253	0	6.0	7.5	42	2657	2374	1250	395	446	1792	232	5231
4	13:52	983	734	300	291	284	256	252	0	5.9	8.4	42	2650	2451	1359	431	434	1874	239	5301
5	13:53	985	732	301	291	284	256	252	0	6.6	8.8	44	2678	2438	1414	457	452	1944	238	5316
6	13:54	997	736	302	292	284	256	252	0	7.1	8.4	66	2626	2413	1400	440	471	1946	235	5238
7	13:55	986	734	301	290	284	256	252	0	6.6	7.8	41	2619	2374	1401	399	463	1860	227	5192
8	13:56	987	731	300	290	283	256	252	0	6.2	8.8	79	2622	2539	1500	441	446	1851	234	5318
9	13:57	1003	736	302	291	283	255	252	0	6.9	8.6	38	2788	2464	1493	457	456	1920	238	5252
0	13:58	1005	739	302	291	284	255	252	0	6.8	7.4	39	2612	2438	1447	387	458	1884	234	5167
1	13:59	993	737	301	290	283	255	252	0	5.8	7.1	37	2620	2451	1471	368	437	1810	231	5272
2	14:00	979	733	300	289	282	255	252	0	5.5	7.8	49	2638	2451	1542	378	411	1916	235	5289
3	14:01	976	728	300	290	283	255	252	0	6.0	8.7	38	2640	2400	1629	431	411	1960	239	5239
4	14:02	981	728	302	291	283	255	252	0	7.0	9.0	63	2654	2502	1655	453	432	2004	245	5355
5	14:03	995	733	302	292	283	255	252	0	7.3	8.8	38	2645	2491	1618	0	451	1932	242	5336
6	14:04	986	732	301	290	283	255	252	0	6.7	8.8	34	2645	2438	1612	0	446	1815	232	5283
7	14:05	994	733	300	290	282	255	252	0	6.3	8.8	36	2617	2440	1593	1	443	1853	243	5257
8	14:06	1003	737	301	291	283	255	252	0	6.6	8.8	39	2613	2453	1593	1	439	1898	240	5266
9	14:07	990	734	301	290	283	255	252	0	5.9	8.8	36	2615	2427	1592	0	424	1820	232	5263
0	14:08	1000	735	301	290	282	255	252	0	6.0	8.6	36	2615	2453	1365	431	422	1908	240	5268
	14:09	998	737	300	289	282	255	251	0	6.4	7.6	33	2797	2440	1507	401	431	1936	237	5247
2	14:10	995	735	301	289	282	254	251	0	6.0	8.1	35	2659	2466	1600	407	430	1896	228	5325
3	14:11	1010	739	302	290	282	255	252	0	6.3	8.2	36	2654	2478	1625	436	436	1938	230	5332
	14:12	1005	740	302	290	283	255	252	0	6.2	7.0	61	2652	2414	1552	367	433	1908	224	5266
	14:13	995	737	300	289	282	255	252	0	5.4	7.2	34	2631	2440	1585	370	416	1863	225	5271
	14:14	987	733	299	288	281	255	251	0	5.3	7.7	70	2631	2427	1622	392	403	1913	227	5259
	14:15	984	730	301	289	281	255	251	0	5.9	8.4	33	2636	2440	1684	427	420	1945	224	5277
	14:16	995	731	302	291	282	255	251	0	6.5	8.6	33	2640	2414	1695	448	439	1934	229	5254
	14:17	1005	735	302	290	282	254	251	0	6.8	7.5	32	2608	2453	1598	401	461	1897	226	5261
	14:18	1000	736	301	289	282	255	251	0	5.8	7.0	53	2621	2362	1606	370	437	1759	220	5183
	14:19	988	733	300	288	281	254	251	0	5.3	7.5	34	2615	2478	1656	379	416	1823	225	5294
	14:20	984	731	301	289	281	254	251	0	5.6	8.2	34	2629	2427	1703	423	412	1901	227	5257
	14:21	985	730	302	290	281	254	251	0	6.4	8.6	33	2647	2516	1735	442	432	1933	228	5320
	14:22	1002	734	303	290	282	254	251	0	6.8	8.4	30	2792	2440	1701	448	451	1906	226	5232
	14:23	991	733	301	289	281	254	251	0	6.5	7.4	33	2642	2455	1632	394	446	1827	219	5269
	14:24	998	734	301	289	281	254	251	0	6.0	8.4	31	2642	2457	1724	432	440	1831	225	5309
	14:25	1007	738	302	290	281	254	251	0	6.5	7.6	31	2640	2442	1642	408	440	1886	234	5282
	14:26	1004	741	302	290	281	254	251	169	5.8	7.0	52	2654	2455	1580	370	422	1790	220	5309

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 24, 1991.
Calcium Injector Type is Mod I

3) Calcium Sorbent Type is Wulfrasorp.
4) Injector Traverse

n #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	14:27	990	739	301	289	281	264	251	171	5.3	7.0	60	2635	2442	1411	370	405	1829	224	5277
0	14:28	983	735	301	289	280	263	250	165	5.3	8.0	60	2642	2455	1420	404	396	1898	229	5297
1	14:29	984	733	302	290	281	263	250	161	6.2	8.5	61	2656	2467	1428	433	413	1960	234	5323
2	14:30	999	737	303	291	281	263	251	174	6.8	8.4	66	2656	2390	1325	447	434	1937	230	5215
3	14:31	1006	741	302	290	281	263	251	160	6.7	7.1	65	2658	2456	1195	360	445	1878	223	5314
4	14:32	1003	742	301	289	280	263	250	175	5.4	6.7	66	2631	2493	1166	355	420	1747	219	5265
5	14:33	995	741	300	289	280	263	250	164	4.8	6.8	65	2636	2455	1157	361	394	1833	225	5293
6	14:34	982	737	301	289	280	263	250	168	4.7	7.3	68	2617	2444	1156	371	382	1905	224	5271
7	14:35	979	734	301	290	280	263	250	167	5.4	8.2	64	2624	2494	1190	424	400	1975	223	5319
8	14:36	985	734	302	291	281	263	250	166	6.2	8.5	77	2606	2519	1175	448	427	1976	222	5328
9	14:37	1002	739	303	292	281	263	250	169	6.7	8.3	69	2612	2456	1125	450	455	1937	221	5268
0	14:38	1001	743	303	291	281	263	251	168	6.5	7.0	72	2654	2418	1035	376	462	1882	214	5272
1	14:39	986	739	301	289	281	263	250	172	5.3	7.2	72	2651	2456	1043	366	433	1801	213	5307
2	14:40	998	741	301	291	281	263	250	161	5.5	8.0	64	2642	2456	1067	418	417	1931	227	5298
3	14:41	993	742	301	290	281	263	250	176	5.8	6.9	69	2642	2431	995	364	417	1941	220	5263
4	14:42	994	741	301	291	281	263	251	161	5.2	7.8	70	2642	2494	1036	398	409	1902	213	5336
5	14:43	1004	746	302	291	281	263	250	171	5.7	7.5	73	2623	2494	987	406	413	1948	221	5347
6	14:44	999	745	302	291	281	263	251	161	5.4	7.1	73	2656	2494	969	389	410	1884	208	5350
7	14:45	1002	747	301	291	281	263	251	168	5.3	7.4	72	2628	2418	974	414	421	1919	219	5245
8	14:46	989	744	301	291	281	263	250	174	5.4	7.2	75	2642	2392	956	397	428	1932	212	5234
9	14:47	991	742	301	291	281	263	251	159	5.5	8.0	72	2622	2392	981	432	432	1954	213	5214
0	14:48	1006	745	303	293	282	263	251	177	6.1	7.8	90	2621	2494	951	444	441	1970	212	5315
1	14:49	1008	749	303	292	282	264	251	174	6.0	6.8	75	2640	2494	896	395	447	1910	202	5334
2	14:50	1002	749	301	291	282	264	251	176	4.9	6.7	91	2642	2380	869	382	431	1828	195	5216
3	14:51	990	746	300	291	281	264	251	172	4.7	7.3	71	2652	2469	917	403	415	1903	199	5321
4	14:52	990	743	300	291	281	264	251	163	5.2	7.9	72	2636	2456	938	436	422	1950	200	5270
5	14:53	998	744	301	292	282	264	251	165	5.9	8.0	51	2631	2392	934	448	442	1955	197	5223
6	14:54	1011	748	302	292	282	264	251	0	6.1	7.6	63	2633	2482	1036	441	455	1924	191	5315
7	14:55	1007	750	301	291	282	264	251	0	5.5	6.5	41	2635	2458	1109	374	450	1860	185	5293
8	14:56	996	748	300	290	282	264	251	0	4.5	6.6	38	2643	2445	1188	371	422	1859	187	5269
9	14:57	987	744	299	289	281	264	251	0	4.4	7.2	39	2621	2494	1267	396	405	1949	193	5315
0	14:58	984	740	300	290	282	264	251	0	5.0	7.7	38	2629	2392	1332	418	413	1993	193	5221
1	14:59	992	740	301	290	282	264	251	0	5.8	8.1	38	2631	2471	1368	448	441	2005	190	5302
2	15:00	1007	744	302	291	283	264	251	0	6.1	7.6	37	2610	2469	1349	439	460	1945	189	5279
3	15:01	1008	747	301	290	282	264	252	0	5.5	6.4	36	2620	2418	1326	373	457	1838	180	5249
4	15:02	988	743	299	288	282	264	251	0	4.4	6.4	35	2636	2494	1379	358	429	1803	189	5331
5	15:03	986	739	299	288	281	264	251	0	4.5	7.5	35	2638	2405	1472	405	412	1936	192	5243
6	15:04	992	739	301	290	282	264	251	0	5.3	7.7	33	2638	2431	1488	435	429	2000	194	5269
7	15:05	1005	743	302	290	283	264	252	0	5.7	7.5	34	2640	2469	1488	431	451	1963	187	5309
8	15:06	1000	744	301	289	282	264	252	0	5.5	6.5	67	2627	2418	1459	363	457	1907	184	5245
9	15:07	995	742	299	288	281	264	251	0	4.7	7.3	34	2635	2456	1544	403	434	1899	187	5291
0	15:08	1004	743	300	289	282	264	251	0	5.1	7.4	81	2614	2456	1547	423	426	1974	193	5270
1	15:09	992	741	301	289	282	264	251	0	5.3	6.6	30	2633	2494	1517	378	435	1959	187	5327
2	15:10	995	741	301	289	282	264	252	0	4.9	7.4	34	2641	2444	1595	410	427	1928	186	5280
3	15:11	1003	743	301	289	282	264	252	0	5.2	7.2	34	2629	2456	1580	405	429	1951	188	5286
4	15:12	994	742	301	289	282	264	251	0	5.0	6.4	50	2650	2431	1622	95	429	1912	180	5281
5	15:13	1002	743	301	289	282	264	251	0	4.8	6.9	38	2614	2507	–	–	416	1923	186	5320
6	15:14	995	742	301	288	282	264	251	0	5.1	0.4	33	2647	2469	–	–	421	1953	179	5316

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1) All data on this sheet were taken on OCT 24, 1991.
2) Calcium Injector Type is Mod I
3) Calcium Sorbent Type is Wulfrasorp.
4) Injector Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
07	15:15	998	743	300	269	262	264	251	0	4.7	0.1	32	2631	2392	–	–	412	1956	180	5223
08	15:16	991	741	301	269	262	264	251	0	4.7	3.7	32	2629	2444	–	–	410	1978	183	5273
09	15:17	1002	742	301	269	262	264	251	0	4.8	3.8	32	2629	2392	–	–	408	2012	187	5221
10	15:18	1002	743	300	269	262	264	251	0	5.2	3.8	33	2626	2617	–	–	425	2024	184	5443
11	15:19	993	741	300	268	262	264	251	0	4.7	3.8	33	2631	2431	–	–	417	1961	180	5262
12	15:20	991	739	301	269	262	264	251	0	5.1	3.8	32	2619	2494	–	–	415	2004	187	5313
13	15:21	997	740	302	269	262	264	251	0	5.9	15.8	34	2666	2492	–	–	438	2026	186	5348
14	15:22	1011	744	302	290	262	264	251	0	6.1	18.4	35	2670	2444	–	–	456	1981	180	5283
15	15:23	996	743	301	269	262	264	251	0	5.7	3.7	35	2656	2534	–	–	456	1922	178	5369
16	15:24	985	739	300	268	261	264	251	0	4.8	3.8	68	2663	2484	–	–	424	1919	180	5346
17	15:25	990	737	301	269	261	264	251	0	5.3	20.0	33	2624	2445	–	–	426	2009	187	5269
18	15:26	999	736	302	290	262	264	251	0	5.9	14.1	74	2626	2458	–	–	445	2000	178	5284
19	15:27	1007	741	302	290	262	264	251	0	6.0	7.9	31	2615	2445	1541	420	464	1949	172	5261
20	15:28	995	741	301	268	261	264	251	0	5.5	7.2	33	2615	2458	1550	371	453	1885	170	5273
21	15:29	984	736	300	268	260	264	251	0	5.0	8.1	29	2624	2445	1656	420	424	1935	174	5269
22	15:30	989	735	301	269	261	264	251	0	5.5	8.7	46	2635	2445	1737	456	424	2000	179	5280
23	15:31	999	737	303	291	261	264	251	0	6.2	8.5	32	2659	2458	1744	460	451	2006	177	5292
24	15:32	1000	739	302	290	262	264	251	0	6.2	7.6	33	2657	2458	1708	410	457	1959	174	5316
25	15:33	989	737	300	268	261	264	251	0	5.5	8.2	32	2642	2432	1803	421	445	1890	171	5288
26	15:34	990	736	301	269	261	264	251	0	5.6	8.7	32	2647	2473	1866	462	435	1978	179	5320
27	15:35	998	737	301	290	261	264	251	0	6.2	8.6	32	2617	2434	1864	466	448	2020	180	5251
28	15:36	997	738	302	290	261	264	251	0	6.3	8.3	30	2626	2434	1850	456	461	1981	177	5260
29	15:37	995	738	302	290	261	264	251	0	6.1	8.7	31	2628	2434	1912	467	468	1951	173	5262
30	15:38	1003	741	302	290	261	264	251	0	6.2	8.5	31	2625	2360	1895	472	466	1956	178	5206
31	15:39	993	739	301	290	261	264	251	0	6.2	7.8	31	2631	2458	1867	415	468	1943	174	5269
32	15:40	991	738	302	290	261	264	251	135	5.6	8.5	45	2657	2445	1942	453	447	1960	177	5303
33	15:41	998	740	303	291	262	264	251	135	6.0	8.6	54	2664	2469	1812	472	453	2006	178	5334
34	15:42	1011	745	304	292	262	264	251	139	6.2	8.2	83	2645	2471	1650	454	463	1979	175	5286
35	15:43	1004	747	303	291	262	264	251	267	5.9	7.3	64	2659	2456	1607	388	462	1918	171	5316
36	15:44	993	745	302	291	262	264	251	262	5.0	7.6	89	2661	2456	1459	393	431	1885	176	5310
37	15:45	987	743	302	291	262	264	251	266	5.2	8.4	70	2619	2458	1455	440	422	2011	180	5277
38	15:46	993	743	302	292	262	264	251	268	5.8	8.9	74	2610	2458	1420	474	437	2035	178	5284
39	15:47	1002	746	303	293	263	264	251	259	6.4	8.7	76	2615	2456	1337	474	465	2000	178	5272
40	15:48	1006	748	303	293	263	264	251	262	6.5	8.5	91	2621	2444	1275	466	464	1946	177	5264
41	15:49	1015	753	303	293	263	264	251	264	6.3	8.1	78	2633	2456	1211	448	464	1909	177	5269
42	15:50	1009	755	302	292	263	264	251	267	5.9	7.0	79	2606	2456	1095	366	471	1880	174	5265
43	15:51	989	750	301	291	263	265	251	263	5.0	7.3	81	2610	2444	1108	366	436	1866	181	5254
44	15:52	989	747	302	292	263	265	251	264	5.0	8.5	82	2654	2444	1166	430	410	1970	187	5298
45	15:53	1000	750	303	294	264	265	252	257	5.8	8.6	79	2645	2444	1137	461	426	2047	183	5308
46	15:54	1004	754	303	294	264	265	252	268	6.2	7.8	76	2641	2456	1041	417	449	2024	177	5298
47	15:55	993	752	302	293	264	265	252	266	5.6	8.0	82	2654	2444	1045	416	445	1942	172	5319
48	15:56	997	752	301	293	264	265	252	268	5.5	8.5	84	2631	2418	1041	455	432	1961	176	5249
49	15:57	1006	755	302	294	264	265	252	260	6.0	8.4	82	2626	2544	1017	455	443	1985	175	5372
50	15:58	1010	758	302	294	264	265	252	259	6.1	7.6	84	2790	2494	954	402	455	1956	171	5285
51	15:59	1000	757	302	294	264	266	252	267	5.4	7.5	82	2604	2518	950	383	439	1878	169	5322
52	16:00	991	754	302	293	264	266	252	266	5.1	8.0	93	2650	2442	966	418	410	1938	180	5292
53	16:01	989	752	302	294	265	266	252	260	5.5	8.6	84	2631	2455	981	447	420	2002	178	5286
54	16:02	996	752	302	294	265	266	252	265	6.0	8.8	93	2638	2455	960	469	438	2007	177	5293

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

IOTE:
) All data on this sheet were taken on OCT 24, 1991.
) Calcium Injector Type is Mod I
3) Calcium Sorbent Type is Wulfrasorp.
4) Injector Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
45	16:03	1007	756	303	295	265	266	253	265	6.4	8.5	85	2627	2429	924	463	460	1965	175	5256
46	16:04	1016	761	303	295	266	266	253	262	6.3	8.1	84	2638	2403	894	435	468	1900	174	5250
47	16:05	1008	761	302	295	265	266	253	259	5.8	7.3	86	2625	2455	859	371	456	1871	172	5260
48	16:06	998	759	301	294	265	266	253	267	5.2	7.3	93	2618	2493	866	370	429	1934	177	5306
49	16:07	991	755	301	294	265	266	253	259	5.0	7.9	86	2657	2390	899	392	410	1968	180	5247
50	16:08	994	754	301	295	265	266	253	0	5.3	8.2	89	2629	2403	895	420	408	2029	180	5250
51	16:09	1001	756	303	296	266	266	253	0	5.7	8.3	89	2606	2390	882	439	429	2007	175	5196
52	16:10	1002	758	303	295	266	267	253	0	5.8	8.2	89	2625	2530	865	447	445	1992	172	5356
53	16:11	1001	758	302	295	266	267	253	0	5.8	8.3	89	2653	2364	867	448	456	1989	170	5217
54	16:12	995	757	301	295	266	267	253	0	5.9	8.3	89	2636	2403	848	448	469	1992	171	5239
55	16:13	997	756	301	295	266	267	253	0	5.9	8.9	89	2620	2403	860	465	467	1970	173	5223
56	16:14	1002	758	302	296	267	267	253	0	6.4	8.6	92	2606	2416	838	464	477	2011	178	5222
57	16:15	1003	759	302	296	267	267	254	0	6.4	8.6	91	2653	2427	830	456	477	2001	179	5261
58	16:16	1001	759	302	296	267	267	254	0	6.3	8.4	91	2604	2528	812	455	477	2005	180	5332
59	16:17	995	756	301	295	266	267	254	0	6.2	8.6	91	2623	2427	816	445	470	2004	180	5260
60	16:18	1000	758	301	295	267	268	254	0	6.3	8.5	93	2634	2440	817	449	471	2008	180	5274
61	16:19	1002	759	302	296	267	268	254	0	6.6	8.7	90	2632	2503	820	450	463	2008	188	5337
62	16:20	1000	759	302	296	267	268	254	0	6.8	8.6	93	2667	2414	818	445	462	2008	196	5281
63	16:21	1003	760	302	296	267	268	254	0	6.8	8.8	88	2793	2491	825	451	460	1994	198	5284
64	16:22	1000	759	302	296	267	268	254	0	6.7	8.6	85	2665	2453	815	437	451	1974	202	5318
65	16:23	997	756	301	295	267	268	254	0	6.6	8.5	70	2667	2368	940	440	454	1975	203	5255
66	16:24	998	754	300	294	266	268	254	0	6.6	8.9	86	2630	2503	1138	443	452	1980	203	5334
67	16:25	1003	754	301	295	266	268	254	0	6.7	8.8	60	2627	2503	1232	436	454	1989	208	5330
68	16:26	1002	754	301	295	266	268	254	0	6.7	8.5	63	2636	2401	1308	424	451	1993	207	5237
69	16:27	997	752	301	295	266	268	254	0	6.5	8.4	57	2622	2478	1366	418	449	2017	206	5300
70	16:28	995	751	301	295	266	268	254	0	6.4	8.8	55	2650	2413	1475	430	443	2060	202	5232
71	16:29	997	750	302	295	266	268	254	0	6.4	8.7	52	2665	2491	1502	436	443	2070	201	5356
72	16:30	1000	750	302	295	266	268	254	0	6.6	8.7	53	2629	2528	1558	430	453	2074	204	5373
73	16:31	998	750	301	294	266	268	254	0	6.6	8.8	48	2644	2414	1626	435	454	2048	204	5259
74	16:32	1012	753	301	294	266	267	254	0	6.7	8.9	48	2788	2527	1672	436	454	2062	205	5315
75	16:33	962	740	299	291	264	267	253	0	6.8	9.9	60	2611	2491	1810	366	454	2067	213	5302
76	16:34	932	723	298	290	263	267	252	0	6.9	13.0	59	2787	2401	2259	381	424	2011	256	5188
77	16:35	905	708	300	292	264	266	252	0	7.0	14.2	58	2624	2530	2415	313	345	1735	564	5354
78	16:36	880	700	302	293	265	266	252	0	7.1	15.4	79	2678	2364	2656	280	259	1352	–	5242
79	16:37	863	690	302	292	264	266	252	0	7.2	16.2	53	2675	2480	2807	286	174	989	–	5355
80	16:38	846	680	300	289	263	266	252	0	7.3	16.4	83	2647	.2467	2709	274	130	744	–	5314
81	16:39	829	670	299	289	262	265	251	0	7.4	17.0	66	2675	2493	2887	229	0	594	–	5357
82	16:40	812	659	300	289	262	265	251	0	7.5	17.8	62	2645	2494	3326	225	1	589	–	5340
83	16:41	797	648	301	290	262	265	251	0	7.6	18.0	87	2799	2519	3290	198	1	581	289	5319

OCT. 28, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

IOTE:
) All data on this sheet were taken on OCT 28, 1991.
) CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Varied
4) Calcium Sorbent Type is Wulfrasorp.
5) Injector Traverse

:h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
IO	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	11:12	907	666	302	277	268	251	236	0	6.7	9.4	26	2654	2463	1918	426	500	1899	260	5311
2	11:13	908	666	300	276	267	251	235	0	6.7	9.2	25	2654	2450	1929	416	503	1874	279	5304
3	11:14	902	665	301	277	267	251	235	0	6.5	9.3	26	2661	2562	1918	423	498	1840	273	5423
4	11:15	908	666	302	278	268	251	236	0	6.6	9.2	25	2631	2461	1957	425	504	1872	277	5291
5	11:16	910	667	302	277	267	251	236	0	6.7	9.2	25	2640	2487	1972	424	503	1873	281	5326
6	11:17	910	666	301	277	267	251	236	0	6.5	9.1	24	2625	2488	1984	419	498	1853	275	5314
7	11:18	907	667	301	277	268	251	236	0	6.4	9.1	25	2636	2435	1954	413	495	1850	278	5271
8	11:19	903	666	301	277	268	251	236	0	6.4	9.5	25	2643	2422	1983	416	490	1857	281	5265
9	11:20	905	666	302	278	268	251	236	0	6.6	9.4	26	2664	2474	1991	428	491	1877	285	5338
0	11:21	909	667	302	277	268	251	236	0	6.7	9.3	25	2648	2474	1997	424	493	1868	279	5290
1	11:22	904	666	301	277	268	252	236	0	6.6	9.3	26	2676	2474	2006	421	497	1847	277	5350
2	11:23	904	666	302	277	268	252	236	0	6.5	9.5	26	2657	2474	2033	424	501	1845	278	5331
3	11:24	902	665	302	278	268	252	236	0	6.6	9.5	27	2661	2474	2013	421	504	1852	279	5334
4	11:25	905	666	302	277	268	251	236	0	6.7	9.4	26	2643	2537	1978	425	508	1850	281	5360
5	11:26	905	666	300	276	267	251	236	0	6.8	9.4	26	2673	2435	1980	425	508	1841	281	5308
6	11:27	903	665	301	276	267	251	236	0	6.7	9.4	24	2627	2422	1958	402	511	1820	282	5249
7	11:28	903	664	301	277	268	251	236	0	6.8	9.6	25	2640	2409	1977	390	512	1831	291	5248
8	11:29	899	663	302	278	268	251	236	0	6.9	9.6	25	2666	2435	1994	398	499	1822	298	5301
9	11:30	903	663	301	277	268	251	236	0	7.0	9.6	28	2629	2487	1990	402	492	1810	303	5315
0	11:31	904	664	300	276	267	252	236	0	7.0	9.3	24	2640	2448	1966	386	491	1811	297	5287
1	11:32	909	665	301	277	268	252	236	0	6.8	9.2	28	2625	2499	2000	382	487	1795	298	5325
2	11:33	904	665	302	277	268	251	236	165	6.7	9.2	31	2622	2474	1894	373	475	1817	297	5295
3	11:34	904	666	302	277	268	251	236	180	6.6	9.4	34	2662	2474	1614	381	468	1832	307	5355
4	11:35	908	667	301	277	268	252	236	169	6.7	9.1	36	2664	2435	1453	395	465	1824	308	5281
5	11:36	911	669	301	277	267	252	236	172	6.7	8.9	33	2657	2395	1435	390	464	1800	300	5252
5	11:37	908	669	302	277	268	252	236	172	6.5	9.1	37	2668	2395	1394	385	467	1788	298	5263
7	11:38	908	669	302	277	268	252	236	166	6.5	9.2	43	2659	2472	1360	387	474	1833	300	5331
3	11:39	909	669	301	277	268	252	236	172	6.6	9.3	40	2631	2550	1363	373	472	1862	298	5380
)	11:40	905	668	301	277	267	251	236	163	6.7	9.2	38	2661	2448	1323	367	478	1873	295	5309
)	11:41	903	667	301	277	267	251	236	166	6.7	9.3	39	2659	2409	1282	375	474	1866	297	5268
l	11:42	908	668	301	277	268	252	236	175	6.8	9.3	41	2654	2435	1265	381	476	1853	301	5270
2	11:43	909	668	302	278	268	252	236	165	6.8	9.2	45	2676	2461	1244	376	475	1824	300	5337
3	11:44	909	669	302	277	268	252	236	171	6.7	9.1	44	2661	2461	1183	369	475	1802	294	5322
1	11:45	910	669	301	277	268	252	236	175	6.6	9.3	43	2648	2435	1242	378	478	1792	293	5283
5	11:46	906	668	301	277	267	252	235	165	6.6	9.4	42	2613	2474	1202	367	477	1793	299	5287
5	11:47	903	666	301	277	268	252	235	161	6.7	9.6	44	2629	2461	1199	369	480	1797	296	5290
'	11:48	903	666	302	277	268	252	236	177	6.9	9.5	43	2659	2474	1151	374	476	1791	303	5333
	11:49	900	665	301	277	268	252	236	169	7.0	9.4	47	2634	2448	1153	369	471	1775	305	5282
	11:50	898	664	301	276	268	252	235	164	7.0	9.6	48	2661	2435	1201	375	469	1761	305	5296
	11:51	896	663	301	277	268	252	235	170	7.1	9.5	49	2663	2512	1198	371	466	1767	311	5350
	11:52	899	663	302	277	268	251	235	166	7.1	9.5	49	2654	2499	1165	361	460	1766	309	5353
	11:53	904	664	302	277	268	252	236	169	7.1	9.3	46	2661	2433	1131	360	454	1760	306	5294
	11:54	921	668	301	277	268	251	235	167	7.0	9.4	50	2668	2422	1153	360	457	1752	300	5290
	11:55	937	673	301	277	268	252	235	170	6.8	9.2	43	2640	2395	1118	353	455	1758	304	5235
	11:56	949	679	301	278	268	252	235	170	6.7	9.1	51	2672	2420	1086	356	451	1759	311	5292
	11:57	960	686	302	279	269	252	236	173	6.6	9.3	50	2650	2420	1083	360	458	1778	314	5270
	11:58	967	690	302	279	269	252	236	168	6.7	9.2	50	2640	2446	1074	350	460	1788	320	5286
	11:59	974	695	301	278	269	252	236	159	6.7	9.2	52	2620	2510	1059	350	463	1793	314	5330

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
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CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Varied
4) Calcium Sorbent Type is Wulfrasorp.
5) Injector Traverse

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
12:00	978	699	301	278	269	252	236	167	6.7	9.2	48	2638	2433	1054	346	464	1792	313	5271
12:01	983	702	301	279	269	252	236	172	6.7	9.3	54	2662	2459	1051	346	464	1793	315	5322
12:02	989	706	302	279	269	252	236	169	6.8	9.4	51	2632	2459	1048	343	462	1800	314	5287
12:03	994	709	302	279	269	252	236	175	6.9	9.5	48	2638	2510	1024	349	460	1792	316	5348
12:04	999	713	301	279	270	252	236	162	7.0	9.3	51	2631	2433	1005	343	461	1782	317	5264
12:05	1005	717	301	279	270	252	236	175	6.9	9.4	57	2625	2459	977	349	454	1758	311	5284
12:06	1009	720	301	280	270	252	236	161	6.9	9.3	51	2640	2431	975	349	454	1763	315	5271
12:07	1013	723	302	280	270	252	236	171	6.8	9.4	52	2620	2470	959	347	452	1761	311	5290
12:08	1017	726	302	280	270	253	236	171	6.8	9.3	59	2666	2470	957	350	449	1761	310	5336
12:09	1020	729	301	280	270	253	236	159	6.8	9.3	57	2657	2457	968	352	449	1760	311	5314
12:10	1020	731	301	280	270	253	236	178	6.9	9.5	54	2678	2483	952	352	450	1768	315	5361
12:11	1025	733	302	281	270	253	237	173	6.9	9.5	56	2662	2508	945	355	454	1771	316	5371
12:12	1028	735	302	281	271	253	237	173	6.9	9.2	56	2632	2508	919	344	455	1757	316	5341
12:13	1030	736	301	280	270	253	237	173	6.9	9.3	48	2637	2470	934	352	459	1749	313	5318
12:14	1030	739	300	280	270	253	237	173	6.8	9.3	60	2634	2508	914	350	458	1751	317	5342
12:15	1034	741	301	281	271	253	237	165	6.8	9.3	52	2602	2431	915	353	462	1765	317	5269
12:16	1035	743	302	282	271	253	237	170	6.8	9.2	56	2629	2507	907	349	465	1767	307	5335
12:17	1036	745	301	281	271	254	237	169	6.8	9.4	55	2669	2417	943	356	470	1779	311	5286
12:18	1039	746	301	281	271	254	237	171	6.8	9.3	62	2636	2430	901	355	471	1786	316	5265
12:19	1023	744	301	281	271	254	237	168	6.8	9.6	51	2659	2532	925	344	472	1783	310	5390
12:20	1006	740	301	281	271	254	237	171	6.8	9.4	58	2655	2417	943	361	475	1775	312	5272
12:21	988	733	301	281	271	254	237	162	6.8	9.4	59	2659	2443	937	363	476	1770	306	5301
12:22	978	726	301	280	271	254	237	169	6.8	9.4	57	2671	2456	953	358	480	1766	306	5326
12:23	969	723	301	281	271	254	237	172	6.9	9.3	57	2660	2417	963	373	487	1766	306	5296
12:24	959	718	301	281	271	254	237	169	6.8	9.3	54	2643	2494	977	378	486	1756	303	5370
12:25	951	713	301	280	271	254	237	171	6.7	9.1	56	2632	2505	998	372	488	1753	301	5337
12:26	944	708	301	280	271	254	237	174	6.6	9.2	61	2655	2530	1005	366	472	1758	298	5378
12:27	938	704	301	280	271	254	237	175	6.6	9.2	58	2664	2492	1013	356	474	1773	305	5356
12:28	934	699	301	280	271	254	237	163	6.6	9.2	60	2637	2441	1030	355	471	1776	305	5278
12:29	932	696	301	280	271	254	237	169	6.6	9.1	54	2625	2441	1022	352	468	1768	305	5266
12:30	930	694	301	280	271	254	237	171	6.6	9.2	55	2622	2479	1057	347	464	1768	303	5301
12:31	926	691	301	280	271	254	237	160	6.5	9.2	56	2618	2454	1103	344	459	1770	305	5272
12:32	926	689	301	280	271	254	237	182	6.5	9.2	61	2636	2479	1111	350	457	1787	305	5315
12:33	927	688	301	280	271	254	237	160	6.5	9.3	63	2630	2479	1117	344	457	1812	307	5310
12:34	926	687	302	280	271	254	236	167	6.5	8.9	54	2618	2428	1104	361	480	1827	310	5246
12:35	925	685	301	280	271	254	237	174	6.3	8.9	60	2614	2490	1089	368	459	1821	300	5320
12:36	923	684	301	280	271	254	237	170	6.2	9.1	64	2653	2415	1124	378	479	1834	300	5269
12:37	923	683	302	280	271	254	237	170	6.2	9.2	61	2627	2415	1098	382	485	1830	301	5247
12:38	921	682	303	281	271	254	236	175	6.3	9.1	55	2632	2428	1106	378	488	1824	297	5260
12:39	919	680	302	280	271	254	236	169	6.4	9.3	56	2646	2505	1091	390	491	1819	293	5351
12:40	919	678	301	280	271	254	236	0	6.5	9.3	45	2643	2516	1451	367	469	1811	288	5358
12:41	919	676	301	280	271	254	236	0	6.7	9.3	41	2634	2479	1555	369	469	1800	294	5313
12:42	919	676	302	280	271	254	236	0	6.7	9.0	42	2625	2467	1597	363	478	1780	299	5291
12:43	920	675	303	280	271	254	236	0	6.6	8.9	44	2664	2479	1660	359	469	1771	299	5343
12:44	919	675	301	279	270	254	236	0	6.4	8.9	42	2674	2452	1686	367	465	1768	295	5326
12:45	919	674	301	279	270	254	236	0	6.3	9.1	41	2623	2441	1722	363	471	1779	293	5264
12:46	916	673	302	280	270	254	236	0	6.4	9.0	38	2662	2479	1761	353	469	1781	295	5314
12:47	917	672	302	280	271	254	236	0	6.4	9.0	37	2662	2492	1779	353	467	1773	294	5354

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#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	12:48	919	672	301	279	270	254	237	0	6.4	8.8	37	2885	2454	1791	358	467	1775	290	5349
8	12:49	918	672	300	279	270	254	237	0	6.3	8.8	38	2836	2492	1818	355	466	1777	289	5328
9	12:50	921	673	301	280	270	254	237	0	6.2	8.9	39	2859	2441	1860	354	474	1795	293	5299
0	12:51	921	674	301	280	270	253	237	0	6.2	9.0	36	2862	2479	1866	360	469	1813	295	5342
1	12:52	923	674	301	280	270	253	237	0	6.2	8.9	35	2852	2542	1875	354	469	1810	290	5394
2	12:53	925	675	301	280	270	253	237	0	6.2	8.7	35	2845	2467	1880	348	472	1805	285	5311
3	12:54	922	675	300	278	269	253	237	0	6.1	8.7	35	2852	2505	1882	351	464	1793	282	5356
4	12:55	923	674	300	278	269	253	237	0	6.0	8.7	36	2845	2479	1913	346	463	1800	281	5324
5	12:56	921	674	301	280	269	253	237	0	6.0	8.9	37	2836	2457	1923	352	458	1815	282	5302
6	12:57	921	674	302	280	270	253	237	0	6.1	8.9	36	2837	2481	1906	354	458	1833	283	5326
7	12:58	922	673	301	279	270	253	237	0	6.2	8.9	35	2830	2481	1930	345	457	1832	280	5312
8	12:59	922	673	300	278	269	253	237	0	6.2	8.9	34	2841	2481	1932	340	455	1819	275	5322
9	13:00	922	673	300	278	269	253	237	0	6.2	8.9	36	2855	2507	1918	348	453	1816	275	5362
0	13:01	922	673	301	279	269	253	237	0	6.2	9.0	34	2832	2456	1937	343	448	1810	274	5288
1	13:02	922	673	302	279	269	253	237	0	6.3	8.9	35	2829	2443	1954	339	450	1819	272	5271
2	13:03	923	674	301	278	269	253	237	0	6.3	8.7	34	2845	2481	1935	333	452	1824	270	5326
3	13:04	923	674	300	278	269	253	237	0	6.1	8.8	33	2862	2481	1944	342	452	1812	269	5343
4	13:05	925	675	301	278	269	253	237	0	6.1	8.7	34	2836	2415	1941	339	451	1824	276	5251
5	13:06	923	674	301	279	269	253	237	0	6.0	8.8	33	2845	2388	1945	333	452	1816	279	5232
6	13:07	925	674	301	279	269	253	237	0	6.0	8.8	34	2832	2457	1956	343	453	1820	274	5299
7	13:11	967	688	302	280	270	253	237	0	6.0	8.7	35	2827	2507	1921	337	456	1827	273	5333
8	13:12	981	695	302	280	270	253	236	0	6.1	8.6	40	2841	2505	1920	336	450	1820	273	5346
9	13:13	991	702	301	279	270	253	236	0	5.9	8.5	32	2825	2441	1920	335	444	1796	271	5266
0	13:14	1000	707	301	279	270	253	237	0	5.7	8.5	38	2866	2517	1933	333	443	1802	267	5383
1	13:15	1010	713	301	280	270	253	236	0	5.7	8.6	33	2832	2505	1962	339	443	1821	269	5337
2	13:16	1017	718	301	280	270	253	236	0	5.8	8.5	31	2821	2481	1956	344	445	1841	273	5338
3	13:17	1024	723	301	280	271	253	236	0	5.7	8.6	34	2839	2402	1949	346	449	1843	266	5241
4	13:18	1028	727	301	280	270	253	236	0	5.6	8.6	41	2830	2507	1944	349	455	1835	261	5337
5	13:19	1031	731	301	280	271	253	236	0	5.8	8.7	32	2828	2505	1953	352	464	1843	261	5333
6	13:20	1036	734	301	281	271	253	236	0	5.9	8.7	41	2857	2402	1929	348	469	1844	259	5258
7	13:21	1045	739	301	281	271	254	236	0	5.9	8.6	32	2846	2402	1943	352	471	1835	253	5246
8	13:22	1044	742	302	281	271	254	236	0	5.8	8.5	35	2839	2468	1926	341	473	1823	255	5307
9	13:23	1039	742	301	280	271	254	236	0	5.6	8.6	32	2844	2530	1921	341	471	1812	250	5374
0	13:24	1034	742	300	281	271	254	236	0	5.6	8.6	34	2853	2417	1940	348	471	1824	254	5270
1	13:25	1032	743	301	281	271	254	236	0	5.7	8.6	35	2848	2415	1925	346	469	1822	248	5267
2	13:26	1032	743	301	281	271	254	236	0	5.7	8.6	40	2857	2467	1946	346	471	1833	246	5323
3	13:27	1034	744	301	281	271	254	236	0	5.7	8.7	33	2850	2467	1951	349	471	1835	250	5316
4	13:28	1034	745	301	281	271	254	236	0	5.8	8.6	34	2851	2441	1957	348	471	1845	254	5292
5	13:29	1032	745	301	281	271	254	236	0	5.7	8.6	33	2853	2441	1940	345	468	1834	251	5294
6	13:30	1030	744	301	281	272	254	236	0	5.7	8.6	40	2871	2441	1944	349	465	1835	247	5311
7	13:31	1033	742	301	281	271	254	236	0	5.7	8.6	33	2844	2441	1965	352	465	1834	245	5285
8	13:32	1031	739	300	281	271	254	236	0	5.7	8.5	36	2839	2467	1960	348	465	1836	241	5306
9	13:33	1033	736	301	280	271	254	236	187	5.6	8.6	35	2857	2454	1965	349	466	1839	239	5310
0	13:34	1034	735	301	281	271	254	236	182	5.6	8.2	42	2862	2479	1703	342	468	1851	241	5324
1	13:35	1031	733	301	281	271	254	236	167	5.5	8.3	43	2848	2441	1455	340	466	1848	238	5289
2	13:36	1028	731	301	281	271	254	236	172	5.3	8.4	51	2864	2441	1365	339	465	1845	233	5285
3	13:37	1031	729	301	281	271	254	236	166	5.4	8.3	49	2858	2454	1327	337	461	1873	236	5312
4	13:38	1035	729	301	281	271	254	236	173	5.5	8.3	56	2865	2390	1293	334	471	1865	235	5256

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1 All data on this sheet were taken on OCT 28, 1991.
1 CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Varied
4) Calcium Sorbent Type is Wulfrasorp.
5) Injector Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15	13:39	1033	726	301	281	271	254	238	164	5.5	8.2	49	2658	2364	1261	330	472	1885	232	5222
16	13:40	1028	726	300	280	271	255	238	172	5.4	8.3	48	2634	2377	1254	331	469	1888	231	5211
17	13:41	1027	725	301	281	271	255	238	172	5.3	8.3	45	2639	2443	1232	334	470	1903	229	5262
18	13:42	1028	724	301	281	271	255	238	169	5.3	8.4	53	2625	2517	1170	341	466	1908	226	5342
19	13:43	1032	724	301	281	271	255	238	162	5.3	8.5	51	2646	2467	1179	344	466	1902	226	5313
20	13:44	1033	726	301	282	272	255	238	163	5.3	8.1	60	2667	2479	1151	330	470	1897	220	5347
21	13:45	1027	724	300	280	271	255	238	174	5.2	8.3	53	2623	2402	1127	330	465	1889	219	5248
22	13:46	1029	724	300	280	271	255	238	172	5.1	8.4	51	2650	2441	898	437	457	1892	222	5290
23	13:47	1031	723	301	281	271	255	238	172	5.3	8.5	50	2611	2415	882	435	456	1892	221	5236
24	13:48	1028	722	301	282	272	255	238	172	5.4	8.5	56	2643	2505	905	448	460	1886	221	5347
25	13:49	1027	722	301	282	272	255	238	166	5.3	8.6	57	2650	2494	912	450	459	1888	217	5343
26	13:50	1030	722	301	282	272	255	238	165	5.3	8.6	56	2653	2505	952	454	462	1913	212	5358
27	13:51	1032	723	301	282	272	255	238	170	5.4	8.6	56	2650	2467	955	451	469	1930	209	5316
28	13:52	1032	723	301	282	272	255	238	175	5.4	8.5	59	2634	2530	957	446	469	1922	209	5364
29	13:53	1030	722	301	282	272	255	238	161	5.3	8.5	55	2639	2517	957	442	469	1906	213	5356
30	13:54	1028	721	301	282	272	255	238	171	5.3	8.5	61	2644	2362	974	446	472	1905	213	5351
31	13:55	1025	720	300	281	272	255	238	164	5.3	8.4	58	2650	2479	969	438	470	1899	215	5329
32	13:56	1032	721	300	281	272	255	238	182	5.2	8.8	64	2655	2375	985	456	472	1897	212	5226
33	13:57	1028	721	301	281	272	255	238	168	5.5	8.4	57	2660	2415	954	430	477	1926	222	5275
34	13:58	1029	722	300	281	272	255	238	175	5.4	8.6	58	2644	2428	978	447	476	1889	216	5272
35	13:59	1027	722	300	280	272	255	238	175	5.5	8.7	61	2637	2505	995	450	477	1886	217	5342
36	14:00	1026	721	300	281	272	256	238	163	5.5	8.8	61	2627	2505	996	453	474	1888	214	5331
37	14:01	1023	719	300	281	273	256	238	180	5.6	9.0	61	2625	2415	1051	459	476	1906	216	5240
38	14:02	1027	719	299	280	272	255	238	170	5.6	9.0	66	2644	2505	1050	463	475	1913	218	5349
39	14:03	1029	720	300	280	272	256	238	171	5.8	8.8	62	2635	2505	1061	457	481	1945	222	5331
40	14:04	1028	720	300	280	272	255	238	177	5.8	9.0	64	2657	2428	1057	468	480	1953	219	5264
41	14:05	1028	720	299	280	272	255	238	172	5.8	8.9	60	2641	2426	1055	461	481	1955	218	5263
42	14:06	1029	719	300	280	272	255	238	173	5.8	8.9	69	2623	2428	1056	462	481	1946	220	5251
43	14:07	1026	717	300	280	272	255	238	167	5.8	8.9	64	2603	2503	1061	455	485	1948	223	5306
44	14:08	1027	716	300	280	272	256	238	172	5.8	9.0	66	2634	2528	1079	462	488	1941	220	5362
45	14:09	1027	716	300	281	272	255	238	173	5.9	9.0	59	2635	2400	1092	457	489	1948	221	5235
46	14:10	1027	717	300	282	273	256	238	167	5.8	8.9	60	2618	2428	1074	468	487	1948	218	5246
47	14:11	1021	714	299	281	272	256	238	172	5.8	9.1	64	2634	2428	1115	452	490	1950	220	5262
48	14:12	1031	716	298	281	272	256	237	177	5.9	9.2	69	2614	2417	1098	474	496	1955	224	5258
49	14:13	1021	716	298	282	272	256	238	181	6.1	8.9	64	2655	2390	1053	455	497	1965	220	5245
50	14:14	1023	715	298	282	272	255	237	180	5.8	9.4	71	2663	2418	1080	484	496	1947	216	5277
51	14:15	1033	717	299	283	272	255	238	0	6.1	9.2	65	2655	2392	1089	488	500	1965	225	5247
52	14:16	1026	717	298	283	272	255	238	0	6.1	8.9	62	2637	2431	1080	459	500	1969	223	5269
53	14:17	1025	718	298	283	272	255	238	0	5.8	9.3	63	2628	2470	1120	478	492	1941	220	5299
	14:18	1022	717	298	283	271	255	238	0	5.8	9.1	62	2628	2394	1311	461	486	1960	226	5222
	14:19	1023	715	298	284	272	255	238	0	5.8	9.4	53	2651	2394	1220	475	480	1971	230	5245
	14:20	1033	716	299	284	272	255	238	0	6.1	8.8	61	2655	2407	1479	456	485	1989	230	5262
	14:21	1029	717	298	284	271	255	238	0	5.9	8.7	49	2655	2380	1557	456	477	1941	224	5246
	14:22	1021	715	297	283	271	255	238	0	5.6	8.8	55	2653	2367	1632	450	475	1911	229	5220
	14:23	1023	714	296	283	271	255	238	0	5.5	9.0	48	2657	2510	1695	463	479	1925	236	5365
	14:24	1027	715	299	284	271	255	238	0	5.6	8.7	56	2657	2422	1686	461	480	1941	232	5269
	14:25	1032	716	299	284	270	255	238	0	5.6	8.6	49	2639	2487	1713	448	484	1935	226	5326
	14:26	1024	715	298	283	270	255	238	0	5.4	8.5	53	2658	2422	1737	442	482	1925	223	5260

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1 All data on this sheet were taken on OCT 28, 1991.
1 CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Varied
4) Calcium Sorbent Type is Wulfrasorp.
5) Injector Traverse

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
03	14:27	1024	715	298	284	270	254	238	0	5.3	8.8	44	2651	2474	1800	454	477	1934	224	5325
04	14:28	1025	715	300	285	270	255	238	0	5.5	8.6	41	2635	2474	1791	454	482	1959	225	5309
05	14:29	1026	715	299	284	270	255	238	0	5.4	8.4	42	2612	2474	1800	448	480	1951	226	5296
06	14:30	1027	715	299	284	270	255	238	0	5.4	8.5	52	2643	2474	1816	453	483	1944	229	5316
07	14:31	1026	717	300	285	270	255	238	0	5.4	8.5	41	2639	2472	1807	458	484	1940	236	5311
08	14:32	1023	716	300	285	270	255	238	0	5.4	8.5	42	2643	2470	1807	451	486	1926	230	5330
09	14:33	1030	717	302	285	271	255	239	0	5.4	8.7	41	2621	2468	1833	464	483	1911	231	5269
10	14:34	1032	719	301	285	271	255	239	0	5.5	8.1	43	2619	2454	1836	436	482	1903	231	5273
11	14:35	1030	719	301	284	271	255	239	0	5.2	8.2	38	2646	2454	1866	440	472	1863	229	5300
12	14:36	1026	719	302	285	271	255	239	0	5.1	8.1	39	2637	2452	1875	435	466	1879	237	5269
13	14:37	1028	719	302	285	272	255	239	0	5.0	8.3	38	2628	2452	1911	438	463	1892	234	5280
14	14:38	1028	719	302	285	272	255	238	0	5.0	8.2	84	2665	2452	1915	436	464	1908	233	5317
15	14:39	1033	720	302	284	272	255	239	0	5.1	8.1	58	2648	2450	1907	432	466	1926	232	5298
16	14:40	1029	720	301	284	272	256	239	0	5.1	8.0	43	2641	2450	1901	426	469	1930	235	5291
17	14:41	1029	719	301	284	272	256	239	0	4.9	8.2	39	2633	2411	1959	438	464	1908	232	5259
18	14:42	1030	720	303	285	273	256	239	0	4.9	8.2	43	2644	2426	1945	438	464	1915	230	5270
19	14:43	1026	719	302	284	272	256	239	0	5.0	8.3	36	2644	2503	1935	442	471	1926	229	5347
20	14:44	1030	720	302	284	272	256	239	0	5.1	8.4	40	2663	2439	1949	451	474	1930	230	5302
21	14:45	1030	720	302	284	272	256	239	0	5.2	8.3	38	2679	2452	1916	449	460	1935	227	5331
22	14:46	1031	720	303	284	273	256	239	0	5.2	8.5	37	2658	2437	1937	458	466	1926	228	5295
23	14:47	1030	721	302	284	273	256	239	0	5.3	8.4	39	2665	2373	1915	450	491	1925	229	5239
24	14:48	1033	722	302	284	273	256	239	170	5.3	8.2	49	2637	2450	1822	444	469	1907	231	5267
25	14:49	1032	723	302	284	273	256	239	173	5.2	8.2	50	2632	2463	1439	441	483	1896	227	5295
26	14:50	1030	723	303	284	273	257	239	165	5.1	8.1	54	2651	2501	1341	434	477	1896	222	5361
27	14:51	1031	723	302	283	273	257	239	178	5.0	8.2	51	2617	2514	1314	441	468	1896	225	5331
28	14:52	1032	724	301	283	273	257	239	171	5.1	8.0	53	2633	2501	1259	439	467	1895	225	5335
29	14:53	1032	725	302	284	273	257	239	168	5.1	8.1	48	2637	2514	1249	438	467	1882	229	5351
30	14:54	1029	724	302	285	274	257	240	165	5.0	8.1	53	2645	2501	1219	441	466	1881	231	5347
31	14:55	1032	724	302	284	274	258	240	179	5.1	8.2	51	2644	2424	1239	443	469	1890	230	5268
32	14:56	1030	723	301	284	274	258	239	165	5.2	8.1	59	2642	2424	1194	428	473	1897	229	5267
33	14:57	1031	723	301	284	274	258	240	176	5.1	8.2	55	2631	2450	1188	434	471	1880	231	5282
34	14:58	1032	723	302	285	274	258	240	173	5.1	8.0	55	2623	2476	1166	427	471	1870	232	5298
35	14:59	1033	723	302	284	274	258	240	165	5.0	8.1	56	2658	2396	1140	432	468	1865	231	5296
36	15:00	1031	723	301	283	274	258	240	170	5.0	7.8	59	2638	2411	1149	407	472	1858	234	5250
37	15:01	1034	724	302	285	274	258	240	171	4.9	8.0	54	2635	2501	1167	412	467	1864	237	5336
38	15:02	1029	723	302	284	274	258	240	170	4.9	7.7	59	2642	2499	1155	392	460	1868	242	5341
39	15:03	1030	723	302	284	274	258	240	176	4.8	7.8	56	2612	2423	1129	392	449	1893	246	5235
40	15:04	1032	723	302	284	274	258	240	169	4.9	8.0	58	2610	2383	1120	404	444	1896	247	5193
41	15:05	1031	723	301	284	274	258	240	168	4.9	8.0	60	2635	2467	1110	404	442	1886	253	5322
42	15:06	1028	721	302	284	274	258	240	178	4.9	7.9	63	2635	2423	1078	410	441	1880	252	5258
43	15:07	1029	721	301	283	274	258	240	169	4.9	8.1	58	2642	2383	1074	421	440	1867	252	5226
44	15:08	1030	721	301	283	274	258	240	160	5.0	8.2	67	2640	2410	1084	431	447	1864	251	5260
45	15:09	1032	721	302	284	274	258	239	174	5.1	8.3	59	2605	2467	1075	433	453	1864	252	5292
46	15:10	1032	721	303	285	274	258	240	177	5.2	8.1	56	2619	2469	1036	424	457	1860	254	5306
47	15:11	1033	722	301	284	274	258	240	165	5.2	8.1	60	2633	2436	1028	425	459	1842	257	5269
48	15:12	1030	722	301	284	274	258	240	179	5.1	8.1	61	2633	2512	1029	421	460	1821	258	5345
49	15:13	1029	719	301	284	274	258	240	167	5.1	8.2	59	2623	2512	1023	420	458	1814	258	5335
50	15:14	1030	717	302	285	274	258	240	166	5.1	8.1	71	2644	2499	996	411	460	1817	259	5343

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 28, 1991.
CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Varied
4) Calcium Sorbent Type is Wulfrasorp.
5) Injector Traverse

1 #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	15:15	1032	717	302	285	275	258	240	166	5.1	8.2	67	2837	2410	968	427	461	1822	258	5246
2	15:16	1030	717	302	284	275	258	240	171	5.1	8.2	68	2865	2499	968	436	460	1818	257	5364
3	15:17	1030	717	301	284	275	258	240	173	5.1	8.2	64	2845	2499	964	427	470	1814	262	5325
4	15:18	1030	717	301	284	274	258	240	169	5.1	8.2	73	2856	2423	947	428	474	1820	266	5279
5	15:19	1031	717	301	285	275	258	240	168	5.2	8.2	63	2853	2549	932	437	473	1827	261	5395
6	15:20	1032	718	302	285	275	258	240	170	5.2	8.4	68	2849	2501	937	447	472	1821	262	5350
7	15:21	1030	719	301	285	274	258	240	176	5.3	8.2	66	2838	2501	920	436	477	1826	264	5340
8	15:22	1024	717	301	284	274	258	240	166	5.2	8.4	65	2844	2372	921	442	474	1811	261	5216
9	15:23	1031	719	301	285	274	258	240	163	5.4	8.4	66	2844	2450	899	445	477	1833	262	5294
0	15:24	1032	717	302	285	275	258	240	169	5.5	8.4	71	2826	2514	904	444	477	1827	258	5340
1	15:25	1029	713	301	285	274	258	240	175	5.4	8.4	68	2847	2411	896	447	477	1812	256	5259
2	15:26	1029	710	301	285	274	258	240	169	5.4	8.4	69	2840	2410	894	446	479	1811	255	5272
3	15:27	1028	709	302	285	275	258	240	176	5.4	8.6	68	2860	2449	904	454	483	1813	258	5308
4	15:28	1032	709	302	285	275	258	240	163	5.5	8.6	69	2830	2499	904	453	486	1825	259	5329
5	15:29	1033	709	302	285	275	258	240	170	5.6	8.7	67	2826	2383	901	455	494	1826	259	5209
6	15:30	1034	711	301	285	275	258	240	170	5.7	8.8	68	2817	2487	899	460	496	1823	258	5304
7	15:31	1031	711	302	285	275	258	240	174	5.7	8.6	69	2819	2436	870	451	497	1806	261	5255
8	15:32	1029	710	302	285	275	258	240	164	5.6	8.7	71	2830	2421	873	453	496	1777	260	5251
9	15:33	1027	710	301	285	275	258	240	168	5.6	8.8	68	2851	2510	892	448	494	1765	263	5361
0	15:34	1032	711	301	285	275	258	240	174	5.7	8.9	68	2840	2510	899	453	493	1765	265	5350
1	15:35	1029	711	302	285	275	258	240	172	5.8	8.8	70	2823	2423	895	438	491	1765	268	5271
2	15:36	1028	717	302	285	275	258	240	168	5.8	8.9	71	2823	2383	886	430	481	1758	271	5206
3	15:37	1029	724	302	285	275	258	240	173	5.9	8.8	67	2819	2512	888	430	470	1767	276	5343
4	15:38	1027	726	301	284	275	258	240	172	6.0	8.9	71	2824	2487	902	437	461	1771	274	5311
5	15:39	1028	728	302	285	275	258	240	165	6.1	9.3	67	2845	2474	921	440	458	1773	278	5320
6	15:40	1032	729	303	286	275	258	240	168	6.2	9.2	70	2833	2395	906	436	457	1769	285	5226
7	15:41	1034	729	302	285	275	258	240	168	6.3	9.0	68	2805	2421	895	432	460	1756	284	5226
8	15:42	1037	730	302	285	275	258	240	173	6.2	9.2	72	2799	2434	912	439	459	1727	280	5233
9	15:43	1033	729	301	284	275	258	240	174	6.2	8.8	67	2842	2460	874	417	463	1731	286	5302
0	15:44	1023	727	301	284	275	258	240	171	6.1	8.8	74	2851	2434	879	410	463	1727	285	5274
1	15:45	1029	726	302	285	275	258	240	165	6.2	9.2	69	2837	2523	872	447	466	1736	297	5359
2	15:46	1034	731	302	285	275	258	240	220	6.4	9.1	74	2833	2508	884	437	463	1741	304	5333
3	15:47	1035	732	302	284	275	258	241	208	6.3	9.1	69	2833	2498	853	437	466	1714	294	5331
4	15:48	1032	731	302	285	275	258	240	209	6.3	9.0	70	2831	2421	842	439	472	1713	300	5275
5	15:49	1033	731	301	285	275	258	241	221	6.3	8.9	74	2845	2535	822	442	471	1718	302	5360
6	15:50	1032	731	302	285	276	258	241	214	6.2	8.8	77	2850	2533	812	441	472	1715	304	5364
7	15:51	1031	731	302	285	276	258	241	212	6.1	8.8	75	2849	2523	811	436	475	1714	305	5371
8	15:52	1030	731	302	285	276	258	241	213	6.0	8.8	73	2842	2472	811	436	473	1714	299	5314
9	15:53	1032	731	302	285	276	258	241	0	6.0	8.9	65	2859	2395	892	439	472	1724	294	5254
0	15:54	1030	730	301	284	275	258	241	0	6.0	8.9	61	2845	2419	1099	440	466	1729	293	5264
1	15:55	1032	731	301	284	275	258	241	0	6.0	8.9	56	2847	2395	1186	446	465	1730	293	5242
2	15:56	1029	729	302	284	275	258	241	0	6.1	9.0	54	2840	2521	1258	438	467	1739	294	5361
3	15:57	1036	731	303	285	276	258	241	0	6.0	8.8	53	2838	2395	1296	450	471	1720	296	5221
4	15:58	1028	730	301	284	275	258	241	0	6.1	8.8	50	2850	2498	1345	442	472	1722	290	5348
5	15:59	1032	730	302	284	275	258	241	0	5.9	9.0	50	2821	2547	1402	459	479	1701	291	5368
6	16:00	1034	731	302	284	275	258	241	0	6.0	8.7	56	2785	2508	1433	448	477	1714	293	5293

OCT. 30, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
1 All data on this sheet were taken on OCT 30, 1991.
2 CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Flush
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs Ca/S

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	13:11	1028	717	302	283	272	255	238	0	6.7	9.7	27	2804	2409	1931	476	500	1726	280	5213
2	13:12	1030	717	301	282	272	255	238	0	6.8	9.6	30	2811	2422	1915	475	496	1740	279	5232
3	13:13	1029	717	301	282	272	255	238	0	6.9	9.8	27	2818	2459	1930	487	500	1745	274	5269
4	13:14	1030	717	301	282	272	255	238	0	6.9	10.0	28	2772	2368	1887	498	500	1737	267	5141
5	13:15	1032	717	301	282	271	255	238	0	7.0	9.9	28	2840	2472	1850	491	504	1737	268	5312
6	13:16	1031	717	300	282	271	255	238	0	7.1	9.8	29	2785	2370	1858	487	512	1733	265	5155
7	13:17	1029	716	301	283	272	255	238	0	7.1	10.2	28	2809	2445	1859	492	515	1721	269	5254
8	13:18	1028	716	302	283	272	255	238	0	7.2	9.7	30	2786	2445	1875	475	510	1732	269	5231
9	13:19	1033	717	301	283	272	255	238	0	7.2	10.0	27	2837	2447	1875	489	506	1723	267	5264
0	13:20	1036	718	301	282	272	254	238	0	7.2	9.6	27	2800	2396	1868	483	503	1716	273	5196
1	13:21	1030	717	300	281	271	254	238	0	7.1	9.6	27	2804	2422	1874	474	501	1699	272	5225
2	13:22	1028	716	301	282	271	254	238	0	6.9	9.9	29	2833	2409	1864	490	499	1686	277	5247
3	13:23	1031	716	302	283	271	254	238	0	7.0	9.9	27	2799	2422	1880	485	495	1705	276	5220
4	13:24	1032	717	301	282	271	254	238	0	7.1	9.6	27	2806	2484	1895	477	499	1712	276	5253
5	13:25	1032	717	301	282	271	254	237	0	7.1	9.8	26	2806	2363	1921	479	499	1704	278	5189
6	13:26	1030	717	302	283	271	254	237	0	7.0	9.8	26	2818	2459	1919	478	497	1698	265	5277
7	13:27	1028	716	302	283	272	254	238	0	7.0	9.7	28	2807	2422	1923	478	496	1713	279	5229
8	13:28	1030	716	301	282	272	254	238	0	6.9	9.7	32	2832	2422	1897	481	495	1716	280	5253
9	13:29	1032	717	301	282	271	254	238	0	7.0	9.8	26	2823	2396	1925	477	500	1728	278	5219
0	13:30	1031	717	302	283	271	254	238	0	6.9	9.8	29	2812	2472	1929	481	496	1717	276	5264
1	13:31	1031	717	302	282	271	254	238	0	7.0	9.7	27	2821	2396	1935	483	505	1731	274	5217
2	13:32	1030	716	301	282	271	254	237	0	7.0	9.9	28	2809	2434	1901	487	506	1732	273	5244
3	13:33	1028	715	302	282	271	254	238	0	7.0	9.9	27	2811	2434	1893	487	509	1733	272	5220
4	13:34	1032	716	302	282	271	254	238	50	7.0	9.8	28	2825	2434	1887	485	510	1733	268	5259
5	13:35	1033	716	301	282	271	254	237	72	7.1	9.8	30	2806	2434	1756	482	512	1739	265	5219
6	13:36	1031	716	301	281	271	254	237	64	7.0	9.7	32	2804	2422	1747	473	513	1718	259	5226
7	13:37	1031	717	302	283	271	254	237	76	7.0	9.8	32	2797	2434	1761	492	506	1713	259	5231
8	13:38	1030	717	302	283	271	254	238	68	7.0	9.7	30	2785	2434	1395	479	502	1715	261	5219
9	13:39	1030	717	301	282	271	254	238	58	7.0	9.8	30	2837	2472	1411	481	502	1722	260	5309
0	13:40	1029	717	301	282	271	254	237	70	6.9	9.6	32	2830	2447	1293	478	499	1716	265	5277
1	13:41	1033	717	303	284	272	254	238	77	6.9	9.8	32	2821	2472	1376	492	494	1717	262	5293
2	13:42	1029	717	302	283	272	254	238	61	7.0	9.6	34	2788	2484	1274	477	500	1731	263	5272
3	13:43	1032	717	301	282	272	254	237	69	6.9	9.9	33	2790	2484	1429	491	499	1716	262	5274
4	13:44	1033	717	301	283	271	254	238	62	7.0	9.8	33	2786	2509	1367	489	500	1722	265	5315
5	13:45	1034	718	302	284	272	254	238	74	7.0	9.6	31	2807	2363	1307	474	500	1710	264	5190
6	13:46	1030	718	302	284	272	254	238	70	6.9	9.6	37	2832	2447	1301	474	500	1695	261	5262
7	13:47	1032	718	301	283	272	254	238	70	6.9	9.6	33	2795	2422	1263	480	499	1695	267	5217
8	13:48	1032	717	301	282	272	254	237	59	6.9	9.6	36	2828	2422	1223	469	494	1689	270	5241
9	13:49	1032	718	302	284	272	254	238	71	6.9	9.4	32	2802	2422	1323	456	496	1689	269	5224
0	13:50	1028	717	302	284	272	254	238	71	6.8	9.5	33	2809	2409	1418	466	498	1690	269	5218
1	13:51	1032	717	301	283	272	254	238	66	6.7	9.6	34	2823	2484	1361	470	493	1695	265	5307
2	13:52	1032	717	301	283	272	254	237	61	6.8	9.5	32	2790	2422	1310	466	494	1730	263	5211
3	13:53	1032	717	301	283	272	254	238	70	6.8	9.7	32	2811	2409	1440	483	495	1728	263	5220
4	13:54	1031	717	302	284	272	254	238	65	6.8	9.5	35	2800	2422	1266	473	491	1724	263	5222
5	13:55	1030	716	302	284	272	254	238	72	6.8	9.5	34	2792	2422	1305	471	490	1710	262	5204
6	13:56	1028	716	301	283	272	254	238	68	6.8	9.6	36	2802	2422	1354	475	490	1701	258	5224
7	13:57	1030	716	301	283	272	254	237	0	6.8	9.6	33	2815	2434	1213	480	485	1698	259	5265
8	13:58	1029	715	301	283	272	254	237	0	6.8	9.7	34	2808	2447	1633	457	484	1698	256	5254

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 30, 1991.
CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Flush
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs Ca/S

1 #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	13:59	1034	715	301	283	272	254	238	0	6.9	9.7	30	2811	2509	1763	481	485	1705	263	5265
0	14:00	1032	715	301	283	272	254	238	0	7.0	9.6	30	2821	2434	1801	461	485	1700	260	5255
1	14:01	1035	715	302	284	272	254	238	0	6.9	9.4	29	2802	2497	1854	473	487	1681	258	5299
2	14:02	1029	714	301	283	272	254	237	0	6.9	9.4	29	2809	2472	1890	450	487	1682	260	5281
3	14:03	1027	713	301	283	272	254	237	0	6.6	9.6	28	2785	2459	1860	470	482	1662	260	5244
4	14:04	1029	713	301	283	272	255	237	0	6.8	9.7	30	2799	2447	1918	483	482	1696	263	5245
5	14:05	1033	714	302	284	272	254	238	0	6.9	9.6	30	2800	2445	1860	474	486	1708	261	5245
6	14:06	1034	715	302	283	272	254	238	0	6.9	9.5	31	2804	2433	1878	473	497	1709	252	5270
7	14:07	1030	714	301	283	272	254	238	0	6.8	9.7	29	2785	2434	1907	462	495	1694	250	5219
8	14:08	1030	714	301	283	272	254	238	0	6.8	9.6	28	2804	2370	1912	475	499	1693	255	5167
9	14:09	1031	714	301	283	272	254	238	0	6.9	9.5	27	2783	2383	1927	473	497	1703	254	5166
0	14:10	1033	715	301	283	272	254	238	0	6.8	9.6	28	2795	2422	1893	474	493	1692	256	5217
1	14:11	1034	715	301	283	272	254	238	0	6.8	9.4	27	2802	2434	1863	469	491	1697	263	5236
2	14:12	1030	715	302	283	272	254	238	0	6.8	9.3	30	2800	2409	1864	457	490	1694	264	5209
3	14:13	1029	714	302	283	272	254	238	97	6.7	9.7	31	2788	2447	1816	471	485	1681	265	5235
4	14:14	1031	714	301	283	272	255	238	105	6.8	9.5	31	2825	2509	1616	471	485	1690	267	5334
5	14:15	1032	715	301	283	272	255	238	112	6.9	9.5	31	2818	2434	1355	471	486	1695	266	5252
6	14:16	1032	716	301	283	272	255	238	97	6.8	9.3	35	2819	2422	1184	458	487	1679	260	5241
7	14:17	1030	716	302	283	272	255	238	105	6.7	9.4	35	2792	2459	1142	465	487	1672	255	5251
8	14:18	1028	715	301	283	272	255	238	104	6.7	9.7	35	2821	2458	1147	474	483	1674	256	5279
9	14:19	1030	715	301	283	273	255	238	102	6.8	9.6	35	2790	2483	1160	475	487	1684	251	5272
0	14:20	1033	716	302	284	273	255	238	105	6.9	9.6	35	2790	2470	1090	483	494	1686	245	5260
1	14:21	1033	716	301	283	273	255	238	106	6.8	9.5	36	2821	2420	1096	476	493	1688	248	5227
2	14:22	1032	716	301	284	273	255	238	110	6.8	9.5	37	2818	2445	1185	465	498	1686	248	5263
3	14:23	1029	715	302	284	273	255	238	102	6.8	9.5	37	2792	2445	1138	471	498	1671	245	5240
4	14:24	1028	715	301	284	273	255	238	103	6.8	9.7	40	2818	2355	1148	463	500	1678	244	5173
5	14:25	1030	715	301	284	273	255	238	105	6.8	9.7	38	2830	2394	1096	491	498	1682	242	5224
6	14:26	1034	716	301	284	273	255	238	105	6.9	9.5	37	2809	2355	1168	480	501	1693	237	5164
7	14:27	1029	715	302	284	273	255	238	104	6.9	9.5	37	2819	2420	1160	476	497	1667	237	5239
8	14:28	1029	715	301	284	273	255	238	100	6.8	9.7	39	2838	2433	1138	486	504	1684	239	5271
9	14:29	1033	716	301	285	273	255	238	106	6.9	9.6	37	2826	2470	1088	482	504	1692	244	5297
0	14:30	1027	715	302	285	274	255	238	98	7.0	9.4	39	2804	2407	1133	464	500	1694	247	5211
1	14:31	1032	714	302	285	274	255	238	0	6.6	9.9	36	2821	2394	1232	490	498	1642	244	5215
2	14:32	1033	715	302	285	274	255	238	0	7.0	9.5	33	2816	2433	1655	468	492	1686	245	5229
3	14:33	1032	715	301	284	274	255	238	0	6.9	9.5	32	2788	2418	1820	471	490	1688	239	5206
4	14:34	1027	714	301	285	274	255	238	0	6.8	9.6	34	2826	2418	1826	460	489	1674	242	5244
5	14:35	1029	713	302	285	274	255	239	0	6.8	9.7	31	2774	2354	1833	479	490	1649	240	5128
6	14:36	1031	714	302	285	275	255	239	0	6.9	9.6	31	2843	2394	1838	474	490	1644	242	5238
7	14:37	1033	714	302	285	275	255	239	0	6.9	9.5	30	2843	2418	1875	466	487	1630	242	5261
8	14:38	1034	714	301	285	274	255	239	0	6.8	9.6	30	2809	2481	1874	467	483	1604	237	5290
9	14:39	1032	714	302	285	274	255	239	0	6.8	9.3	30	2804	2418	1896	468	486	1625	236	5222
0	14:40	1030	713	302	285	274	255	239	0	6.7	9.3	32	2783	2393	1915	457	479	1626	232	5175
1	14:41	1030	713	302	285	274	255	239	0	6.5	9.2	29	2795	2393	1899	461	480	1621	227	5173
2	14:42	1027	712	301	285	274	256	239	0	6.3	9.4	31	2831	2393	1899	469	477	1616	224	5224
3	14:43	1032	713	302	285	274	256	239	0	6.4	9.3	29	2793	2393	1887	469	479	1639	225	5186
4	14:44	1033	713	302	286	275	256	239	0	6.5	9.2	29	2810	2481	1896	457	481	1650	223	5291
5	14:45	1034	713	302	285	275	256	239	0	6.5	9.3	30	2812	2367	1924	451	481	1650	220	5179
6	14:46	1031	713	301	285	274	256	239	177	6.5	9.4	34	2790	2418	1781	464	482	1656	226	5208

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
) All data on this sheet were taken on OCT 30, 1991.
) CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Flush
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs Ca/S

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
57	14:47	1026	712	302	286	274	256	239	181	6.4	9.5	36	2795	2443	1198	476	478	1649	223	5236
58	14:48	1030	713	302	286	274	256	239	177	6.6	9.7	40	2797	2405	940	484	482	1669	225	5202
59	14:49	1033	714	302	286	275	256	239	176	6.6	9.4	40	2783	2431	907	481	479	1660	218	5213
60	14:50	1030	714	302	286	274	256	239	183	6.7	9.5	41	2761	2405	866	469	483	1661	218	5210
61	14:51	1027	713	301	286	274	256	239	172	6.6	9.7	42	2810	2431	932	475	483	1645	220	5241
62	14:52	1032	714	301	286	275	256	239	176	6.7	9.5	48	2779	2468	875	471	486	1655	218	5303
63	14:53	1031	714	302	286	275	256	239	184	6.7	9.5	45	2795	2481	893	474	480	1642	217	5276
64	14:54	1033	714	302	286	275	256	239	181	6.8	9.6	46	2814	2479	890	483	486	1645	222	5293
65	14:55	1032	715	301	286	275	256	239	169	6.9	9.7	44	2814	2468	925	497	492	1653	220	5282
66	14:56	1032	715	301	286	275	256	239	180	6.8	9.5	48	2798	2416	873	476	491	1642	217	5215
67	14:57	1028	714	302	286	275	256	239	174	6.8	9.5	48	2805	2429	914	480	495	1646	222	5234
68	14:58	1031	714	302	286	275	256	239	185	6.7	9.7	49	2802	2481	881	483	492	1637	222	5283
69	14:59	1030	714	302	286	275	256	239	174	6.8	9.6	48	2807	2416	887	483	495	1645	225	5223
70	15:00	1029	714	302	286	275	256	239	183	6.6	9.6	54	2823	2404	862	489	488	1617	222	5226
71	15:01	1030	714	301	285	275	256	239	182	6.8	9.7	41	2823	2442	970	491	499	1640	226	5259
72	15:02	1034	714	302	286	275	256	239	0	6.8	9.6	41	2814	2391	1589	480	499	1640	226	5205
73	15:03	1032	714	302	286	275	256	239	0	6.8	9.4	36	2812	2467	1745	484	500	1637	227	5270
74	15:04	1028	713	302	286	275	256	239	0	6.7	9.5	36	2797	2468	1782	484	493	1622	221	5265
75	15:05	1028	712	301	285	275	256	239	0	6.8	9.8	36	2809	2418	1801	484	496	1631	223	5227
76	15:06	1031	712	302	286	275	256	239	0	6.9	9.6	34	2819	2404	1809	483	497	1639	226	5223
77	15:07	1031	712	301	286	275	256	239	0	6.9	9.6	35	2817	2404	1803	483	491	1636	226	5221
78	15:08	1027	711	301	286	275	256	239	0	6.8	10.0	35	2790	2467	1831	493	495	1623	226	5256
79	15:09	1031	712	302	286	275	256	239	0	6.9	9.9	34	2790	2454	1849	503	490	1637	226	5244
80	15:10	1034	713	302	286	275	256	239	0	7.0	9.7	35	2786	2429	1843	495	491	1642	226	5166
81	15:11	1034	713	302	286	275	256	239	0	7.0	9.7	32	2793	2404	1854	479	489	1635	231	5197
82	15:12	1034	713	301	285	275	256	239	0	6.9	9.5	33	2817	2391	1859	485	491	1621	235	5216
83	15:13	1030	712	301	285	275	256	239	0	6.8	9.5	32	2809	2491	1856	477	489	1611	236	5300
84	15:14	1031	712	302	286	275	256	239	0	6.7	9.7	32	2795	2354	1842	469	488	1607	238	5169
85	15:15	1031	712	302	286	275	256	240	0	6.5	9.3	32	2810	2404	1841	463	485	1597	231	5214
86	15:16	1026	711	302	285	275	256	239	0	6.6	9.6	34	2793	2429	1850	457	487	1616	233	5222
87	15:17	1033	712	302	286	275	256	239	0	6.6	9.8	31	2797	2491	1855	492	486	1619	235	5286
88	15:18	1035	713	302	286	275	256	239	0	6.8	9.7	32	2817	2479	1852	489	486	1637	232	5296
89	15:19	1032	713	302	286	275	256	239	0	6.8	9.5	29	2804	2416	1831	482	490	1631	230	5220
90	15:20	1032	712	302	286	275	256	239	0	6.8	9.6	31	2821	2416	1838	477	493	1631	232	5237
91	15:21	1031	712	301	285	275	256	239	0	6.7	9.5	32	2758	2404	1875	479	493	1624	237	5138
92	15:22	1028	711	301	285	274	256	239	142	6.7	9.7	37	2807	2416	1713	467	490	1625	236	5223
93	15:23	1031	712	302	285	275	256	239	143	6.6	9.7	39	2804	2431	1255	463	483	1616	235	5234
94	15:24	1033	713	302	285	275	256	239	143	6.8	9.5	39	2800	2429	1094	463	486	1641	236	5229
95	15:25	1031	713	301	284	274	256	239	137	6.9	9.5	41	2768	2442	1032	477	487	1655	239	5210
	15:26	1030	713	301	285	274	256	239	138	6.7	9.8	43	2791	2365	1018	485	478	1630	234	5156
	15:27	1033	714	302	286	275	256	239	142	6.9	9.6	42	2777	2491	958	483	481	1656	240	5269
	15:28	1032	714	302	286	275	256	239	144	6.9	9.5	43	2790	2339	936	473	481	1650	237	5129
	15:29	1028	713	301	285	274	256	239	143	6.8	9.5	44	2804	2467	1022	488	481	1630	240	5270
	15:30	1034	714	301	285	274	256	239	135	6.8	9.4	46	2817	2479	1034	470	485	1626	244	5272
	15:31	1032	714	302	286	275	256	239	141	6.8	9.1	45	2819	2429	1000	451	480	1626	240	5248
	15:32	1029	714	302	285	275	256	239	140	6.7	9.6	43	2823	2404	961	460	478	1617	240	5216
	15:33	1034	715	301	285	275	256	239	147	6.5	9.2	50	2772	2418	1016	464	474	1605	234	5190
	15:34	1026	714	301	285	274	256	239	144	6.6	9.3	49	2791	2431	1010	442	473	1617	234	5222

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 30, 1991.
CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Flush
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs Ca/S

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15	15:35	1029	714	301	285	274	256	239	139	6.4	9.4	49	2842	2493	1046	456	470	1600	231	5335
16	15:36	1033	714	302	286	275	256	238	140	6.4	9.5	49	2809	2456	1022	458	473	1608	231	5265
17	15:37	1034	714	302	285	275	256	239	0	6.4	9.5	40	2826	2481	1547	457	474	1615	231	5307
18	15:38	1034	714	301	285	274	256	238	0	6.5	9.1	37	2811	2418	1754	452	476	1628	229	5229
9	15:39	1029	713	301	284	274	256	238	0	6.5	9.3	36	2777	2405	1781	448	475	1629	225	5183
0	15:40	1026	711	301	284	274	256	238	0	6.4	9.7	37	2795	2404	1796	454	474	1619	219	5199
1	15:41	1032	711	302	285	274	256	238	0	6.6	9.7	34	2830	2468	1803	484	476	1699	215	5260
2	15:42	1032	712	302	285	274	256	238	0	6.7	9.4	35	2816	2481	1810	476	469	1700	209	5297
3	15:43	1032	713	301	284	274	256	238	0	6.7	9.4	35	2765	2405	1832	485	475	1690	208	5171
4	15:44	1032	713	301	285	274	256	238	0	6.6	9.4	34	2819	2341	1866	467	478	1675	213	5160
5	15:45	1029	711	301	285	274	256	238	0	6.5	9.5	35	2800	2456	1864	465	476	223	213	5256
6	15:46	1035	713	302	285	274	256	238	0	6.4	9.3	33	2814	2418	1855	460	453	2007	210	5232
7	15:47	1035	713	301	284	273	256	238	0	6.5	8.9	32	2830	2393	1891	440	359	1683	213	5222
8	15:48	1030	712	301	284	274	256	238	0	6.0	9.2	33	2821	2418	1871	444	465	1634	207	5229
9	15:49	1028	711	301	284	274	256	238	0	6.1	9.1	32	2828	2468	1854	448	469	1632	208	5297
0	15:50	1028	711	302	285	274	256	238	292	6.2	9.4	46	2811	2380	1281	449	472	1641	207	5211
1	15:51	1026	712	302	285	274	256	238	286	6.4	9.3	51	2802	2443	816	468	479	1656	209	5245
2	15:52	1035	714	302	285	274	256	238	284	6.5	9.8	51	2788	2456	770	496	482	1645	208	5244
3	15:53	1034	717	301	285	274	256	238	286	6.8	9.5	54	2844	2393	743	474	493	1661	208	5236
4	15:54	1033	717	301	285	274	256	238	292	6.7	9.6	55	2833	2456	751	460	489	1629	211	5269
5	15:55	1026	716	302	286	274	256	238	292	6.5	9.4	55	2777	2354	728	458	485	1596	210	5131
6	15:56	1031	718	302	286	275	256	238	290	6.7	9.7	55	2814	2380	729	478	490	1616	212	5194
7	15:57	1032	720	302	286	275	256	238	290	6.9	9.4	57	2812	2468	707	462	488	1627	219	5261
8	15:58	1029	720	301	285	275	256	238	288	6.8	9.2	58	2821	2418	698	459	480	1601	220	5239
9	15:59	1030	720	301	285	275	256	238	293	6.5	9.6	61	2802	2405	719	478	479	1587	221	5207
0	16:00	1032	720	302	286	275	256	238	282	6.7	9.4	61	2812	2418	710	475	483	1600	214	5231
1	16:01	1029	720	302	287	276	256	239	291	6.7	9.6	64	2797	2367	733	480	480	1613	212	5163
2	16:02	1030	721	301	286	275	256	238	288	6.6	9.6	63	2788	2405	724	466	479	1611	209	5193
3	16:03	1033	722	301	286	275	256	238	287	6.7	9.5	62	2818	2481	751	464	483	1625	207	5299
4	16:04	1032	722	302	287	276	256	239	280	6.7	9.4	69	2804	2405	739	475	487	1622	207	5209
5	16:05	1031	723	302	287	276	256	239	290	6.6	9.5	62	2802	2418	729	465	487	1610	204	5220
6	16:06	1030	723	301	287	276	256	238	0	6.6	9.4	50	2823	2341	1082	465	489	1615	207	5164
7	16:07	1029	721	301	286	275	256	239	0	6.6	9.6	44	2781	2405	1541	480	488	1619	207	5186
8	16:08	1027	720	301	286	275	256	239	0	6.7	9.7	43	2810	2481	1689	471	494	1627	211	5246
9	16:09	1034	721	302	287	275	256	239	0	6.8	9.6	44	2826	2457	1735	475	498	1627	209	5293
0	16:10	1031	721	302	286	275	256	239	0	6.9	9.5	45	2828	2481	1743	480	499	1622	211	5309
	16:11	1032	721	301	285	275	256	239	0	6.8	9.5	42	2772	2354	1752	474	496	1596	212	5126
	16:12	1036	722	301	286	275	256	239	0	6.8	9.4	44	2797	2468	1750	483	496	1596	213	5265
	16:13	1029	721	301	286	275	256	238	0	6.8	9.2	46	2819	2454	1775	453	496	1597	211	5274
	16:14	1030	721	302	286	275	256	239	0	6.4	9.4	41	2816	2442	1784	472	481	1580	209	5257
	16:15	1028	720	301	285	275	256	239	0	6.4	9.4	39	2783	2468	1790	469	486	1589	206	5251
	16:16	1032	720	301	285	275	256	238	222	6.5	9.5	52	2800	2468	1286	479	485	1582	209	5269
	16:17	1032	721	302	286	275	256	238	204	6.6	9.1	56	2795	2391	915	452	483	1593	209	5246
	16:18	1032	722	301	286	275	256	238	215	6.6	9.2	56	2804	2429	852	451	476	1591	205	5233
	16:19	1030	722	301	286	275	256	238	218	6.4	9.3	56	2797	2404	830	457	470	1580	205	5200
	16:20	1028	722	301	286	275	256	238	211	6.4	9.3	56	2811	2418	822	458	467	1587	206	5229
	16:21	1031	722	302	287	276	256	239	218	6.5	9.4	59	2769	2431	830	464	469	1602	201	5199
	16:22	1030	723	303	287	276	256	239	210	6.6	9.5	60	2786	2479	834	457	473	1612	204	5265

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on OCT 30, 1991.
CBTF SO2 Cor. is w/ a Correction factor of (1630/1596)

3) Calcium Injector Type is II – Flush
4) Calcium Sorbent Type is Wulfrasorp.
5) Delta SO2 Vs Ca/S

1 #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2 Cor	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
3	16:23	1032	722	301	286	275	256	239	0	6.6	9.6	49	2786	2467	836	457	473	1611	205	5253
4	16:24	1030	721	301	285	275	256	239	0	6.7	9.4	44	2802	2479	1617	453	476	1625	205	5281
5	16:25	1028	720	301	286	275	256	238	0	2.7	9.4	44	2744	2429	1726	434	371	1266	160	5173
6	16:26	1023	717	302	286	275	256	238	0	2.7	10.4	41	2790	2456	1660	353	370	1264	163	5212
7	16:27	991	708	301	285	275	256	238	0	2.7	11.5	42	2786	2405	1506	329	361	1249	161	5192
8	16:28	961	695	300	283	274	255	238	0	2.8	13.8	48	2793	2418	1362	291	318	1235	161	5211
9	16:29	933	681	300	283	273	255	238	0	2.8	15.5	45	2788	2405	1240	269	256	1180	247	5193
0	16:30	912	668	301	283	274	255	237	0	2.8	16.4	83	2785	2354	1090	259	196	1092	415	5139

NOV. 12, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 12, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	12:25	1030	714	333	310	291	264	243	0	4.4	8.2	39	2765	2429	1884	364	366	1723	291	5194
2	12:26	1031	715	336	312	293	264	244	0	4.4	8.2	45	2736	2428	1877	359	369	1711	290	5163
3	12:27	1029	715	338	314	295	264	244	0	4.4	8.2	42	2792	2341	1880	365	369	1703	291	5133
4	12:28	1029	717	341	317	297	265	245	0	4.5	8.3	42	2823	2340	1894	372	371	1709	291	5163
5	12:29	1031	717	344	319	298	265	246	0	4.7	8.5	44	2791	2327	1905	384	380	1727	287	5118
6	12:30	1032	718	347	322	300	266	247	0	4.8	8.5	44	2771	2388	1880	387	389	1729	284	5179
7	12:31	1032	719	350	324	302	267	248	0	4.8	8.4	39	2757	2324	1876	381	392	1712	287	5081
8	12:32	1028	719	348	321	302	268	248	0	4.7	8.4	42	2753	2309	1874	378	391	1693	289	5095
9	12:33	1029	719	345	319	301	269	248	0	4.8	8.6	42	2733	2309	1867	389	394	1706	291	5042
0	12:34	1030	719	341	317	301	269	248	0	4.8	8.5	40	2764	2295	1881	378	394	1694	288	5059
1	12:35	1032	720	339	316	299	270	248	153	4.8	8.5	56	2733	2295	1859	380	395	1686	287	5028
2	12:36	1031	721	337	314	299	270	249	170	4.8	8.4	34	2746	2320	1536	378	391	1690	286	5067
3	12:37	1030	720	336	313	298	270	249	166	4.8	8.4	36	2672	2281	1071	374	388	1689	280	4953
4	12:38	1032	721	334	313	298	270	248	160	4.8	8.5	36	2742	2319	1003	388	385	1694	284	5060
5	12:39	1030	721	334	312	297	270	249	163	4.9	8.4	36	2751	2381	968	385	387	1707	281	5132
6	12:40	1030	721	333	312	297	270	248	170	4.9	8.4	36	2740	2405	981	384	389	1699	274	5145
7	12:41	1030	721	333	312	297	270	248	157	4.8	8.5	38	2767	2319	942	385	388	1691	274	5120
8	12:42	1030	721	333	312	297	270	248	172	4.8	8.5	39	2747	2405	947	390	388	1699	278	5152
9	12:43	1029	720	333	312	297	270	248	160	4.9	8.5	40	2738	2417	949	387	393	1708	282	5155
0	12:44	1032	720	334	312	297	270	248	167	4.9	8.6	40	2750	2441	923	396	394	1704	280	5191
1	12:45	1032	720	335	313	297	270	248	164	4.9	8.5	43	2730	2331	935	388	396	1695	275	5061
2	12:46	1034	720	336	314	298	270	248	165	4.9	8.4	44	2750	2319	945	384	398	1687	271	5069
3	12:47	1031	719	337	315	299	270	249	167	4.8	8.3	44	2755	2405	933	379	397	1679	271	5160
4	12:48	1030	720	339	317	300	270	249	170	4.9	8.5	52	2760	2305	865	390	401	1695	271	5065
5	12:49	1030	723	341	318	300	270	249	159	4.8	8.4	49	2724	2367	808	382	399	1690	268	5091
6	12:50	1031	727	343	320	302	270	250	169	4.8	8.5	51	2748	2342	873	388	400	1708	269	5075
7	12:51	1031	731	346	322	303	271	250	161	4.8	8.5	51	2717	2355	820	384	400	1723	263	5072
8	12:52	1033	735	349	325	304	271	251	169	4.9	8.5	52	2753	2438	804	387	401	1733	263	5158
9	12:53	1031	739	350	325	306	272	251	164	4.9	8.5	51	2729	2402	808	390	399	1722	269	5131
0	12:54	1030	742	349	324	306	272	251	169	4.8	8.5	55	2768	2412	813	390	398	1704	267	5180
1	12:55	1031	742	347	324	306	272	252	161	4.9	8.5	56	2768	2412	793	387	398	1721	258	5180
2	12:56	1032	743	347	324	306	273	252	167	4.9	8.4	55	2764	2399	788	385	398	1723	261	5163
3	12:57	1030	745	346	323	306	273	252	163	4.9	8.4	58	2766	2325	768	377	397	1733	265	5091
4	12:58	1031	747	346	323	306	274	252	160	4.9	8.6	60	2759	2399	761	390	396	1740	265	5158
5	12:59	1032	749	345	323	306	274	253	168	4.9	8.5	61	2757	2397	800	383	394	1733	264	5154
6	13:00	1030	752	346	323	306	275	252	165	4.9	8.5	84	2758	2385	748	380	396	1724	259	5142
7	13:01	1028	758	346	324	307	275	252	164	5.0	8.6	71	2734	2311	728	391	401	1731	267	5057
8	13:02	1029	762	346	325	307	275	252	165	5.0	8.7	80	2739	2334	850	405	402	1721	265	5073
9	13:03	1034	766	347	326	308	275	253	165	5.0	8.7	62	2711	2297	832	409	408	1710	256	5008
0	13:04	1034	768	349	326	309	276	254	160	5.0	8.5	61	2733	2309	866	381	414	1700	252	5043
1	13:05	1031	770	350	327	309	276	254	169	5.0	8.4	79	2711	2322	876	377	415	1700	259	5033
2	13:06	1030	770	351	329	310	276	254	164	4.8	8.5	81	2747	2381	865	377	400	1697	258	5128
3	13:07	1028	769	351	328	310	276	254	167	5.0	8.6	81	2706	2320	751	386	402	1726	256	5026
4	13:08	1030	771	351	328	310	277	254	165	5.2	8.7	83	2727	2281	732	393	408	1723	255	5007
5	13:09	1033	772	350	327	310	277	255	157	5.2	8.7	82	2701	2318	747	393	407	1706	251	5019
6	13:10	1033	774	351	329	311	278	255	168	5.1	8.6	81	2714	2380	732	390	406	1696	248	5111
7	13:11	1034	776	353	330	312	278	255	170	5.0	8.6	82	2716	2317	755	394	403	1692	247	5033
8	13:12	1033	778	351	328	311	278	255	164	4.9	8.4	82	2737	2378	739	381	401	1700	250	5115

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 12, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13:13	1031	780	349	328	311	279	256	160	4.7	8.3	84	2728	2304	754	381	392	1685	245	5032
13:14	1029	781	351	328	312	279	256	159	4.6	8.3	87	2733	2315	763	376	395	1704	249	5048
13:15	1028	780	352	330	312	280	256	171	4.5	8.4	86	2716	2278	730	377	380	1716	253	4994
13:16	1030	780	353	330	313	280	256	173	4.6	8.5	87	2736	2301	748	368	381	1729	255	5036
13:17	1034	783	351	329	312	281	257	153	4.7	8.4	88	2711	2301	705	382	386	1734	245	5012
13:18	1035	784	352	329	313	281	257	169	4.6	8.2	84	2716	2312	743	374	389	1721	242	5028
13:19	1031	785	353	330	313	281	257	159	4.4	8.2	84	2739	2385	750	371	384	1709	241	5101
13:20	1028	784	353	329	313	282	257	173	4.4	8.2	89	2734	2275	764	372	382	1725	243	5009
13:21	1027	783	351	328	312	282	257	167	4.5	8.5	99	2746	2360	741	364	381	1741	242	5106
13:22	1029	784	352	329	313	282	257	158	4.7	8.6	99	2734	2384	726	400	392	1765	241	5118
13:23	1033	786	353	330	313	282	257	166	4.8	8.6	99	2724	2335	722	397	401	1751	235	5059
13:24	1033	787	351	328	313	282	256	164	4.8	8.6	99	2728	2349	739	397	407	1729	236	5077
13:25	1033	787	352	329	313	282	257	167	4.7	8.5	99	2731	2347	728	393	406	1704	234	5078
13:26	1031	787	353	330	313	282	257	159	4.7	8.4	99	2734	2360	758	365	404	1699	239	5094
13:27	1031	786	352	329	313	283	257	170	4.5	8.4	99	2738	2396	727	381	397	1682	235	5133
13:28	1030	786	351	328	313	283	257	159	4.4	8.3	99	2733	2408	615	362	389	1693	236	5072
13:29	1029	786	352	329	313	283	258	167	4.4	8.3	99	2736	2310	438	354	385	1719	241	5046
13:30	1030	786	353	329	313	283	258	166	4.4	8.4	99	2716	2309	405	357	380	1740	245	5024
13:31	1028	786	351	328	313	283	258	163	4.4	8.3	99	2666	2284	402	348	380	1756	247	4950
13:32	1029	786	351	328	312	283	258	162	4.5	8.4	99	2731	2394	361	357	383	1775	246	5125
13:33	1032	789	352	329	313	284	258	164	4.6	8.6	99	2733	2309	354	370	384	1782	246	5041
13:34	1033	791	353	329	313	284	258	172	4.7	8.4	99	2744	2358	378	361	391	1769	241	5097
13:35	1033	793	351	327	313	284	258	165	4.7	8.4	99	2729	2370	364	361	396	1749	236	5099
13:36	1032	794	350	327	313	284	258	161	4.6	8.4	99	2736	2307	329	328	394	1733	236	5040
13:37	1027	792	351	328	313	284	258	167	4.5	8.2	99	2722	2307	334	345	393	1727	236	5030
13:38	1029	793	352	329	313	285	259	167	4.5	8.6	99	2715	2368	307	365	391	1738	242	5094
13:39	1030	794	352	329	314	285	259	161	4.7	8.5	99	2698	2380	284	364	394	1747	239	5079
13:40	1030	795	351	328	313	285	259	169	4.7	8.5	99	2729	2380	318	365	399	1734	239	5109
13:41	1031	792	350	328	313	285	259	165	4.7	8.5	99	2700	2367	364	368	406	1731	242	5067
13:42	1031	783	351	328	313	285	259	163	4.7	8.4	99	2705	2391	339	357	404	1730	239	5096
13:43	1030	772	351	328	313	285	259	165	4.7	8.4	99	2734	2355	339	355	401	1739	239	5089
13:44	1028	762	351	328	313	285	260	164	4.7	8.5	99	2715	2379	338	359	400	1750	241	5094
13:45	1028	754	351	328	313	285	259	166	4.7	8.5	99	2715	2343	354	368	397	1749	240	5051
13:46	1029	745	345	322	312	285	260	162	4.8	8.7	99	2722	2329	349	370	399	1744	239	5051
13:47	1032	740	324	306	304	285	258	164	4.9	8.6	99	2716	2377	365	365	402	1734	235	5096
13:48	1032	733	310	297	297	284	256	163	4.8	8.4	99	2733	2391	408	361	399	1714	238	5124
13:49	1032	728	307	296	294	282	255	173	4.8	8.4	99	2753	2360	454	357	398	1723	240	5127
13:50	1031	723	306	297	293	281	254	163	4.7	8.4	99	2750	2284	412	352	394	1733	240	5034
13:51	1028	719	307	295	291	280	253	165	4.7	8.4	99	2739	2298	454	365	392	1751	238	5037
13:52	1030	716	294	283	285	278	252	166	4.6	8.5	99	2754	2312	556	374	392	1746	234	5066
13:53	1032	715	283	275	279	276	249	165	4.7	8.4	99	2722	2303	614	375	394	1759	234	5025
13:54	1030	715	282	276	277	274	248	163	4.6	8.2	99	2767	2317	629	372	394	1737	235	5084
13:55	1032	717	286	278	276	273	247	166	4.5	8.4	99	2730	2281	664	379	394	1723	239	5011
13:56	1029	717	290	281	277	271	247	164	4.6	8.2	99	2762	2297	653	371	396	1734	242	5088
13:57	1030	718	295	284	277	270	246	159	4.6	8.4	99	2740	2395	600	374	395	1743	239	5136
13:58	1030	720	299	286	278	269	246	158	4.7	8.5	99	2766	2312	554	378	396	1750	244	5061
13:59	1032	723	300	286	278	268	246	158	4.8	8.5	99	2727	2399	471	374	400	1746	238	5125
14:00	1033	725	300	285	278	267	245	163	4.8	8.5	99	2756	2368	393	374	400	1727	237	5144

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 12, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:01	1031	726	300	265	277	266	244	165	4.8	8.5	99	2787	2328	368	371	402	1713	236	5115
14:02	1032	727	301	266	277	265	244	161	4.8	8.6	99	2777	2402	419	367	400	1709	235	5178
14:03	1032	727	302	266	278	265	244	170	4.9	8.3	99	2788	2404	415	357	404	1713	236	5192
14:04	1031	729	301	265	277	264	244	167	4.7	8.4	99	2761	2330	408	354	398	1699	234	5091
14:05	1031	730	301	264	276	263	243	160	4.7	8.3	99	2736	2305	411	351	394	1709	239	5063
14:06	1030	731	301	265	276	263	243	169	4.6	8.3	99	2746	2294	421	351	390	1706	238	5040
14:07	1029	731	302	266	276	262	243	166	4.7	8.3	99	2673	2268	375	321	392	1718	241	4953
14:08	1030	732	302	265	276	262	242	162	4.6	8.2	99	2741	2417	379	317	390	1700	239	5159
14:09	1030	732	301	264	276	261	242	163	4.5	8.2	99	2763	2393	393	319	387	1692	234	5157
14:10	1032	734	301	264	275	261	242	170	4.5	8.3	99	2767	2431	412	321	389	1709	234	5198
14:11	1034	735	302	265	275	260	241	160	4.5	8.1	99	2762	2396	400	337	390	1715	228	5158
14:12	1031	735	302	265	275	260	241	167	4.5	8.1	99	2750	2396	408	330	392	1721	231	5146
14:13	1029	736	302	264	275	260	241	165	4.5	8.2	99	2694	2309	402	337	389	1728	237	5004
14:14	1032	736	301	264	275	259	241	171	4.6	8.1	99	2750	2347	407	336	389	1734	237	5097
14:15	1030	737	293	277	272	259	240	159	4.6	8.1	99	2766	2286	413	330	388	1726	231	5051
14:16	1032	737	280	267	267	258	236	167	4.5	8.2	99	2752	2311	461	331	383	1725	230	5064
14:17	1033	738	267	258	261	257	237	163	4.5	8.1	99	2784	2338	457	331	380	1749	228	5122
14:18	1033	737	261	255	256	256	235	168	4.5	8.0	99	2772	2341	451	332	379	1756	228	5113
14:19	1030	736	265	259	256	254	234	163	4.5	8.1	99	2771	2330	446	330	380	1764	232	5101
14:20	1029	736	271	264	258	253	234	166	4.5	8.0	99	2776	2345	437	301	378	1758	227	5120
14:21	1029	737	274	264	258	252	233	165	4.4	8.3	99	2766	2346	448	317	378	1736	222	5117
14:22	1030	737	272	262	257	251	233	161	4.5	8.2	99	2788	2410	434	320	381	1737	220	5196
14:23	1032	740	270	260	256	250	232	166	4.6	8.3	99	2780	2399	450	328	390	1730	219	5179
14:24	1032	744	270	261	255	249	232	165	4.6	8.3	94	2797	2389	440	324	395	1720	219	5186
14:25	1034	748	272	262	255	248	231	166	4.6	8.2	92	2766	2426	433	321	396	1721	219	5192
14:26	1032	752	273	262	255	248	231	165	4.6	8.2	90	2772	2390	399	319	398	1720	220	5162
14:27	1031	757	272	261	255	247	231	164	4.6	8.3	89	2782	2342	401	324	396	1721	220	5124
14:28	1028	761	271	260	254	247	230	166	4.6	8.2	88	2796	2303	385	317	396	1729	217	5101
14:29	1030	764	271	260	254	246	230	169	4.6	8.3	91	2779	2331	388	314	396	1721	212	5110
14:30	1033	768	272	261	254	246	229	164	4.7	8.3	67	2758	2408	378	315	397	1717	213	5133
14:31	1034	773	273	262	254	246	229	166	4.7	8.1	64	2784	2396	372	301	393	1708	212	5180
14:32	1032	776	272	261	254	245	229	159	4.6	8.3	60	2815	2434	390	303	387	1701	221	5249
14:33	1030	778	271	260	253	245	228	170	4.6	8.2	62	2803	2269	375	331	381	1719	221	5073
14:34	1029	781	272	260	253	244	228	169	4.6	8.2	62	2765	2347	383	330	380	1725	222	5112
14:35	1031	783	272	261	253	244	228	162	4.5	8.2	62	2772	2310	366	330	379	1721	218	5082
14:36	1032	786	273	261	253	244	227	161	4.4	8.0	65	2767	2310	380	319	374	1725	220	5077
14:37	1031	788	280	267	255	244	228	164	4.4	8.1	60	2732	2323	383	320	376	1730	221	5064
14:38	1030	791	289	274	259	243	228	170	4.5	8.2	64	2769	2462	378	328	378	1740	223	5231
14:39	1027	792	299	281	264	244	229	166	4.6	8.2	62	2709	2424	376	328	383	1744	221	5133
14:40	1028	793	308	288	268	244	230	164	4.6	8.2	60	2765	2323	358	331	387	1741	219	5088
14:41	1029	795	317	294	272	245	231	161	4.6	8.4	59	2754	2460	349	336	389	1739	215	5214
14:42	1029	797	324	300	277	246	233	161	4.7	8.5	62	2714	2321	292	345	392	1746	213	5035
14:43	1032	797	327	302	280	247	234	169	4.8	8.6	62	2769	2433	239	354	400	1740	211	5202
14:44	1033	798	332	306	283	249	235	164	4.8	8.4	59	2784	2356	258	339	405	1710	205	5140
14:45	1032	798	337	309	286	250	236	162	4.7	8.4	63	2794	2355	242	335	402	1685	207	5149
14:46	1032	798	341	314	289	252	237	164	4.7	8.5	60	2754	2364	243	331	399	1687	203	5118
14:47	1031	799	344	317	293	254	239	168	4.7	8.5	59	2761	2438	234	335	397	1701	203	5199
14:48	1032	800	348	320	295	255	240	164	4.7	8.4	61	2776	2434	236	331	392	1705	204	5210

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 12, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs T

h #: —>		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	14:49	1030	801	351	323	298	256	241	168	4.7	8.4	63	2771	2421	249	325	391	1708	201	5191
6	14:50	1030	801	355	325	301	258	242	159	4.7	8.4	60	2753	2345	236	337	388	1716	202	5098
7	14:51	1032	803	358	328	304	259	244	161	4.7	8.4	61	2687	2354	236	338	390	1721	198	5041
8	14:52	1033	803	362	331	306	261	245	171	4.6	8.4	63	2732	2365	256	302	393	1709	198	5096
9	14:53	1032	802	365	334	308	263	247	165	4.6	8.2	64	2766	2336	245	297	393	1711	200	5114
0	14:54	1031	803	368	337	311	265	248	166	4.5	8.3	66	2769	2335	247	295	390	1711	201	5103
1	14:55	1030	803	371	339	313	266	249	169	4.5	8.4	65	2768	2395	253	332	390	1715	200	5163
2	14:56	1029	803	372	341	316	268	250	162	4.6	8.2	67	2766	2416	249	327	394	1715	201	5182
3	14:57	1031	804	357	328	312	269	251	166	4.5	8.4	67	2754	2390	226	337	392	1705	202	5144
4	14:58	1030	805	336	313	305	270	250	162	4.5	8.3	69	2751	2388	274	335	391	1704	201	5139
5	14:59	1029	804	315	298	297	271	248	167	4.5	8.3	69	2762	2388	286	328	391	1695	201	5150
5	15:00	1029	805	298	287	288	270	245	165	4.6	8.6	70	2706	2327	316	338	391	1709	203	5033
7	15:01	1030	805	284	277	281	270	243	167	4.8	8.8	67	2739	2390	343	354	389	1726	206	5129
8	15:02	1030	805	274	269	275	268	241	161	4.9	8.5	65	2777	2330	331	344	390	1734	202	5105
9	15:03	1032	806	266	264	269	267	239	169	4.8	8.7	69	2768	2407	335	358	394	1700	196	5175
0	15:04	1032	808	260	258	265	265	238	169	4.9	8.5	66	2773	2297	339	345	394	1701	196	5078
1	15:05	1033	809	258	257	261	264	236	158	4.8	8.4	63	2765	2338	318	338	391	1673	191	5103
2	15:06	1031	809	266	264	262	262	235	166	4.7	8.3	62	2781	2438	340	332	390	1657	185	5219
1	15:07	1030	811	277	271	265	260	235	164	4.6	8.2	62	2776	2415	342	327	388	1657	187	5191
1	15:08	1030	812	288	279	269	259	236	167	4.6	8.3	61	2741	2330	335	308	385	1672	189	5071
1	15:09	1032	813	299	286	273	259	236	164	4.6	8.2	58	2791	2357	337	303	385	1689	190	5148
	15:10	1032	813	310	293	277	258	236	166	4.5	8.1	60	2744	2357	338	288	386	1690	183	5101
	15:11	1030	812	317	297	280	259	239	161	4.4	8.1	60	2766	2429	316	288	382	1690	183	5195
	15:12	1030	811	322	301	283	259	239	171	4.4	8.2	64	2775	2465	299	292	379	1701	186	5240
	15:13	1032	811	329	306	287	259	240	157	4.5	8.3	62	2743	2415	269	290	382	1722	181	5115
	15:14	1031	811	335	310	290	260	241	169	4.4	8.2	60	2740	2403	258	289	380	1713	177	5143
	15:15	1032	811	337	312	293	261	242	166	4.4	8.2	59	2668	2314	254	288	382	1713	176	4941
	15:16	1032	811	337	312	293	262	243	159	4.4	8.1	62	2743	2424	252	281	379	1721	177	5167
	15:17	1030	811	339	314	295	263	244	170	4.3	8.2	61	2783	2410	264	289	374	1724	176	5194
	15:18	1029	810	341	314	296	263	244	159	4.4	8.2	65	2754	2410	241	317	374	1740	180	5165
	15:19	1030	810	341	315	297	264	245	168	4.4	8.4	64	2737	2409	246	329	373	1728	175	5146
	15:20	1030	811	341	315	298	265	245	169	4.5	8.4	66	2811	2407	249	331	377	1723	176	5218
	15:21	1030	813	340	315	299	266	246	165	4.6	8.4	65	2799	2393	236	335	382	1718	179	5193
	15:22	1034	815	343	317	300	267	247	166	4.7	8.5	65	2742	2294	241	341	388	1710	175	5003
	15:23	1034	817	341	316	301	268	247	166	4.7	8.2	66	2772	2342	217	326	391	1703	177	5115
	15:24	1030	814	340	315	300	268	247	164	4.5	8.2	65	2740	2402	254	316	387	1693	172	5125
	15:25	1028	814	341	316	301	268	246	167	4.5	8.6	64	2764	2328	253	333	383	1722	177	5092
	15:26	1029	814	343	317	301	269	246	166	4.7	8.5	63	2775	2316	245	328	388	1739	175	5083
	15:27	1031	815	341	316	301	269	246	166	4.7	8.4	67	2752	2327	245	332	392	1717	175	5078
	15:28	1030	816	341	316	301	270	246	165	4.7	8.6	66	2743	2327	233	336	394	1715	172	5070
	15:29	1030	815	342	317	302	270	249	163	4.8	8.6	66	2795	2362	239	336	397	1728	169	5157
	15:30	1031	815	342	316	302	270	249	168	4.8	8.5	69	2721	2300	243	335	396	1723	169	5021
	15:31	1034	815	342	316	302	271	249	159	4.8	8.4	67	2751	2312	229	331	396	1721	170	5064
	15:32	1035	814	342	316	302	272	249	169	4.6	8.1	65	2672	2266	250	315	388	1701	168	4958
	15:33	1031	813	341	315	302	272	249	159	4.3	8.0	66	2745	2286	243	307	390	1678	169	5049
	15:34	1029	814	341	315	302	272	250	171	4.2	8.2	65	2709	2409	248	309	372	1703	170	5117
	15:35	1029	815	341	317	302	273	250	161	4.4	8.5	66	2760	2395	342	336	370	1746	174	5136
	15:36	1027	815	342	317	303	273	250	163	4.6	8.4	69	2741	2419	425	331	376	1752	169	5160

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 12, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
3	15:37	1030	815	342	317	303	273	250	170	4.7	8.7	67	2760	2407	467	349	381	1735	166	5167
4	15:38	1031	816	341	316	302	274	250	160	4.8	8.8	66	2717	2443	456	352	386	1742	166	5160
5	15:39	1033	815	341	317	302	274	250	163	4.9	8.8	68	2724	2407	459	362	387	1726	168	5131
6	15:40	1034	815	343	317	303	274	251	169	5.0	8.7	65	2715	2332	474	346	388	1703	168	5048
7	15:41	1032	814	342	317	303	274	251	163	5.0	8.6	66	2726	2308	506	336	391	1672	169	5033
8	15:42	1032	815	341	316	303	274	251	160	5.0	8.6	66	2768	2369	530	336	383	1672	170	5154
9	15:43	1032	815	341	316	303	275	251	168	5.0	8.6	65	2737	2406	518	341	375	1677	170	5143
0	15:44	1031	814	341	316	303	275	251	158	4.9	8.5	66	2741	2381	545	338	368	1669	167	5146
1	15:45	1031	806	341	316	303	275	251	165	4.9	8.7	71	2771	2343	562	346	366	1681	168	5114
2	15:46	1030	796	341	316	303	275	252	169	4.9	8.6	67	2749	2394	573	343	365	1693	164	5165
3	15:47	1028	784	341	316	303	275	252	171	4.9	8.7	68	2758	2406	600	348	362	1686	162	5163
4	15:48	1029	774	342	317	303	275	252	163	5.0	8.7	71	2752	2368	594	351	365	1690	161	5120
5	15:49	1032	768	342	316	303	275	252	160	5.0	8.7	73	2746	2355	609	357	364	1672	162	5101
6	15:50	1034	761	341	315	302	275	252	161	5.1	8.6	62	2742	2343	586	351	364	1657	162	5086
7	15:51	1034	753	341	315	302	275	252	0	5.0	8.5	48	2759	2392	1051	335	363	1638	164	5151
8	15:52	1032	745	343	317	303	275	252	0	4.9	8.6	46	2696	2318	1412	348	360	1640	163	5015
9	15:53	1029	739	342	315	302	275	252	0	4.9	8.6	46	2747	2331	1500	348	361	1665	160	5060
0	15:54	1031	735	341	314	302	275	252	0	5.0	8.8	48	2732	2360	1534	359	364	1677	158	5112
1	15:55	1031	730	341	314	302	275	252	0	5.1	8.6	44	2752	2318	1553	351	368	1673	156	5060
2	15:56	1033	727	341	315	302	275	252	0	5.1	8.7	43	2744	2360	1592	352	373	1664	156	5124
3	15:57	1028	723	342	315	302	275	252	0	5.0	8.5	41	2717	2368	1611	345	372	1659	158	5084
4	15:58	1029	720	342	315	302	275	252	0	4.9	9.1	44	2727	2404	1636	363	368	1665	157	5131
5	15:59	1031	718	341	313	301	275	252	0	5.3	9.1	43	2713	2355	1611	372	373	1703	157	5069
6	16:00	1033	717	341	314	301	275	252	0	5.4	9.0	41	2756	2404	1602	372	378	1683	155	5160
7	16:01	1032	715	342	315	302	275	252	0	5.3	8.8	41	2729	2404	1644	358	381	1650	154	5133

NOV. 13, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 13, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

) #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F													KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	Ca(OH)2	CBTF	KVB	OPA-	ESP	BH						
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
									PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	10:18	1031	677	341	313	291	264	243	0	5.0	8.8	29	2760	2409	1902	322	390	1829	191	5168
2	10:19	1032	677	342	314	292	265	244	0	5.0	8.7	29	2722	2409	1871	318	387	1838	195	5131
3	10:20	1030	677	340	312	291	265	244	0	4.9	8.5	28	2758	2421	1903	309	378	1827	192	5179
4	10:21	1028	677	338	311	291	265	243	0	4.7	8.7	28	2744	2370	1868	317	370	1818	190	5115
5	10:22	1029	676	337	310	291	265	243	0	4.8	8.9	30	2785	2383	1881	328	367	1825	190	5168
6	10:23	1032	677	337	310	291	265	243	0	5.0	8.9	28	2755	2345	1877	331	376	1843	189	5100
7	10:24	1030	676	336	310	291	265	244	0	5.1	8.8	30	2718	2363	1876	322	382	1830	189	5101
8	10:25	1031	677	336	310	290	265	244	167	5.1	8.9	34	2785	2333	1865	330	386	1823	190	5118
9	10:26	1033	680	337	310	291	265	244	151	5.2	8.8	37	2744	2381	1420	325	369	1824	189	5125
0	10:27	1029	680	338	311	291	266	244	158	5.1	8.7	36	2732	2381	990	323	390	1799	188	5087
1	10:28	1031	682	339	312	292	266	244	155	5.0	9.0	43	2720	2294	877	341	387	1787	190	5014
2	10:29	1033	683	341	314	292	266	245	161	5.1	8.8	41	2742	2306	866	333	390	1791	189	5048
3	10:30	1032	684	342	315	294	266	245	158	5.0	8.7	43	2783	2342	829	332	394	1786	189	5125
4	10:31	1032	684	341	314	294	267	245	150	4.9	8.7	40	2768	2367	904	327	393	1786	189	5135
5	10:32	1031	685	340	314	293	267	245	155	4.8	8.6	46	2727	2390	865	319	388	1800	193	5117
6	10:33	1026	684	339	313	293	267	245	158	4.8	8.7	45	2742	2402	874	320	386	1804	189	5144
7	10:34	1022	682	339	313	293	267	245	158	4.8	9.0	48	2766	2402	832	343	380	1807	189	5168
8	10:35	1029	684	340	314	294	267	246	153	5.2	9.7	49	2737	2328	794	379	387	1807	193	5065
9	10:36	1039	686	341	315	295	267	246	156	5.7	9.1	49	2781	2289	821	356	405	1794	188	5169
0	10:37	1036	686	342	316	295	268	246	154	5.3	8.5	49	2773	2366	856	318	404	1694	181	5161
	10:38	1034	687	341	315	295	268	246	156	4.7	8.4	49	2747	2399	871	314	369	1661	183	5156
	10:39	1030	687	340	314	295	268	246	154	4.4	8.3	50	2774	2411	912	303	368	1731	187	5185
	10:40	1025	685	339	314	295	268	246	156	4.3	8.2	51	2735	2399	896	299	358	1789	189	5134
	10:41	1026	684	339	314	295	268	247	156	4.2	8.6	54	2745	2267	869	322	352	1830	189	5032
	10:42	1033	685	339	314	295	268	246	152	4.5	8.7	52	2737	2287	822	329	358	1845	191	5024
	10:43	1032	685	339	315	295	268	247	158	4.7	8.7	49	2735	2300	825	332	371	1811	190	5035
	10:44	1031	685	340	315	295	268	247	156	4.8	8.7	53	2747	2300	839	335	380	1784	188	5047
	10:45	1028	685	341	316	296	268	247	154	4.9	8.8	54	2743	2312	874	337	387	1791	188	5056
	10:46	1030	685	341	317	296	268	247	152	4.9	8.7	59	2740	2373	852	332	390	1790	185	5113
	10:47	1032	686	342	317	297	269	248	155	4.9	8.7	54	2757	2286	814	330	392	1793	185	5050
	10:48	1034	686	340	315	296	269	247	156	4.8	8.7	54	2766	2297	845	329	389	1787	185	5062
	10:49	1030	686	340	315	296	269	248	156	4.8	8.4	54	2757	2295	806	314	385	1779	185	5157
	10:50	1028	684	340	315	296	269	248	157	4.6	8.5	54	2764	2297	823	316	376	1757	184	5060
	10:51	1026	684	340	315	296	269	248	154	4.6	8.6	54	2759	2332	858	317	371	1763	189	5091
	10:52	1033	686	341	316	296	270	248	160	4.8	8.8	56	2746	2418	834	320	371	1791	189	5166
	10:53	1030	686	341	316	296	270	248	158	5.0	8.6	58	2745	2394	827	309	374	1800	189	5139
	10:54	1031	690	342	317	297	269	248	157	5.0	8.9	55	2782	2381	811	325	372	1773	186	5164
	10:55	1031	698	342	318	297	270	249	162	5.2	8.8	56	2757	2429	811	324	374	1773	190	5186
	10:56	1033	705	341	317	297	270	249	152	5.2	8.9	59	2743	2257	779	330	376	1756	188	5000
	10:57	1030	711	341	316	297	270	249	156	5.2	8.6	58	2757	2406	812	316	381	1744	187	5162
	10:58	1031	716	341	317	297	270	249	157	5.0	8.9	64	2748	2368	800	327	381	1739	186	5123
	10:59	1032	723	343	319	298	270	249	155	5.1	8.9	58	2738	2355	782	324	383	1771	189	5093
	11:00	1029	727	342	317	298	270	249	153	5.1	8.7	63	2722	2392	788	315	386	1770	190	5128
	11:01	1028	731	341	316	298	270	249	159	5.0	8.8	60	2770	2281	777	320	383	1758	185	5051
	11:02	1029	735	341	318	298	270	250	158	5.1	8.9	60	2783	2266	738	325	383	1773	184	5051
	11:03	1028	734	343	319	298	270	250	151	5.2	8.8	64	2733	2368	791	314	387	1765	189	5100
	11:04	1029	735	342	318	298	270	250	155	5.2	9.1	65	2797	2329	781	334	387	1756	190	5126
	11:05	1032	737	340	317	298	270	250	161	5.3	9.1	62	2744	2329	787	334	391	1754	193	5074

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 13, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

1 #: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F						Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9 11:06	1033	737	341	318	298	271	250	155	5.4	8.9	59	2770	2390	814	324	395	1758	189	5160
0 11:07	1031	737	342	318	299	271	250	158	5.3	8.7	60	2736	2378	847	318	391	1761	190	5116
1 11:08	1030	736	341	317	298	271	250	161	5.1	8.9	62	2741	2390	847	333	395	1764	190	5131
2 11:09	1030	736	341	317	298	271	250	160	5.2	9.0	63	2726	2402	826	338	392	1803	197	5126
3 11:10	1030	739	342	319	299	271	250	153	5.2	8.8	63	2736	2369	775	331	391	1826	193	5125
4 11:11	1029	736	343	319	299	271	250	161	5.1	8.7	63	2727	2315	825	326	393	1823	194	5034
5 11:12	1033	739	341	318	299	271	250	155	5.0	8.8	64	2753	2364	842	333	391	1811	195	5117
5 11:13	1034	739	341	318	298	271	251	163	5.0	8.7	61	2748	2377	845	327	393	1814	197	5124
7 11:14	1032	740	341	319	299	271	251	155	4.9	8.5	63	2744	2424	817	315	391	1825	199	5169
3 11:15	1029	736	343	320	299	271	251	153	4.8	8.6	66	2741	2252	853	313	377	1834	200	4993
0 11:16	1028	736	343	318	300	271	251	161	4.8	8.8	69	2703	2269	644	315	374	1834	207	4992
0 11:17	1028	736	341	316	299	272	251	158	4.9	8.8	91	2754	2375	496	305	377	1863	208	5129
1 11:18	1031	739	341	317	299	272	251	154	5.0	8.9	91	2726	2375	424	306	382	1861	208	5102
2 11:19	1033	739	342	318	299	272	251	159	5.1	8.8	91	2753	2314	386	302	387	1838	213	5065
1 11:20	1030	739	343	319	300	272	251	157	5.1	8.8	92	2739	2387	364	296	387	1787	208	5130
1 11:21	1030	740	342	317	299	272	251	157	5.0	8.9	92	2766	2373	382	301	386	1755	206	5139
1 11:22	1028	741	341	316	299	273	251	155	5.1	8.9	98	2759	2300	359	304	389	1770	207	5059
1 11:23	1029	739	341	317	299	273	252	156	5.1	9.0	73	2739	2287	495	295	390	1773	207	5026
1 11:24	1028	739	342	318	299	274	251	161	5.3	8.9	71	2765	2409	899	291	392	1782	208	5174
1 11:25	1031	739	343	318	300	274	252	154	5.2	8.9	67	2746	2360	1017	295	389	1767	208	5105
1 11:26	1032	739	341	317	299	275	252	155	5.3	8.8	50	2718	2310	1081	296	392	1780	213	5029
11:27	1030	739	342	318	299	275	252	0	5.2	8.9	60	2747	2384	1147	298	389	1767	211	5133
11:28	1032	739	342	318	299	276	252	0	5.2	9.0	60	2727	2372	1056	308	388	1787	214	5099
11:29	1031	739	341	317	299	276	252	0	5.2	8.9	64	2725	2394	1129	300	391	1787	215	5130
11:30	1028	739	341	317	299	276	252	0	5.0	8.8	78	2744	2296	1154	300	390	1779	213	5040
11:31	1029	736	341	317	299	276	252	0	5.0	9.0	63	2710	2370	910	301	388	1798	216	5080
11:32	1031	736	341	317	299	277	252	0	5.0	8.9	59	2741	2382	1164	295	391	1800	216	5123
11:33	1030	736	341	317	299	277	252	0	4.9	8.9	56	2761	2406	1211	301	393	1794	218	5167
11:34	1031	736	341	317	299	277	252	0	5.0	8.9	65	2710	2321	1462	315	395	1804	221	5031
11:35	1030	736	341	317	299	276	252	0	5.0	9.0	54	2736	2382	1570	328	395	1808	221	5118
11:36	1033	739	342	319	299	276	252	473	5.0	9.0	92	2736	2382	1322	335	396	1806	225	5118
11:37	1031	736	343	319	300	276	253	473	5.1	8.9	64	2735	2321	658	325	397	1799	227	5057
11:38	1030	737	342	317	299	276	252	172	5.1	9.0	78	2742	2382	1462	331	395	1780	225	5118
11:39	1029	737	342	318	299	276	252	159	5.0	8.9	84	2746	2382	892	333	391	1752	226	5126
11:40	1029	736	343	319	299	276	252	154	5.0	9.0	90	2771	2346	745	338	391	1754	226	5117
11:41	1031	737	342	318	299	276	252	156	5.0	9.0	83	2724	2358	775	335	387	1766	231	5082
11:42	1032	739	341	317	299	276	252	157	5.0	8.9	84	2761	2346	750	333	387	1782	233	5107
11:43	1030	739	341	317	299	276	252	151	4.9	9.0	83	2717	2394	752	338	384	1789	232	5111
11:44	1029	741	343	319	299	276	252	157	4.9	8.9	84	2744	2271	768	333	383	1783	229	5015
11:45	1030	741	342	318	299	276	252	156	4.8	9.0	82	2746	2370	791	334	381	1763	228	5116
11:46	1031	740	340	317	299	276	252	165	4.8	9.0	84	2729	2346	754	332	379	1777	232	5074
11:47	1029	740	341	317	299	276	252	156	4.9	8.9	84	2751	2358	770	330	380	1793	233	5092
11:48	1029	741	342	318	299	275	252	158	4.9	9.2	89	2742	2370	753	341	384	1792	234	5112
11:49	1032	742	343	318	299	275	252	155	5.1	9.1	91	2746	2259	771	343	391	1789	233	5004
11:50	1033	742	343	317	299	275	252	160	5.1	9.0	83	2730	2284	776	328	394	1755	228	5014
11:51	1032	743	341	316	299	275	252	159	4.9	8.8	91	2747	2309	633	315	393	1730	223	5056
11:52	1030	743	342	317	299	275	252	156	4.7	8.8	89	2761	2346	670	309	386	1733	225	5107
11:53	1030	742	342	316	299	275	253	155	4.8	8.8	86	2732	2370	365	297	384	1762	230	5102

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 13, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

# --->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F													KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	Ca(OH)2	CBTF	KVB	OPA-	ESP	BH						
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
									PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	11:54	1015	738	341	314	298	275	252	162	4.8	8.9	93	2727	2346	322	295	379	1766	231	5073
8	11:55	1027	736	341	315	298	275	252	154	5.0	10.2	88	2736	2346	288	328	365	1782	235	5081
9	11:56	1039	741	342	317	299	275	252	157	5.9	9.4	87	2758	2346	254	305	400	1814	246	5074
0	11:57	1039	743	343	317	299	275	252	158	5.9	8.9	87	2720	2321	216	274	401	1740	237	5041
1	11:58	1035	742	341	315	298	275	252	161	5.4	8.8	92	2730	2321	234	265	391	1673	233	5052
2	11:59	1031	742	341	315	298	275	252	161	5.2	8.7	88	2763	2309	257	261	377	1709	236	5071
3	12:00	1029	740	343	317	299	275	252	155	5.0	8.8	88	2732	2362	253	271	367	1734	233	5114
4	12:01	1027	740	343	317	299	275	252	157	5.0	8.8	71	2722	2346	277	271	366	1755	229	5068
5	12:02	1026	740	341	315	299	275	253	157	5.0	9.0	87	2747	2259	299	274	368	1764	227	5006
6	12:03	1032	741	341	315	298	275	252	156	5.2	9.0	86	2737	2309	283	283	375	1787	226	5046
7	12:04	1032	741	342	315	298	275	252	160	5.3	8.9	87	2737	2362	264	282	381	1790	223	5119
8	12:05	1033	741	342	316	298	275	252	151	5.2	8.9	87	2749	2406	234	289	383	1777	219	5133
9	12:06	1032	741	341	316	299	275	253	162	5.1	8.8	88	2751	2360	225	286	385	1757	221	5131
0	12:07	1032	741	341	316	298	275	253	154	5.0	8.8	87	2744	2320	388	291	388	1739	220	5063
1	12:08	1032	741	343	318	299	276	253	159	4.9	8.7	87	2727	2362	494	298	388	1743	226	5109
2	12:09	1028	741	342	317	299	276	253	155	4.8	8.7	88	2752	2296	531	298	388	1742	227	5049
3	12:10	1027	741	340	316	299	276	253	157	4.9	9.1	91	2727	2362	592	308	390	1754	223	5109
4	12:11	1030	741	341	317	299	276	253	153	5.2	9.1	92	2749	2360	595	311	392	1777	225	5129
5	12:12	1032	743	342	318	299	276	253	164	5.4	8.9	89	2732	2368	615	307	393	1766	223	5100
6	12:13	1029	743	342	317	299	277	253	157	5.4	9.0	88	2722	2356	620	308	390	1738	223	5078
7	12:14	1034	744	341	317	299	277	253	155	5.4	9.0	88	2725	2356	624	313	386	1728	225	5088
8	12:15	1033	745	341	317	299	277	253	156	5.4	8.8	89	2751	2360	670	305	385	1716	223	5131
9	12:16	1032	745	342	317	299	277	253	162	5.2	8.5	99	2752	2362	654	290	379	1702	220	5112
0	12:17	1029	745	342	317	299	277	253	153	5.0	8.7	89	2745	2309	676	295	372	1715	223	5054
1	12:18	1030	745	341	316	298	277	253	158	5.1	8.8	88	2752	2296	666	300	368	1729	224	5049
2	12:19	1031	746	341	316	298	277	253	155	5.2	8.6	92	2711	2358	672	293	371	1726	222	5069
3	12:20	1030	745	342	317	298	276	253	154	5.1	8.6	89	2747	2309	675	294	370	1720	223	5056
4	12:21	1028	744	342	317	299	276	253	159	4.9	8.6	87	2713	2358	723	294	367	1730	224	5071
5	12:22	1029	744	341	316	298	276	253	163	5.0	8.9	89	2735	2284	736	307	368	1763	226	5019
6	12:23	1031	745	341	316	298	276	253	151	5.1	8.9	85	2699	2370	720	309	372	1775	227	5069
7	12:24	1031	746	343	318	299	276	253	154	5.2	8.9	85	2717	2321	671	316	379	1768	223	5038
8	12:25	1032	747	342	316	298	276	253	162	5.2	8.9	86	2720	2362	709	315	383	1754	220	5053
9	12:26	1032	747	341	315	298	276	253	157	5.1	8.7	87	2740	2282	725	308	385	1734	218	5023
0	12:27	1032	747	342	316	298	275	253	156	5.1	8.7	86	2735	2358	701	305	383	1724	218	5083
1	12:28	1033	747	343	317	298	275	252	156	5.0	8.6	93	2722	2370	747	304	379	1711	217	5092
2	12:29	1032	747	342	315	298	275	253	155	5.0	8.5	88	2734	2296	590	292	377	1719	216	5030
3	12:30	1030	746	341	312	297	275	253	162	4.9	8.6	88	2723	2370	301	278	374	1726	218	5093
4	12:31	1028	745	340	312	297	275	252	155	4.9	8.7	87	2746	2309	249	273	371	1747	222	5055
5	12:32	1029	746	342	313	297	275	252	157	5.0	8.8	87	2712	2362	201	278	372	1763	221	5094
6	12:33	1029	748	343	314	297	275	252	159	5.2	8.7	93	2751	2370	188	276	377	1783	218	5121
7	12:34	1033	749	341	312	297	275	252	154	5.1	8.6	99	2732	2309	182	274	378	1771	218	5041
8	12:35	1029	749	341	312	296	275	252	156	5.0	8.6	94	2764	2394	178	271	378	1761	216	5158
9	12:36	1026	747	342	313	296	275	252	161	4.8	8.9	98	2739	2370	164	279	377	1757	218	5119
0	12:37	1031	747	342	312	296	275	252	164	5.1	9.1	99	2741	2260	141	290	389	1788	222	5001
1	12:38	1035	749	340	311	296	274	252	153	5.3	8.8	93	2715	2360	138	237	397	1784	216	5048
2	12:39	1035	751	341	312	296	274	252	158	5.2	8.7	88	2732	2362	131	229	397	1757	213	5114
3	12:40	1028	751	342	312	296	274	252	157	5.0	8.6	89	2751	2362	135	223	394	1746	213	5168
4	12:41	1027	750	342	312	296	274	252	158	4.9	9.0	86	2752	2346	135	235	389	1760	219	5098

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 13, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

1 #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	12:42	1027	752	342	312	296	274	252	160	5.1	9.0	90	2742	2358	120	247	394	1774	213	5100
6	12:43	1032	750	341	312	296	273	252	159	5.2	9.0	88	2763	2364	105	250	400	1769	212	5146
7	12:44	1034	751	340	311	295	273	252	159	5.3	8.7	90	2803	2362	122	227	404	1759	215	5185
8	12:45	1032	751	340	313	295	273	252	153	5.1	8.9	94	2752	2309	230	231	399	1722	213	5061
9	12:46	1030	750	343	316	297	274	252	156	5.0	8.8	92	2796	2248	346	237	390	1716	220	5044
0	12:47	1005	745	341	314	297	274	252	157	4.9	8.9	92	2700	2347	425	242	384	1713	220	5019
1	12:48	985	730	339	312	295	274	251	151	5.1	11.1	99	2737	2360	424	269	389	1761	225	5097
2	12:49	928	713	339	311	295	274	251	162	2.9	13.5	91	2722	2347	377	269	323	1463	226	5071
3	12:50	891	696	338	310	294	274	251	156	3.9	15.4	92	2734	2347	335	264	296	1260	--	5081
4	12:51	894	698	338	309	293	273	251	157	4.9	16.7	92	2732	2335	341	254	240	1073	--	5086
5	12:52	938	694	338	310	293	273	250	157	5.5	16.0	93	2729	2349	610	347	178	810	--	5078
6	14:03	1032	742	341	312	294	271	250	0	5.2	8.9	50	2744	2401	1787	279	383	1814	246	5145
7	14:04	1034	744	341	311	293	271	250	0	5.1	8.7	51	2739	2377	1774	271	378	1784	245	5116
8	14:05	1031	744	342	312	293	271	250	0	5.0	8.6	54	2734	2290	1746	265	374	1769	242	5025
9	14:06	1031	745	341	312	293	271	250	0	4.8	8.6	50	2734	2278	1735	263	365	1742	239	5012
0	14:07	1029	745	341	311	293	271	250	0	4.8	8.6	53	2727	2278	1816	266	360	1738	240	4982
1	14:08	1031	745	342	312	293	271	250	0	4.8	8.6	53	2743	2239	1832	265	359	1741	233	4982
2	14:09	1028	745	342	312	294	271	250	0	4.8	8.7	51	2733	2352	1822	269	360	1747	233	5113
3	14:10	1030	745	342	312	293	271	250	0	4.7	8.7	50	2715	2352	1822	273	359	1745	228	5069
4	14:11	1028	745	341	312	293	271	250	0	4.8	8.7	50	2724	2315	1796	271	364	1751	225	5039
5	14:12	1032	746	341	311	293	271	250	0	4.8	8.9	51	2766	2389	1759	282	365	1743	223	5155
6	14:13	1032	746	342	312	294	271	250	0	4.9	8.7	53	2746	2328	1781	274	370	1728	220	5076
7	14:14	1032	747	342	312	294	271	250	0	4.9	8.7	51	2721	2315	1794	279	373	1712	218	5036
8	14:15	1032	747	340	311	293	271	250	0	4.9	8.6	51	2744	2340	1755	274	373	1712	224	5084
9	14:16	1032	747	341	311	293	271	250	0	4.8	8.6	49	2739	2401	1828	272	371	1701	217	5140
0	14:17	1032	747	343	312	294	271	250	0	4.8	8.6	54	2726	2389	1829	274	371	1709	220	5114
	14:18	1032	747	342	312	294	271	250	0	4.7	8.6	51	2748	2377	1853	274	365	1725	219	5093
2	14:19	1032	747	341	311	293	271	250	0	4.7	8.6	52	2739	2328	1863	271	364	1737	214	5067
3	14:20	1032	747	341	311	293	271	250	0	4.7	8.6	49	2751	2352	1831	274	362	1758	212	5106
4	14:21	1032	747	342	312	293	271	250	0	4.7	8.5	51	2760	2377	1836	266	359	1766	211	5136
5	14:22	1029	746	342	312	293	271	250	0	4.7	8.5	50	2755	2369	1835	270	358	1760	204	5143
	14:23	1029	745	342	311	293	271	250	0	4.7	8.6	50	2656	2366	1823	272	358	1759	206	5022
	14:24	1028	746	342	311	293	271	250	0	4.7	8.7	49	2743	2369	1850	274	356	1741	204	5131
	14:25	1031	747	341	311	293	271	250	0	4.8	8.9	59	2731	2369	1875	268	362	1739	201	5119
	14:26	1033	749	342	311	293	271	250	241	4.9	8.8	46	2743	2377	1278	287	368	1747	201	5119
	14:27	1030	750	342	312	294	271	250	233	5.0	8.9	49	2746	2377	779	292	377	1754	199	5123
	14:28	1032	750	342	312	294	271	250	237	5.1	9.1	52	2714	2364	711	299	378	1749	197	5078
	14:29	1034	752	342	312	294	271	250	237	5.1	9.0	56	2739	2377	714	298	383	1748	198	5114
	14:30	1034	752	342	312	294	271	250	235	5.2	8.7	57	2727	2265	703	283	388	1754	197	4992
	14:31	1032	751	343	313	294	271	250	234	4.9	8.7	55	2739	2303	685	280	380	1735	195	5042
	14:32	1030	750	343	312	294	271	250	237	4.8	8.6	61	2734	2377	653	275	372	1753	198	5111
	14:33	1030	749	342	312	294	271	250	235	4.7	8.8	58	2710	2290	686	286	365	1735	201	5001
	14:34	1027	749	342	312	294	271	250	236	4.9	8.8	59	2703	2315	678	288	368	1737	200	5019
	14:35	1030	749	343	312	295	271	250	236	5.0	9.1	62	2743	2290	684	299	370	1740	200	5033
	14:36	1031	750	343	312	295	271	250	234	5.1	8.8	63	2756	2369	657	290	373	1749	202	5145
	14:37	1033	751	341	312	294	271	250	236	5.1	9.0	63	2753	2315	693	295	373	1739	197	5068
	14:38	1035	752	342	313	295	271	250	235	5.1	8.8	63	2739	2401	692	284	374	1741	198	5130
	14:39	1030	752	343	313	295	271	250	230	5.0	8.7	64	2731	2304	685	280	370	1744	196	5035

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

NOTE:
1) All data on this sheet were taken on NOV. 13, 1991.
2) Calcium Injector Type is II–Staggered
3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
03	14:40	1031	752	342	312	295	271	251	240	4.9	8.9	61	2737	2317	680	291	366	1739	200	5054
04	14:41	1027	752	342	312	295	271	250	236	5.0	8.9	64	2753	2390	670	288	365	1737	203	5143
05	14:42	1028	753	343	313	295	271	250	232	5.0	9.3	65	2753	2390	671	310	366	1730	205	5143
06	14:43	1031	753	342	313	295	271	251	237	5.2	9.2	70	2743	2424	672	311	374	1743	204	5167
07	14:44	1031	752	342	312	295	271	250	236	5.3	9.1	67	2763	2389	657	305	365	1744	197	5152
08	14:45	1032	752	342	313	290	271	250	234	5.4	9.2	63	2753	2364	655	312	391	1725	199	5117
09	14:46	1033	753	343	313	293	271	250	235	5.4	9.1	66	2756	2389	651	305	394	1718	200	5145
10	14:47	1032	753	342	312	293	271	250	235	5.3	9.1	66	2733	2278	648	303	391	1707	197	5015
11	14:48	1029	752	341	312	293	270	250	237	5.3	9.1	70	2763	2278	604	302	391	1720	201	5041
12	14:49	1028	751	342	313	294	271	250	240	5.4	9.3	68	2715	2252	667	313	390	1726	199	4968
13	14:50	1031	753	343	313	295	270	250	234	5.5	9.2	69	2734	2290	612	306	391	1726	200	5025
14	14:51	1035	754	343	312	295	271	250	231	5.5	9.2	69	2724	2364	609	304	391	1726	195	5068
15	14:52	1032	754	341	311	295	271	251	239	5.4	8.9	70	2707	2278	368	285	387	1722	195	4984
16	14:53	1032	754	341	311	294	271	251	234	5.2	9.2	73	2744	2278	337	280	382	1707	189	5022
17	14:54	1032	754	342	312	295	272	251	236	5.3	8.9	72	2724	2278	301	270	382	1736	197	5001
18	14:55	1032	755	342	312	295	272	251	236	5.2	9.0	70	2753	2364	352	272	377	1725	195	5117
19	14:56	1030	755	342	312	295	272	251	237	5.2	8.8	69	2748	2328	448	277	379	1730	198	5075
20	14:57	1030	753	342	312	295	272	251	232	5.2	9.1	74	2751	2340	510	290	379	1723	195	5091
21	14:58	1032	755	342	312	295	272	251	234	5.2	9.0	71	2746	2328	561	290	379	1717	194	5074
22	14:59	1034	755	343	312	295	272	251	236	5.2	8.9	73	2737	2377	439	274	382	1717	197	5114
23	15:00	1030	753	341	310	295	273	251	240	5.1	8.8	72	2768	2377	328	265	382	1732	195	5144
24	15:01	1029	753	341	311	295	273	251	232	5.0	9.1	77	2703	2290	305	269	378	1752	198	4993
25	15:02	1028	752	343	312	295	273	251	228	5.2	9.1	77	2766	2363	282	267	379	1764	197	5129
26	15:03	1024	751	342	310	295	273	251	243	5.3	9.2	75	2719	2301	266	266	382	1756	196	5020
27	15:04	1024	750	341	310	294	273	251	239	5.4	9.8	77	2737	2367	256	264	387	1748	197	5124
28	15:05	1031	751	342	311	295	273	251	234	6.0	10.3	77	2744	2375	243	307	402	1770	202	5119
29	15:06	1036	756	343	311	295	272	251	234	6.5	10.1	99	2741	2363	242	305	416	1756	201	5104
30	15:07	1036	757	342	311	295	272	251	234	6.5	9.8	99	2729	2375	229	295	424	1701	194	5104
31	15:08	1032	757	341	310	295	272	251	233	6.3	9.7	99	2734	2363	251	289	422	1672	194	5097
32	15:09	1031	756	342	311	295	272	251	242	6.1	9.6	99	2717	2314	246	279	416	1694	198	5031
33	15:10	1031	755	343	312	295	272	251	227	6.0	9.6	99	2722	2364	234	279	408	1740	204	5087
34	15:11	1030	755	342	310	295	272	251	236	5.9	9.5	99	2715	2367	240	279	405	1743	204	5102
35	15:12	1032	757	341	309	294	272	251	237	5.9	9.6	99	2731	2399	252	287	406	1746	203	5130
36	15:13	1031	758	341	310	294	272	251	239	5.9	9.5	99	2754	2389	269	286	407	1754	203	5143
37	15:14	1031	758	343	313	295	272	251	234	5.8	9.7	99	2739	2301	376	291	407	1743	200	5040
38	15:15	1030	758	342	312	295	272	251	235	5.9	9.7	99	2724	2289	408	304	411	1746	200	5012
39	15:16	1029	758	341	311	295	273	251	236	6.0	9.7	99	2727	2399	432	307	413	1758	203	5126
40	15:17	1030	758	341	311	295	273	251	236	5.9	9.8	99	2731	2413	443	314	415	1740	203	5143
	15:18	1034	758	343	312	295	273	251	237	6.0	9.8	99	2734	2367	464	318	418	1742	204	5121
43	15:19	1033	758	342	312	295	273	251	236	6.1	9.6	99	2754	2290	478	314	418	1754	203	5045
44	15:20	1031	759	341	312	295	273	251	233	6.0	9.7	99	2746	2364	532	313	413	1746	201	5110
	15:21	1030	759	341	311	295	272	251	233	5.9	9.8	99	2739	2338	547	326	409	1749	205	5078
	15:22	1029	758	342	312	295	272	251	237	6.0	9.7	99	2739	2289	556	328	408	1779	203	5028
	15:23	1030	759	342	312	295	272	251	236	6.0	9.7	99	2737	2363	551	331	410	1780	202	5100
	15:24	1034	760	342	311	295	272	251	234	6.0	9.6	99	2724	2301	554	331	407	1772	201	5025
	15:25	1035	761	341	310	295	272	251	233	5.9	9.4	99	2749	2326	579	321	405	1760	199	5075
	15:26	1032	760	341	311	295	272	251	235	5.8	9.4	99	2744	2328	585	318	402	1762	199	5072
	15:27	1032	760	342	312	295	272	251	236	5.6	9.5	99	2756	2401	600	323	395	1756	204	5157

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 13, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	15:28	1032	761	342	312	295	272	251	234	5.6	9.5	99	2743	2413	592	323	394	1764	200	5155
2	15:29	1034	761	341	311	295	272	251	235	5.6	9.3	99	2727	2278	611	313	395	1765	199	5005
3	15:30	1034	761	342	311	295	272	251	237	5.6	9.3	99	2731	2303	571	310	397	1761	201	5033
4	15:31	1030	762	342	310	295	272	251	233	5.5	9.0	99	2734	2314	301	278	392	1749	196	5048
5	15:32	1032	763	342	310	295	272	251	232	5.2	9.2	99	2744	2375	257	280	384	1722	192	5119
6	15:33	1030	762	341	309	294	271	251	237	5.2	9.1	99	2731	2315	228	276	384	1736	196	5046
7	15:34	1029	761	342	309	294	271	251	233	5.2	9.1	99	2724	2278	223	270	385	1750	195	5001
8	15:35	1027	760	341	309	294	271	251	237	5.1	9.2	99	2734	2369	213	269	387	1744	194	5123
9	15:36	1028	761	341	309	294	271	251	233	5.3	9.5	90	2741	2328	217	279	392	1748	194	5068
0	15:37	1027	761	341	309	294	271	251	240	5.5	9.6	99	2751	2278	196	282	395	1748	194	5029
1	15:38	1028	761	342	309	294	271	251	231	5.7	10.0	99	2768	2364	194	283	395	1741	191	5132
2	15:39	1031	761	342	310	294	271	250	237	5.9	9.8	99	2756	2364	184	295	406	1752	193	5121
3	15:40	1034	762	341	309	294	270	250	237	6.1	10.0	99	2739	2352	195	291	406	1745	187	5092
4	15:41	1035	764	341	309	294	270	251	234	6.2	9.8	99	2754	2352	177	292	414	1745	195	5107
5	15:42	1033	764	342	309	294	270	251	238	6.2	9.7	99	2746	2303	185	284	414	1744	195	5049
6	15:43	1031	764	341	309	293	270	250	232	5.9	9.6	99	2753	2375	181	279	411	1714	189	5126
7	15:44	1031	764	342	309	293	270	250	237	5.9	9.5	99	2726	2369	166	281	408	1718	196	5114
8	15:45	1031	765	341	308	293	270	250	239	5.7	9.4	99	2753	2375	176	276	404	1709	192	5128
9	15:46	1031	766	341	308	293	270	250	238	5.6	9.4	99	2751	2314	177	274	404	1710	192	5065
0	15:47	1032	766	342	309	293	270	250	232	5.5	9.5	99	2733	2363	204	276	404	1706	191	5095
	15:48	1029	763	342	309	294	270	251	233	5.5	9.5	99	2748	2289	190	276	407	1713	188	5036
2	15:49	1031	763	342	308	293	270	250	234	5.5	9.6	99	2731	2377	189	284	409	1721	188	5107
3	15:50	1034	765	341	308	293	269	250	239	5.6	9.5	99	2768	2399	168	289	412	1736	186	5167
	15:51	1034	766	341	308	293	270	250	242	5.6	9.4	99	2733	2367	182	282	413	1733	184	5120
	15:52	1030	765	342	308	293	269	250	237	5.5	9.1	99	2760	2367	158	269	414	1717	186	5140
	15:53	1032	766	342	308	293	269	250	234	5.4	9.5	99	2746	2399	157	278	411	1710	186	5145
	15:54	1035	766	341	308	293	269	250	237	5.4	9.2	99	2748	2375	151	275	408	1710	191	5123
	15:55	1032	765	341	308	293	269	250	234	5.2	9.1	99	2736	2301	165	265	399	1681	186	5037
	15:56	1031	765	342	308	293	269	250	231	5.1	8.9	99	2721	2411	169	255	395	1686	188	5131
	15:57	1030	765	343	309	293	269	250	232	4.9	9.2	99	2736	2399	165	269	386	1697	187	5135
	15:58	1030	765	342	308	293	270	250	235	5.0	9.1	99	2753	2265	149	272	384	1745	189	5020
	15:59	1029	764	341	307	292	270	250	240	5.0	9.2	99	2765	2369	159	271	385	1747	189	5153
	16:00	1029	764	341	307	292	269	250	235	5.0	9.4	99	2702	2352	162	280	387	1729	193	5054
	16:01	1031	765	343	309	293	269	250	235	5.1	9.4	99	2750	2315	157	276	392	1720	190	5065
	16:02	1032	766	343	308	293	269	250	230	5.2	9.3	99	2731	2369	156	269	401	1708	190	5119
	16:03	1033	767	341	307	292	269	250	233	5.3	9.1	99	2753	2278	158	250	407	1703	189	5031
	16:04	1032	767	341	307	292	269	250	240	5.2	9.1	99	2734	2315	165	250	405	1684	187	5050
	16:05	1034	768	342	308	292	269	250	228	5.3	9.3	99	2746	2389	159	255	399	1698	189	5135
	16:06	1031	767	342	308	273	268	245	237	5.3	9.0	99	2745	2389	167	253	394	1697	188	5134
	16:07	1028	766	341	307	265	266	242	237	5.2	9.2	81	2743	2315	182	262	390	1701	184	5058
	16:08	1026	766	341	307	262	264	241	236	5.2	9.4	79	2771	2401	174	274	388	1727	188	5171
	16:09	1029	767	342	307	261	263	240	235	5.3	9.7	78	2757	2303	181	291	391	1735	184	5060
	16:10	1029	766	342	307	260	261	239	237	5.6	9.7	76	2759	2278	171	296	405	1740	184	5037
	16:11	1026	765	341	307	260	259	238	234	5.7	9.8	77	2759	2278	163	305	410	1715	179	5037
	16:12	1032	766	341	308	259	258	237	233	5.9	10.3	73	2761	2364	157	317	419	1693	181	5126
	16:13	1029	766	341	308	259	257	237	233	6.2	9.8	74	2768	2328	156	302	430	1677	183	5096
	16:14	1027	765	341	308	259	255	237	239	6.2	10.2	76	2753	2377	182	313	427	1623	184	5104
	16:15	1027	765	342	309	259	254	236	238	6.3	10.3	70	2760	2328	211	324	433	1600	189	5088

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

IOTE:
) All data on this sheet were taken on NOV. 13, 1991.
) Calcium Injector Type is II—Staggered
3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
39	16:16	1027	765	342	309	259	253	236	236	6.6	10.4	67	2791	2278	228	326	437	1581	192	5068
30	16:17	1031	766	341	309	258	252	235	224	6.8	10.7	67	2801	2369	240	332	444	1549	192	5190
31	16:18	1030	766	342	309	258	251	235	242	6.9	10.5	67	2767	2290	243	332	446	1530	193	5057
32	16:19	1034	768	343	310	259	251	234	230	7.0	10.7	76	2788	2377	242	340	448	1505	198	5164
33	16:20	1033	768	342	309	258	250	234	241	7.1	10.5	76	2748	2364	251	343	449	1492	206	5113
34	16:21	1029	768	341	308	257	249	233	231	7.0	10.3	65	2781	2352	241	326	448	1462	209	5134
35	16:22	1027	767	341	308	257	248	233	239	6.9	10.5	65	2759	2265	256	327	448	1454	212	5024
36	16:23	1029	767	343	309	257	248	233	237	7.0	10.5	68	2795	2340	256	334	448	1474	218	5135
37	16:24	1032	767	343	308	257	247	232	234	7.1	10.7	68	2792	2364	184	333	442	1481	223	5156
38	16:25	1030	766	341	306	256	246	232	229	7.2	10.7	63	2773	2304	165	335	442	1469	227	5077
39	16:26	1034	767	340	307	255	246	231	234	7.3	10.8	70	2794	2378	152	339	440	1499	234	5172
40	16:27	1033	767	342	308	256	245	231	229	7.4	10.6	65	2780	2360	151	334	434	1500	236	5160
41	16:28	1030	767	342	308	256	245	231	239	7.4	10.6	66	2778	2368	137	334	440	1493	237	5146
42	16:29	1030	766	341	307	256	245	231	236	7.2	10.5	59	2785	2293	137	335	439	1476	233	5079
43	16:30	1031	765	341	307	255	244	231	229	7.2	10.4	50	2787	2392	315	264	440	1483	234	5179
44	16:31	1034	766	341	307	256	244	231	232	7.1	10.4	48	2780	2378	465	254	440	1485	236	5158
45	16:32	1034	766	341	307	256	244	231	235	7.1	10.3	46	2775	2304	490	252	438	1492	236	5079
46	16:33	1033	765	341	307	256	244	231	233	7.0	10.2	43	2791	2315	559	244	439	1489	232	5106
47	16:34	1030	764	341	307	257	244	231	230	7.0	10.2	43	2804	2290	592	246	443	1500	229	5095
48	16:35	1027	763	341	307	257	244	231	236	6.8	10.4	40	2785	2377	612	252	441	1493	227	5162
49	16:36	1028	763	341	306	257	245	231	0	6.8	10.4	41	2777	2278	626	254	444	1498	229	5054
50	16:37	1030	764	341	307	257	244	231	0	7.0	10.3	42	2775	2315	652	255	447	1502	228	5090
51	16:38	1026	762	341	307	257	244	231	0	7.1	10.6	41	2778	2399	662	261	448	1497	227	5177
52	16:39	1030	763	342	307	273	245	233	0	7.2	10.9	38	2738	2351	677	270	452	1501	223	5089
53	16:40	1033	764	341	307	279	246	236	0	7.4	10.9	37	2739	2276	729	274	452	1500	231	5015
54	16:41	1034	765	344	310	283	248	237	0	7.5	10.9	40	2767	2251	806	283	450	1489	230	5017
55	16:42	1029	764	342	308	284	250	238	0	7.5	10.7	38	2763	2367	853	286	449	1475	235	5150
56	16:43	1028	762	339	305	283	251	237	0	3.0	11.0	43	2768	2377	931	298	335	1105	182	5145
57	16:44	997	752	339	305	284	252	238	0	3.1	11.6	37	2730	2278	914	254	6	1110	186	5008
58	16:45	957	734	340	305	284	253	238	0	3.1	13.1	41	2742	2377	849	207	5	1091	179	5119
59	16:46	926	717	342	306	284	253	238	0	3.1	15.4	43	2725	2342	765	195	4	1001	302	5066

NOV. 14, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 14, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
) TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1 05:58	1031	725	341	310	297	278	261	0	5.1	8.6	38	2735	2342	1746	348	419	1535	151	5076
2 05:59	1031	725	341	310	297	278	260	0	5	8.6	36	2716	2403	1759	342	415	1533	152	5126
3 06:00	1027	724	341	311	297	278	260	0	4.9	8.8	35	2726	2342	1759	354	415	1541	151	5068
4 06:01	1030	724	341	311	297	278	260	0	5	8.9	37	2708	2415	1754	361	413	1552	152	5123
5 06:02	1029	724	342	311	297	278	260	0	5.1	8.8	35	2694	2329	1769	359	416	1555	151	5023
6 06:03	1029	723	341	310	297	278	260	0	5.2	8.9	37	2723	2403	1759	352	420	1568	153	5126
7 06:04	1032	724	341	310	297	277	260	0	5.2	8.9	35	2709	2292	1753	362	422	1572	150	5001
8 06:05	1033	724	341	311	297	278	260	0	5.3	8.9	36	2728	2367	1754	365	421	1571	151	5117
9 06:06	1032	724	342	311	297	277	260	0	5.2	8.8	35	2754	2379	1740	362	424	1549	149	5132
10 06:07	1030	723	340	309	296	277	260	0	5.1	8.8	36	2740	2354	1765	362	426	1543	145	5094
06:08	1029	723	341	310	296	278	260	0	5.1	8.9	37	2765	2379	1821	368	431	1551	143	5144
06:09	1032	724	342	311	297	278	260	0	5.1	8.8	37	2740	2317	1802	349	431	1560	146	5057
06:10	1032	724	341	310	297	277	260	0	5.1	8.8	38	2762	2391	1774	349	436	1572	143	5131
06:11	1030	724	340	310	296	277	260	0	5	8.6	35	2737	2317	1409	383	433	1572	144	5053
06:12	1029	723	341	310	297	278	260	0	5	8	36	2738	2377	1672	376	435	1574	141	5115
06:13	1030	723	342	311	297	278	260	0	4.9	8.1	41	2750	2290	1726	383	432	1570	140	5040
06:14	1034	724	341	310	297	278	260	0	5	5.7	34	2730	2328	1779	364	432	1577	143	5068
06:15	1030	723	341	310	296	278	260	0	5	6.6	35	2731	2317	1727	307	428	1569	143	5048
06:16	1029	723	342	311	297	278	260	0	4.9	8.8	36	2713	2342	1760	367	425	1572	144	5054
06:17	1030	723	342	311	297	278	260	0	4.9	8.9	41	2716	2415	1784	367	422	1577	144	5131
06:18	1030	722	341	309	297	278	260	0	5.1	8.8	33	2748	2367	1769	361	425	1583	143	5115
06:19	1032	725	341	310	297	277	260	243	5	8.8	57	2711	2354	1590	369	424	1561	142	5065
06:20	1035	728	342	311	297	277	260	224	5.1	8.9	57	2731	2367	834	376	427	1563	140	5098
06:21	1032	729	342	310	297	278	260	236	5.2	8.7	63	2737	2365	710	368	428	1561	144	5101
06:22	1028	730	340	310	297	277	260	233	5.1	8.9	69	2731	2367	715	376	426	1546	143	5098
06:23	1034	733	342	312	297	277	260	229	5	9	63	2728	2354	701	365	431	1538	142	5103
06:24	1028	732	342	312	298	277	260	227	5.2	8.6	64	2718	2367	703	362	438	1552	143	5084
06:25	1030	733	341	311	298	278	260	232	5	9	65	2767	2367	677	372	437	1548	143	5133
06:26	1030	735	341	311	298	277	260	233	5.1	8.9	67	2772	2367	680	376	437	1577	143	5139
06:27	1032	736	342	312	298	277	260	225	5.3	9	70	2737	2367	669	376	437	1580	142	5103
06:28	1034	737	341	311	298	277	260	228	5.4	8.9	71	2745	2253	659	377	439	1574	147	4993
06:29	1033	738	341	312	298	277	260	235	5.3	8.8	72	2735	2365	670	374	436	1546	143	5100
06:30	1033	739	342	313	298	277	260	230	5.2	8.7	71	2740	2365	679	367	434	1527	144	5105
06:31	1030	739	341	312	298	277	260	229	5.2	8.8	71	2728	2365	678	370	429	1530	146	5093
06:32	1028	739	342	312	298	277	260	231	5.1	8.8	70	2733	2365	655	379	424	1534	144	5033
06:33	1028	739	342	312	298	277	260	231	5.2	8.9	73	2730	2377	649	383	429	1549	145	5107
06:34	1029	739	341	311	298	277	260	234	5.2	8.8	73	2769	2315	658	380	431	1545	144	5084
06:35	1027	739	341	312	298	277	260	235	5.2	8.8	76	2726	2328	638	380	434	1536	141	5054
06:36	1031	740	343	313	299	277	260	225	5.1	9.1	73	2725	2328	634	387	437	1520	142	5052
06:37	1033	742	342	312	299	278	261	226	5.2	8.9	76	2723	2277	458	374	442	1528	143	5010
06:38	1033	742	341	311	298	278	260	231	5.3	8.9	74	2704	2401	355	364	445	1525	142	5106
06:39	1030	742	341	311	298	278	260	236	5.2	8.8	73	2726	2340	300	359	445	1522	141	5067
06:40	1030	743	343	313	299	278	261	234	5.1	8.9	78	2763	2436	271	364	442	1542	144	5199
06:41	1031	743	342	312	299	278	261	223	5.1	8.9	77	2755	2326	251	361	443	1551	140	5071
06:42	1031	743	341	312	299	278	261	231	5.2	8.7	79	2714	2314	254	352	447	1551	140	5028
06:43	1029	743	342	312	299	278	261	231	5.1	8.7	80	2758	2314	254	348	443	1532	140	5072
06:44	1028	743	342	312	299	278	261	235	5	8.8	80	2733	2339	251	348	438	1531	140	5072
06:45	1024	742	342	312	299	278	261	226	5	9	76	2762	2376	236	358	433	1546	138	5137

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 14, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
06:46	1033	744	342	313	299	278	261	225	5.1	9.4	81	2762	2422	223	378	434	1555	139	5197
06:47	1033	745	342	312	299	278	261	233	5.5	8.9	82	2738	2325	210	361	444	1573	141	5063
06:48	1030	745	341	312	299	278	261	228	5.4	8.8	82	2716	2325	210	345	443	1539	140	5040
06:49	1032	745	342	313	300	278	261	232	5.2	9	79	2724	2398	221	349	437	1520	139	5123
06:50	1027	744	342	313	300	278	262	230	5.3	8.8	82	2756	2362	217	343	435	1533	139	5068
06:51	1032	745	342	313	300	279	262	233	5.2	9.2	82	2750	2397	219	363	432	1529	138	5146
06:52	1031	745	341	312	299	278	262	225	5.4	8.9	82	2731	2362	224	349	435	1545	141	5093
06:53	1035	747	342	313	300	279	262	230	5.3	8.8	79	2693	2362	204	348	438	1530	141	5055
06:54	1029	745	342	313	300	279	262	235	5.1	8.6	76	2699	2362	214	333	438	1519	140	5060
06:55	1028	745	341	313	294	279	261	236	5	9	74	2711	2310	218	349	436	1528	140	4975
06:56	1026	743	341	313	280	278	256	224	5	9.1	75	2746	2325	231	347	432	1539	135	5070
06:57	1034	746	343	314	276	277	254	228	5.3	9	75	2740	2312	232	353	442	1561	141	5052
06:58	1034	747	342	313	274	275	252	237	5.5	8.7	77	2740	2325	216	342	444	1566	141	5064
06:59	1032	748	341	313	272	273	251	229	5.2	8.6	77	2771	2312	223	330	438	1529	141	5063
07:00	1027	746	341	313	271	272	250	232	5.1	8.6	78	2749	2299	217	332	433	1540	143	5074
07:01	1030	749	342	313	271	270	250	234	5.1	8.8	77	2758	2337	210	343	426	1546	139	5094
07:02	1032	751	341	313	270	269	249	226	5.1	8.6	77	2765	2398	212	330	424	1536	140	5164
07:03	1028	750	341	313	270	268	249	231	5.1	8.5	78	2780	2366	209	331	426	1529	138	5166
07:04	1028	749	341	313	269	267	248	235	5	8.8	76	2721	2366	213	342	424	1519	137	5107
07:05	1028	749	341	313	269	266	248	234	5	8.7	73	2719	2398	229	342	422	1520	134	5117
07:06	1033	751	342	314	269	265	247	231	5.1	8.6	72	2704	2397	221	333	426	1526	134	5101
07:07	1031	750	342	314	269	264	247	228	5	8.5	73	2704	2364	230	325	428	1519	135	5089
07:08	1030	749	341	314	269	263	246	228	4.9	8.6	75	2715	2265	228	329	427	1536	134	5005
07:09	1032	750	341	313	268	263	246	226	4.9	8.7	74	2706	2298	224	336	427	1565	135	5006
07:10	1033	751	342	314	269	262	246	234	5	8.6	73	2706	2409	228	332	432	1570	137	5116
07:11	1035	752	342	314	268	262	245	233	5	8.3	72	2718	2323	229	313	430	1559	137	5041
07:12	1034	750	342	313	268	261	245	236	4.8	8.2	74	2706	2335	228	304	428	1545	135	5042
07:13	1032	748	341	313	268	260	244	227	4.6	8.2	74	2722	2363	240	303	418	1559	135	5105
07:14	1030	748	341	313	268	260	244	222	4.5	8.1	75	2688	2407	249	299	409	1578	132	5095
07:15	1029	749	342	314	268	260	244	232	4.4	8.1	74	2698	2358	242	299	405	1587	135	5057
07:16	1029	749	342	314	268	259	244	237	4.3	8.2	75	2693	2443	234	303	400	1598	135	5136
07:17	1032	748	341	313	267	259	244	232	4.4	8.2	59	2717	2383	247	295	398	1608	135	5077
07:18	1031	748	340	313	267	259	244	231	4.5	8.2	51	2722	2346	630	271	398	1604	135	5068
07:19	1031	747	342	315	268	259	244	231	4.5	8.1	49	2705	2344	748	264	403	1589	135	5049
07:20	1032	747	342	315	268	259	244	234	4.5	8	48	2720	2344	828	259	405	1576	134	5065
07:21	1030	747	341	313	267	259	244	229	4.5	8	46	2715	2344	891	264	404	1574	139	5060
07:22	1032	746	340	314	267	259	244	233	4.4	8.1	44	2718	2343	899	263	397	1578	137	5061
07:23	1032	746	342	315	268	259	244	231	4.4	8	45	2712	2355	952	264	397	1598	137	5067
07:24	1031	745	342	314	268	259	244	230	4.4	8	46	2705	2343	964	264	398	1612	135	5048
07:25	1032	745	341	313	267	258	244	227	4.4	8	41	2697	2343	970	266	397	1618	136	5039
07:26	1032	745	341	313	267	258	244	231	4.4	8.1	37	2685	2354	994	267	398	1622	136	5036
07:27	1032	747	342	315	267	258	244	235	4.3	8	40	2690	2354	1020	265	399	1636	135	5043
07:28	1031	747	342	314	267	258	244	234	4.3	8.1	40	2663	2341	1017	267	396	1621	134	5004
07:29	1032	747	341	313	266	258	243	230	4.3	8	39	2687	2354	1009	269	393	1615	135	5040
07:30	1031	746	341	313	266	257	243	228	4.3	8	38	2704	2341	1028	271	390	1599	133	5045
07:31	1032	747	342	314	267	257	243	227	4.3	8.2	39	2688	2341	1028	274	391	1589	130	5021
07:32	1028	747	341	313	266	257	243	235	4.3	8.1	36	2705	2341	1005	273	390	1587	129	5046
07:33	1029	747	341	313	266	257	243	230	4.4	8.2	37	2698	2354	1030	278	392	1589	130	5052

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

NOTE:
1) All data on this sheet were taken on NOV. 14, 1991.
2) Calcium Injector Type is II—Staggered
3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

Ch #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
IO	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
97	07:34	1030	747	342	314	266	257	243	231	4.4	8.3	38	2709	2354	1048	264	392	1578	127	5062
98	07:35	1030	747	342	313	266	256	243	229	4.6	8.4	36	2715	2354	1028	265	398	1586	130	5050
99	07:36	1026	745	341	312	266	256	242	229	4.6	8.4	36	2731	2354	1057	265	399	1570	128	5084
00	07:37	1027	745	341	313	266	256	242	234	4.7	8.6	35	2704	2329	1026	300	404	1563	130	5033
01	07:38	1029	749	342	314	266	256	242	0	4.8	8.5	40	2729	2341	1044	303	408	1559	128	5070
02	07:39	1029	747	342	313	266	256	242	0	4.9	8.7	38	2716	2341	930	305	413	1548	124	5057
03	07:40	1029	747	341	312	266	256	242	0	5	8.7	36	2716	2366	990	304	419	1538	123	5074
04	07:41	1031	747	342	313	266	255	242	0	5.1	8.7	39	2684	2354	1015	305	420	1527	127	5037
05	07:42	1030	749	343	313	266	255	241	0	5.1	8.7	62	2706	2390	603	343	424	1516	125	5096
06	07:43	1030	748	341	312	266	255	241	221	5.1	8.8	58	2731	2279	496	321	425	1507	123	5010
07	07:44	1028	747	341	312	266	255	241	237	5.2	8.8	58	2729	2329	339	337	425	1510	124	5058
08	07:45	1031	748	341	313	265	255	240	226	5.1	8.9	56	2726	2378	310	336	424	1494	127	5118
09	07:46	1034	751	342	313	266	255	240	236	5.1	8.8	62	2714	2306	294	339	423	1501	129	5020
10	07:47	1033	751	342	313	265	254	240	231	5.2	8.7	61	2735	2414	273	335	424	1522	127	5148
11	07:48	1029	751	341	312	265	254	240	237	5.1	8.7	60	2719	2331	280	332	420	1516	126	5050
12	07:49	1027	750	341	313	265	254	240	237	5.1	8.7	64	2706	2404	261	326	419	1518	128	5130
13	07:50	1030	749	342	313	265	254	239	237	5.1	8.9	66	2721	2331	231	327	417	1515	128	5052
14	07:51	1030	748	341	313	265	253	239	232	5.2	8.7	67	2720	2392	257	324	416	1516	130	5111
15	07:52	1033	750	342	313	265	253	239	223	5.3	8.8	65	2743	2392	268	328	417	1515	130	5135
16	07:53	1030	752	341	312	265	253	239	234	5.3	8.7	66	2725	2429	255	320	417	1509	127	5154
17	07:54	1034	755	341	313	265	253	239	232	5.1	8.8	62	2720	2360	260	325	416	1494	127	5105
8	07:55	1034	756	342	313	265	253	239	229	5.1	8.7	62	2715	2355	263	324	416	1502	128	5070
9	07:56	1033	755	341	312	265	253	239	225	5.1	8.5	61	2723	2381	263	313	418	1503	129	5104
20	07:57	1032	752	341	312	265	253	239	229	4.9	8.6	64	2694	2355	260	314	415	1498	128	5049
21	07:58	1030	753	341	313	265	253	239	234	4.9	8.6	61	2720	2332	266	316	416	1515	125	5073
22	07:59	1030	752	341	313	265	253	239	231	4.9	8.7	68	2711	2344	260	318	414	1526	125	5056
23	08:00	1029	752	342	313	265	253	239	227	4.9	8.7	69	2713	2369	267	317	411	1529	128	5082
24	08:01	1027	751	342	313	265	253	238	232	5	8.6	71	2722	2369	256	317	411	1533	127	5091
25	08:02	1028	752	341	312	265	253	238	228	4.9	9	73	2727	2381	253	332	411	1527	126	5108
26	08:03	1032	753	341	312	264	253	238	236	5.1	8.7	70	2720	2357	249	323	414	1546	127	5080
27	08:04	1032	754	341	312	264	253	238	225	5.1	8.7	66	2717	2357	252	320	412	1532	127	5073
28	08:05	1032	754	342	313	265	253	238	235	5.1	8.7	68	2725	2344	244	326	412	1524	129	5069
29	08:06	1031	755	342	312	264	252	238	230	5.1	8.7	66	2732	2343	248	318	410	1520	129	5075
30	08:07	1031	755	342	313	265	252	238	226	5.1	8.9	69	2725	2417	240	324	409	1511	128	5147
31	08:08	1031	753	341	312	264	252	238	236	5.1	8.7	70	2720	2307	248	315	409	1505	131	5027
32	08:09	1032	754	341	312	264	252	238	226	5.2	8.7	69	2713	2320	248	320	412	1508	133	5033
33	08:10	1034	756	342	313	265	252	238	233	5.1	8.6	66	2703	2320	255	323	408	1498	135	5023
34	08:11	1033	756	342	313	243	252	232	229	5	8.5	56	2757	2307	241	319	408	1495	133	5064
35	08:12	1032	758	341	312	235	249	229	236	4.8	8.5	55	2753	2269	230	325	411	1494	126	5022
36	08:13	1032	758	341	312	233	247	227	227	4.8	8.5	51	2733	2361	230	315	412	1515	129	5114
37	08:14	1030	758	341	312	231	245	226	232	4.8	8.4	47	2739	2344	236	304	411	1529	128	5083
38	08:15	1032	758	342	312	230	242	225	235	4.8	8.4	51	2734	2334	242	298	408	1534	128	5087
39	08:16	1032	759	341	312	229	240	224	222	4.9	8.5	49	2722	2395	241	297	403	1535	128	5117
40	08:17	1031	759	341	311	228	239	223	222	4.9	8.4	49	2726	2395	235	295	394	1522	128	5121
41	08:18	1027	758	342	312	228	237	222	239	4.9	8.4	53	2764	2321	213	298	390	1517	124	5085
42	08:19	1030	758	341	312	227	235	222	229	4.9	8.5	50	2753	2309	227	290	389	1515	125	5062
43	08:20	1031	759	340	311	226	234	221	232	4.9	8.5	50	2750	2419	247	286	387	1511	126	5169
44	08:21	1030	757	341	312	226	233	220	230	5	8.6	52	2744	2334	246	297	387	1521	126	5147

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 14, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

n #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	08:22	1029	755	342	312	226	231	220	231	5	8.6	41	2707	2296	224	303	398	1525	125	5003
6	08:23	1030	754	341	312	225	231	220	232	5	8.6	38	2744	2419	485	277	392	1520	124	5163
7	08:24	1031	753	341	312	225	230	220	231	5	8.8	37	2731	2334	686	260	396	1509	126	5080
8	08:25	1032	755	341	312	225	229	219	50	5.1	8.5	37	2739	2320	782	270	401	1502	130	5059
9	08:26	1031	757	342	313	225	228	219	25	5.1	8.5	37	2744	2405	778	274	407	1489	129	5150
0	08:27	1032	758	342	312	224	228	219	0	5	8.4	32	2734	2306	748	262	411	1480	126	5040
1	08:28	1033	761	342	312	224	227	218	0	5	8.5	51	2736	2405	863	264	409	1485	124	5142
2	08:29	1031	761	342	312	224	227	217	0	5	8.4	46	2740	2307	241	299	402	1483	129	5047
3	08:30	1031	762	342	312	223	226	217	232	5	8.6	43	2752	2282	279	297	397	1487	132	5128
4	08:31	1032	761	341	311	222	225	216	229	5.1	8.5	42	2720	2320	256	296	394	1494	135	5040
5	08:32	1029	759	342	312	222	224	216	231	5.2	8.6	40	2759	2381	253	301	396	1489	133	5140
6	08:33	1030	759	342	312	222	224	215	231	5.1	8.5	41	2731	2320	250	292	392	1466	131	5050
7	08:34	1032	759	341	311	222	223	215	235	5.1	8.5	41	2724	2393	247	290	389	1457	130	5117
8	08:35	1033	760	341	311	221	222	215	229	5.1	8.4	43	2720	2395	255	286	386	1455	133	5119
9	08:36	1032	760	341	311	221	222	214	229	5.1	8.5	42	2739	2309	241	297	384	1456	131	5047
0	08:37	1032	761	342	312	221	221	214	230	4.9	8.5	41	2712	2321	250	299	381	1452	131	5033
1	08:38	1031	760	342	312	221	221	214	231	4.9	8.5	39	2719	2407	245	302	386	1470	129	5126
2	08:39	1029	760	341	311	221	221	213	236	5	8.5	41	2724	2284	241	303	391	1462	127	5022
3	08:40	1030	760	341	311	221	220	213	222	4.9	8.7	42	2731	2358	258	315	394	1479	127	5090
4	08:41	1031	761	342	312	221	220	213	237	4.9	8.6	40	2731	2346	252	309	396	1469	124	5077
5	08:42	1030	761	342	312	220	220	213	200	5	8.5	43	2740	2358	253	302	403	1477	126	5098
6	08:43	1031	761	341	312	220	219	212	243	4.9	8.6	40	2743	2358	240	303	405	1472	124	5131
7	08:44	1032	761	341	312	219	219	211	235	5	8.6	41	2764	2346	256	301	408	1486	123	5110
8	08:45	1032	761	342	312	219	219	211	225	5	8.6	43	2764	2358	252	295	405	1495	123	5123
9	08:46	1032	761	342	312	219	218	211	233	5	8.5	42	2778	2346	261	293	403	1505	122	5124
0	08:47	1029	760	341	312	219	218	211	233	5	8.5	43	2737	2358	234	290	395	1541	124	5081
1	08:48	1031	760	341	312	219	218	210	240	5	8.6	43	2737	2358	220	300	393	1508	124	5096
2	08:49	1030	760	342	312	219	218	210	221	5	8.6	47	2766	2334	239	285	388	1549	123	5100
3	08:50	1031	760	341	312	219	217	210	235	5.1	8.5	43	2748	2334	244	283	387	1531	121	5081
4	08:51	1031	759	342	313	220	217	210	234	5.1	8.5	50	2742	2271	241	284	383	1515	122	5013
5	08:52	1031	759	341	312	221	217	210	231	5	8.5	44	2746	2395	232	283	379	1496	122	5158
6	08:53	1031	758	341	312	221	217	210	224	5	8.4	42	2756	2383	248	282	381	1495	124	5139
7	08:54	1034	759	342	313	221	217	210	228	5	8.4	43	2759	2358	271	272	382	1495	123	5118
8	08:55	1032	759	342	313	220	217	210	245	4.9	8.4	43	2766	2358	265	278	379	1502	122	5125
9	08:56	1032	759	341	311	219	217	209	227	4.9	8.4	39	2741	2346	263	278	376	1533	124	5087
0	08:57	1031	759	341	312	219	216	209	236	4.9	8.4	39	2767	2358	221	282	375	1548	125	5098
	08:58	1030	758	342	313	220	216	209	232	4.9	8.4	33	2746	2371	298	269	379	1546	123	5117
	08:59	1031	758	341	313	211	217	208	226	4.8	8.3	32	2769	2363	706	249	381	1526	121	5151
	09:00	1032	758	340	312	207	216	205	231	4.9	8.3	30	2766	2321	743	249	388	1524	122	5088
	09:01	1031	758	341	312	206	215	205	228	4.9	8.3	33	2758	2381	798	251	385	1504	123	5132
	09:02	1031	758	342	313	206	214	204	230	4.9	8.4	31	2743	2269	833	253	384	1486	124	5024
	09:03	1032	758	341	312	204	213	203	55	4.9	8.4	33	2743	2380	853	253	381	1472	124	5123
	09:04	1030	759	341	312	204	212	203	27	4.9	8.3	31	2755	2367	696	257	380	1463	125	5123
	09:05	1029	758	342	312	203	210	202	27	4.9	8.3	32	2757	2331	808	247	378	1458	126	5088
	09:06	1028	759	343	313	202	209	201	468	4.8	8.4	40	2773	2392	387	289	377	1450	129	5137
	09:07	1030	759	341	311	201	208	200	230	4.8	8.5	40	2748	2357	313	287	374	1455	130	5104
	09:08	1030	759	341	311	200	207	200	234	4.9	8.5	36	2763	2357	258	289	377	1462	129	5120
	09:09	1030	760	341	312	201	206	199	232	4.9	8.6	42	2753	2357	240	293	381	1454	122	5110

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 14, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
09:10	1032	761	342	312	201	205	199	226	5	8.5	42	2745	2257	243	266	365	1458	124	5072
09:11	1030	762	342	312	201	205	199	232	5	8.4	44	2750	2271	233	279	366	1460	126	5021
09:12	1032	762	341	311	200	204	199	223	5	8.5	38	2748	2358	235	281	365	1469	125	5107
09:13	1030	762	341	311	200	204	199	229	5	8.5	40	2736	2371	241	279	363	1489	126	5107
09:14	1032	762	342	312	200	203	198	232	5	8.5	38	2740	2321	230	277	362	1493	125	5061
09:15	1033	763	342	312	200	203	198	235	5	8.5	40	2736	2363	230	276	361	1486	128	5133
09:16	1030	761	340	311	200	202	198	230	4.9	8.6	39	2750	2395	236	279	377	1473	128	5145
09:17	1030	761	341	311	199	202	198	230	4.9	8.6	41	2745	2395	231	279	376	1476	129	5140
09:18	1031	760	342	312	199	201	197	239	5	8.8	37	2739	2443	216	293	378	1482	127	5182
09:19	1032	762	343	312	200	201	197	231	5	8.7	38	2744	2309	220	269	377	1473	125	5154
09:20	1031	762	341	311	199	201	197	232	5.1	8.6	36	2744	2407	224	277	360	1471	126	5151
09:21	1031	762	341	311	199	201	197	224	5.1	8.7	37	2729	2395	224	283	378	1476	126	5123
09:22	1031	762	342	311	199	200	197	231	5	8.7	37	2741	2371	216	285	373	1471	126	5111
09:23	1030	761	342	311	199	200	197	227	5	8.6	35	2737	2371	218	279	373	1468	125	5108
09:24	1029	759	340	310	199	200	197	228	4.9	8.9	35	2744	2309	225	300	373	1451	122	5061
09:25	1027	758	341	311	199	200	197	235	5	8.9	39	2723	2360	222	297	377	1448	122	5083
09:26	1030	758	342	312	199	200	197	236	5.1	8.9	36	2732	2372	209	298	365	1442	121	5104
09:27	1032	759	342	312	199	199	197	230	5.1	8.8	36	2718	2360	201	291	390	1426	121	5078
09:28	1034	760	341	311	198	199	197	232	5.1	8.9	38	2715	2335	209	292	391	1412	121	5069
09:29	1033	761	340	310	198	199	196	227	5	8.9	37	2718	2323	204	297	393	1405	123	5041
09:30	1032	762	341	311	198	199	197	232	5	8.8	39	2731	2360	204	297	395	1417	122	5091
09:31	1033	760	342	312	199	199	197	235	5	8.8	33	2735	2360	228	281	392	1422	122	5095
09:32	1033	759	341	311	199	199	197	232	5	8.7	32	2752	2372	593	258	393	1422	119	5125
09:33	1032	757	340	311	199	199	197	223	5	8.7	31	2744	2395	706	257	391	1420	119	5139
09:34	1031	756	341	312	199	199	197	221	4.9	8.7	33	2744	2323	732	257	396	1415	119	5067
09:35	1027	756	342	312	200	199	198	0	4.9	8.7	33	2758	2383	786	255	383	1424	117	5140
09:36	1029	756	341	312	200	200	198	0	4.9	9	33	2742	2296	690	263	383	1461	119	5038
09:37	1031	759	342	312	200	200	198	0	5.1	9	39	2732	2419	791	260	382	1492	121	5151
09:38	1030	759	342	312	200	200	198	165	5.2	8.9	35	2742	2443	286	295	381	1479	121	5169
09:39	1029	759	341	310	200	199	197	229	5.2	8.9	34	2723	2371	331	283	380	1450	123	5094
09:40	1031	760	340	311	199	199	197	240	5.2	8.9	35	2744	2309	243	286	380	1424	122	5053
09:41	1032	760	342	312	200	199	197	229	5.2	8.8	38	2742	2296	229	281	381	1408	124	5039
09:42	1032	760	342	312	200	199	197	227	5.1	8.8	39	2739	2358	234	280	381	1393	125	5109
09:43	1032	761	341	311	200	199	197	235	5.1	8.7	38	2754	2358	232	276	380	1429	129	5113
09:44	1031	760	341	311	199	199	197	232	5.1	8.8	38	2794	2358	228	277	378	1459	129	5153
09:45	1030	759	342	312	200	199	197	223	5.1	8.8	38	2754	2358	225	274	375	1447	127	5113
09:46	1031	760	342	312	200	199	197	227	5.1	8.9	40	2734	2346	230	277	372	1424	127	5060
09:47	1030	760	341	311	200	199	197	227	5.1	8.8	41	2754	2358	206	280	373	1413	126	5101
09:48	1031	761	341	311	200	199	197	231	5.1	8.8	38	2744	2321	195	277	373	1409	127	5065
09:49	1030	761	342	311	200	199	197	239	5.1	8.8	37	2752	2348	206	277	372	1408	126	5100
09:50	1032	762	342	312	200	199	197	226	5.2	8.8	39	2741	2273	197	275	371	1417	125	5013
09:51	1033	762	341	311	200	199	197	230	5.1	8.7	44	2722	2407	217	270	368	1415	126	5129
09:52	1033	761	342	312	200	199	197	215	5.1	8.8	39	2734	2364	219	275	368	1421	126	5129
09:53	1031	760	342	312	200	199	197	222	5.1	8.7	39	2722	2323	227	269	369	1427	126	5045
09:54	1029	760	342	312	200	199	197	224	5.1	8.8	40	2739	2372	219	268	370	1433	125	5111
09:55	1030	760	342	312	200	199	197	230	5.1	8.9	42	2741	2310	222	282	368	1440	126	5051
09:56	1029	760	342	311	200	199	197	233	5.1	8.9	41	2742	2364	222	285	368	1446	127	5113
09:57	1030	761	342	311	199	199	197	228	5.2	8.9	39	2744	2372	209	269	375	1458	129	5116

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 14, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

1 #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	09:58	1029	761	341	312	200	199	197	237	5.2	8.9	38	2739	2273	205	265	379	1458	127	5011
2	09:59	1032	761	342	312	200	199	197	222	5.2	8.8	41	2744	2364	209	281	384	1453	127	5128
3	10:00	1032	761	342	312	200	199	197	241	5.2	8.8	42	2749	2364	219	284	385	1449	127	5133
4	10:01	1032	761	342	312	200	199	197	223	5.2	8.8	41	2739	2310	213	284	385	1463	129	5043
5	10:02	1032	761	342	312	200	199	197	234	5.1	8.8	40	2742	2397	215	288	383	1507	128	5139
6	10:03	1030	761	342	312	195	199	197	234	5.1	9	43	2749	2397	202	305	383	1529	128	5146
7	10:04	1030	760	342	312	189	198	194	226	5.1	8.9	41	2754	2348	182	306	385	1511	125	5101
8	10:05	1029	759	342	311	187	197	193	227	5.1	9	42	2747	2372	170	323	392	1486	123	5119
9	10:06	1031	759	342	312	186	196	192	232	5	9.1	40	2746	2397	159	323	394	1456	122	5147
0	10:07	1029	758	342	312	186	195	192	234	5.1	8.9	41	2749	2323	169	318	401	1450	119	5072
1	10:08	1029	760	343	313	186	195	191	233	5.1	9	40	2745	2409	170	320	403	1444	120	5153
2	10:09	1030	760	342	312	185	194	191	224	5	9	44	2762	2348	168	320	404	1435	118	5109
3	10:10	1030	760	341	311	184	193	190	240	5	8.9	39	2748	2348	172	319	404	1433	118	5096
4	10:11	1032	762	342	312	183	192	190	229	5.1	9.1	41	2777	2298	167	329	408	1446	120	5075
5	10:12	1030	761	342	312	184	192	190	232	5.1	9	42	2750	2298	161	320	410	1460	118	5048
6	10:13	1029	759	342	312	184	191	190	220	5.1	9	42	2760	2421	161	325	411	1466	120	5181
7	10:14	1029	759	342	311	184	190	189	236	5.1	9.1	38	2773	2397	162	329	412	1469	120	5169
8	10:15	1028	757	342	311	183	190	189	236	5.1	9	40	2756	2397	158	325	415	1471	122	5145
9	10:16	1030	758	342	311	183	189	189	238	5.1	9.2	38	2749	2409	167	337	416	1455	122	5157
0	10:17	1031	758	342	312	183	189	189	234	5.1	9.2	40	2765	2397	164	340	419	1439	122	5181
1	10:18	1030	759	342	311	183	189	189	228	5.1	9.2	41	2747	2409	161	335	423	1429	120	5156
2	10:19	1032	760	341	311	182	188	188	229	5.2	9.2	42	2765	2397	159	340	422	1423	124	5163
3	10:20	1032	762	341	311	183	188	188	224	5.2	9.2	38	2760	2285	162	338	418	1415	123	5054
4	10:21	1032	761	342	311	182	188	188	237	5.2	9.2	40	2754	2398	164	341	420	1410	122	5153
5	10:22	1032	761	342	311	178	188	187	229	5.2	9.2	37	2732	2422	156	340	420	1411	120	5155
6	10:23	1030	758	342	311	174	187	185	232	5.2	9.2	40	2760	2364	147	343	420	1411	121	5164
7	10:24	1028	757	342	310	173	186	184	232	5.2	9.3	37	2746	2432	144	341	422	1415	121	5170
8	10:25	1031	758	342	311	172	185	183	226	5.2	9.4	40	2760	2366	148	358	423	1417	120	5146
9	10:26	1031	759	342	311	172	184	183	226	5.4	9.3	40	2739	2398	154	352	430	1438	118	5137
0	10:27	1031	759	341	311	171	183	182	232	5.4	9.3	39	2774	2261	147	344	432	1435	120	5035
1	10:28	1031	760	342	311	171	182	182	233	5.3	9.3	41	2757	2410	139	347	431	1426	119	5167
2	10:29	1029	761	343	311	171	181	182	229	5.3	9.3	41	2791	2287	138	347	429	1422	121	5078
3	10:30	1031	761	342	311	171	181	181	224	5.3	9.3	38	2776	2398	137	346	433	1436	120	5174
4	10:31	1027	761	341	310	171	180	181	232	5.3	9.2	42	2776	2398	136	343	433	1429	118	5174
5	10:32	1030	762	341	311	171	180	181	229	5.3	9.5	39	2792	2287	140	356	431	1449	120	5079
	10:33	1027	762	343	311	171	180	181	227	5.4	9.5	39	2781	2287	143	360	430	1478	122	5108
	10:34	1031	764	342	311	171	179	180	235	5.5	9.7	39	2792	2396	136	372	431	1475	124	5178
	10:35	1030	764	341	310	170	179	180	231	5.6	9.7	40	2811	2325	133	372	432	1455	126	5135
	10:36	1035	766	342	311	171	178	180	230	5.7	9.6	40	2787	2299	131	375	436	1430	128	5086
	10:37	1035	766	342	311	170	178	180	228	5.7	9.3	40	2787	2398	131	350	437	1404	125	5186
	10:38	1030	766	341	310	170	178	180	235	5.5	9.5	40	2782	2274	133	356	437	1366	126	5056
	10:39	1029	764	341	310	221	179	191	224	5.4	9.4	46	2743	2374	131	358	430	1367	129	5117
	10:40	1029	764	341	310	243	184	201	227	5.5	9.6	44	2722	2374	193	356	423	1382	128	5096
	10:41	1025	761	342	310	252	190	207	233	5.6	9.5	49	2686	2376	220	349	429	1396	128	5061
	10:42	1028	762	342	310	258	196	211	229	5.6	9.9	56	2805	2362	218	369	431	1388	125	5166
	10:43	1030	765	342	310	262	201	214	227	5.8	9.8	58	2830	2362	208	369	439	1386	126	5192
	10:44	1033	765	341	309	265	207	216	237	5.9	9.8	59	2796	2349	181	369	445	1374	129	5149
	10:45	1037	767	341	310	269	211	219	232	5.9	9.4	60	2802	2349	198	344	450	1354	132	5152

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 14, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp.
4) Sodium Sorbent Type is Bicarbonate
5) Opacity Vs Water

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
10:46	1035	767	342	311	272	216	221	232	5.9	9.2	64	2786	2349	210	327	449	1346	132	5135
10:47	1032	765	341	310	274	220	223	226	5.7	9.2	69	2820	2362	203	334	443	1334	132	5162
10:48	1027	763	341	310	275	224	225	230	5.5	9.4	65	2806	2362	199	344	435	1352	131	5167
10:49	1032	765	342	310	277	228	227	237	5.5	9.6	71	2789	2363	200	360	434	1377	129	5153
10:50	1031	765	342	310	279	231	228	229	5.7	9.2	64	2779	2351	193	341	438	1391	130	5130
10:51	1030	764	341	310	280	233	230	0	5.7	9.5	63	2795	2363	198	339	438	1375	131	5159
10:52	1033	765	340	311	281	236	232	0	5.6	9.3	58	2800	2374	520	299	436	1363	130	5174
10:53	1031	764	341	312	283	239	233	0	5.7	9.2	49	2788	2362	721	297	435	1367	130	5156
10:54	1030	762	342	313	284	242	234	0	5.6	9.3	44	2808	2362	864	310	433	1357	129	5170
10:55	1029	762	342	312	285	244	236	0	5.5	9.2	50	2818	2349	1004	312	431	1361	129	5167
10:56	1029	761	341	312	285	246	236	0	5.6	9.4	42	2799	2348	1094	330	432	1378	132	5147
10:57	1033	761	341	312	286	247	237	0	5.6	9.4	50	2802	2360	1149	341	429	1365	131	5162
10:58	1032	761	341	312	286	249	238	0	5.6	9.2	40	2788	2362	1198	338	429	1395	129	5150
10:59	1028	758	341	312	287	251	239	0	5.6	9.3	45	2746	2348	1222	343	432	1391	129	5094
11:00	1032	758	341	312	287	252	239	0	5.5	9.6	42	2769	2349	1269	363	435	1382	129	5118
11:01	1033	759	341	312	288	254	240	0	5.7	9.2	39	2774	2349	1284	352	443	1401	132	5123
11:02	1023	754	341	311	288	255	240	0	5.7	9.3	46	2723	2349	1339	352	445	1404	129	5042
11:03	976	736	340	309	287	255	239	0	5.5	11.1	61	2739	2362	1345	302	444	1394	129	5101
11:04	939	716	340	308	286	256	239	0	6.3	14.1	62	2755	2351	1285	279	432	1458	147	5106
11:05	908	694	341	308	286	256	240	0	3.5	16.5	69	2784	2368	1159	244	296	1143	285	5172

NOV.19,1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 19, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Chemcal.
4) Delta SO2 Vs T

#: --->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME H:M	SORB INJ.PT	ECO OUT	AH MID	HUM. CHM IN	ESP IN	ESP MID	ESP OUT	RATE PPH	O2 %	O2 %	CITY %	FLOW SCFM	FLOW SCFM	SO2	NOX	NOX	SO2	CO	FLOW SCFM
														CORRECTED @ 3% O2, PPM					
10:59	971	732	341	309	299	277	257	0	6.4	8.8	42	2729	2329	1630	368	424	1494	184	5058
11:00	975	734	342	310	299	277	257	0	6.3	8.7	41	2724	2403	1611	364	418	1487	181	5127
11:01	978	736	343	311	300	277	258	0	6.3	8.5	41	2767	2304	1633	346	416	1493	184	5072
11:02	980	738	341	310	300	277	259	0	6.1	8.4	41	2771	2317	1627	339	411	1483	181	5066
11:03	981	739	341	310	299	277	258	0	5.9	8.3	41	2832	2335	1642	334	405	1480	180	5167
11:04	983	740	341	310	300	277	258	0	5.8	8.2	39	2794	2461	1641	326	397	1489	180	5255
11:05	984	741	341	310	300	277	258	0	5.7	8.2	41	2809	2296	1648	321	387	1498	179	5106
11:06	986	742	341	310	300	277	258	0	5.6	8.2	40	2804	2269	1653	320	384	1498	179	5073
11:07	986	742	341	310	300	277	258	0	5.6	8.2	41	2797	2386	1665	317	380	1501	177	5183
11:08	986	743	342	310	300	277	258	0	5.5	8.2	38	2796	2361	1653	317	374	1495	172	5144
11:09	988	744	342	310	300	277	258	0	5.5	8.2	42	2797	2335	1649	313	371	1498	170	5132
11:10	989	745	342	310	300	277	258	0	5.5	8.1	39	2796	2373	1633	312	367	1501	170	5169
11:11	990	745	341	310	300	277	258	0	5.5	8.1	41	2787	2386	1632	308	366	1502	166	5173
11:12	990	746	342	310	300	277	258	0	5.4	8.1	40	2777	2424	1654	312	365	1489	166	5200
11:13	991	747	342	310	300	277	258	0	5.4	8.1	39	2794	2424	1659	322	365	1486	166	5218
11:14	993	747	342	310	300	277	258	0	5.3	8.1	40	2799	2361	1653	323	364	1481	163	5160
11:15	989	745	341	309	300	277	258	0	5.3	8.1	41	2799	2485	1649	330	367	1486	158	5264
11:16	991	746	342	310	300	277	258	0	5.2	9.0	37	2768	2449	1640	297	369	1483	157	5216
11:17	992	746	342	310	300	277	258	0	5.3	8.5	38	2783	2348	1578	212	373	1496	156	5131
11:18	989	746	343	311	300	277	259	0	4.8	8.3	40	2792	2361	1587	304	320	1456	163	5153
11:19	988	746	342	310	300	277	259	0	4.8	8.4	40	2813	2386	1610	348	253	1461	185	5199
11:20	990	749	342	310	300	278	259	0	5.2	8.3	48	2794	2372	1355	362	301	1484	182	5165
11:21	991	749	342	310	300	278	259	123	5.3	8.1	44	2797	2434	1362	344	359	1482	171	5237
11:22	993	750	342	310	300	278	259	129	5.3	8.0	40	2795	2434	1440	341	362	1462	163	5230
11:23	994	750	342	310	300	278	259	133	5.0	7.8	43	2811	2434	1444	332	365	1474	153	5245
11:24	995	751	342	310	300	278	259	133	4.9	7.8	43	2821	2372	1452	332	361	1466	151	5193
11:25	997	752	342	310	300	278	259	127	4.8	7.7	42	2782	2447	1450	331	379	1495	155	5228
11:26	997	753	342	310	300	278	259	134	4.7	7.7	44	2794	2422	1196	332	376	1496	150	5216
11:27	998	756	343	310	301	278	259	128	4.6	7.7	50	2807	2410	1001	335	374	1497	148	5217
11:28	1000	758	341	309	300	278	259	130	4.6	7.6	47	2813	2372	923	328	374	1511	150	5176
11:29	1000	758	341	309	300	278	259	136	4.6	7.6	47	2811	2484	1052	326	373	1512	152	5294
11:30	1001	759	342	310	300	278	259	131	4.6	7.6	46	2797	2333	1236	324	372	1518	153	5130
11:31	1001	760	342	311	300	278	259	128	4.6	7.7	48	2792	2306	1096	330	369	1520	149	5098
11:32	1002	761	342	311	300	278	259	124	4.7	7.7	45	2795	2383	839	325	370	1529	150	5178
11:33	1002	762	341	310	300	278	259	140	4.7	7.7	47	2782	2397	903	332	371	1531	150	5179
11:34	1001	762	342	311	300	278	259	126	4.8	7.8	46	2809	2408	933	338	371	1540	149	5217
11:35	1000	761	343	311	300	278	259	136	4.8	7.8	47	2799	2408	899	342	369	1537	149	5210
11:36	1001	760	341	310	300	279	259	127	4.7	7.9	46	2792	2457	923	343	368	1528	147	5249
11:37	1001	761	341	310	300	278	259	0	4.8	7.9	53	2801	2357	976	348	374	1534	149	5158
11:38	1001	762	342	311	300	278	259	0	4.8	7.9	46	2806	2370	960	346	377	1523	148	5174
11:39	1000	761	341	310	300	278	259	0	4.9	7.9	46	2813	2383	1376	344	380	1522	152	5195
11:40	1001	761	342	311	300	278	259	0	4.8	7.9	44	2795	2370	1515	347	382	1511	151	5165
11:41	1000	757	342	311	300	279	259	0	4.7	7.9	44	2794	2357	1574	344	383	1516	149	5151
11:42	1001	755	342	311	300	279	260	0	4.7	7.9	42	2792	2357	1622	348	387	1527	150	5149
11:43	1002	754	341	310	300	279	259	0	4.8	7.8	45	2797	2344	1631	342	392	1537	151	5142
11:44	1001	753	341	310	300	278	260	0	4.7	7.9	40	2792	2494	1626	343	391	1529	149	5286
11:45	1001	752	342	311	300	279	260	0	4.7	7.9	43	2786	2383	1621	344	390	1535	151	5161
11:46	1001	752	342	311	300	279	260	0	4.7	7.9	41	2783	2370	1603	343	388	1533	152	5153

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 19, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Chemcal.
4) Delta SO2 Vs T

I #: -->	02	04	05	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
11:47	1000	752	342	311	300	279	260	0	4.7	8.0	41	2790	2319	1630	344	387	1525	149	5109
11:48	1001	753	341	311	300	279	260	0	4.8	8.0	43	2788	2433	1673	348	387	1524	150	5221
11:49	1000	753	341	311	300	279	260	0	4.9	7.9	40	2785	2456	1652	346	389	1525	151	5241
11:50	1002	753	341	311	300	279	260	0	4.8	7.8	39	2790	2381	1682	347	387	1518	151	5171
11:51	1002	750	342	311	301	279	260	0	4.7	7.8	42	2780	2381	1686	342	382	1516	149	5161
11:52	1003	750	341	310	300	279	260	0	4.6	7.7	41	2774	2419	1677	340	378	1524	149	5198
11:53	1003	751	345	314	301	279	260	0	4.6	7.7	40	2780	2419	1690	342	376	1533	150	5198
11:54	1003	750	356	322	306	279	261	0	4.5	7.7	39	2783	2356	1684	340	372	1536	148	5139
11:55	1003	747	369	333	312	280	263	0	4.5	7.7	39	2748	2480	1684	340	373	1547	150	5223
11:56	1003	743	383	343	319	281	266	0	4.4	7.7	40	2737	2429	1672	339	371	1540	149	5166
11:57	1001	740	397	355	327	283	268	0	4.4	7.8	39	2745	2327	1689	351	372	1540	151	5072
11:58	1000	736	411	365	336	285	271	147	4.4	7.9	43	2755	2362	1680	351	375	1538	150	5121
11:59	999	736	423	375	343	287	274	127	4.6	8.0	46	2779	2242	1489	361	384	1555	148	5021
12:00	999	734	436	385	351	291	278	132	4.7	8.0	42	2746	2418	1479	366	389	1557	148	5163
12:01	1000	733	435	385	356	294	281	130	4.8	7.9	47	2716	2437	1471	361	395	1557	149	5153
12:02	1000	733	410	365	348	297	280	136	4.7	7.8	47	2789	2348	1387	359	393	1536	147	5137
12:03	1000	733	380	346	336	299	279	124	4.6	7.9	47	2793	2419	1447	359	392	1526	147	5212
12:04	1000	732	356	329	327	300	276	134	4.6	7.7	46	2771	2431	1439	355	391	1526	149	5202
12:05	1002	732	339	318	318	299	274	129	4.6	7.8	47	2787	2394	1435	355	387	1523	149	5185
12:06	1000	730	337	317	314	299	272	136	4.6	7.8	48	2798	2262	1442	354	382	1520	148	5080
12:07	1000	729	342	321	314	298	271	136	4.7	7.8	46	2779	2408	1439	349	382	1524	150	5187
12:08	1001	729	344	320	313	297	271	128	4.7	7.8	47	2748	2434	1424	353	381	1517	151	5182
12:09	1000	732	341	317	311	296	270	135	4.7	7.8	56	2759	2422	1021	355	383	1513	150	5181
12:10	1000	734	340	315	309	295	270	123	4.8	7.9	54	2771	2434	772	364	386	1515	153	5205
12:11	1001	736	341	316	308	294	269	136	4.9	7.9	52	2781	2367	783	359	389	1514	154	5168
12:12	1001	735	342	315	308	293	269	124	4.9	7.8	49	2781	2363	1051	353	392	1507	152	5118
12:13	1002	736	342	315	307	292	268	135	4.9	7.9	49	2785	2427	1165	358	392	1504	151	5212
12:14	1001	736	341	313	305	291	268	137	4.9	7.8	50	2785	2301	1179	348	392	1498	152	5086
12:15	1001	737	341	313	305	290	267	129	4.9	7.8	53	2759	2441	974	347	393	1491	153	5200
12:16	1003	738	342	314	304	289	267	125	4.8	7.7	50	2764	2453	842	350	388	1480	150	5217
12:17	1004	738	342	313	304	289	266	140	4.8	7.7	53	2768	2356	892	342	389	1480	151	5124
12:18	1005	738	341	313	303	288	266	127	4.7	7.7	51	2773	2368	1022	351	387	1482	157	5141
12:19	1005	738	341	312	303	287	266	129	4.7	7.6	49	2773	2479	1019	343	388	1492	158	5249
12:20	1006	737	341	312	303	287	265	132	4.6	7.6	50	2770	2432	1153	342	385	1489	158	5202
12:21	1006	737	342	312	302	286	265	128	4.5	7.6	53	2770	2395	1097	341	383	1487	158	5165
12:22	1007	738	342	312	302	286	265	138	4.5	7.5	50	2787	2396	947	335	383	1491	159	5173
12:23	1007	737	341	311	302	285	265	128	4.5	7.5	53	2772	2359	1010	331	380	1487	165	5130
12:24	1006	736	341	312	301	285	264	134	8.6	7.6	51	2782	2410	888	336	499	1978	218	5193
12:25	1005	737	342	312	301	284	264	131	2.0	7.7	52	2787	2335	925	343	322	1291	144	5122
12:26	1004	736	342	312	301	284	264	133	4.6	7.8	51	2803	2296	982	351	369	1466	165	5099
12:27	1004	737	341	311	301	284	264	128	4.7	7.8	51	2787	2400	991	355	370	1483	161	5187
12:28	1004	737	341	312	301	283	264	129	4.7	7.8	51	2796	2400	963	346	373	1471	160	5196
12:29	1004	735	342	312	301	283	264	0	4.7	7.8	52	2793	2412	687	339	380	1472	160	5197
12:30	1002	733	341	311	300	283	264	0	4.8	7.8	49	2806	2375	1033	340	382	1479	161	5181
12:31	1001	731	341	311	300	283	264	0	4.8	8.0	50	2786	2336	1338	357	379	1472	160	5122
12:32	1000	731	341	312	301	283	264	0	4.8	8.1	47	2801	2362	1456	357	379	1466	158	5165
12:33	996	729	342	312	301	283	264	0	5.0	8.2	51	2782	2437	1462	364	391	1475	158	5219
12:34	997	725	342	312	301	283	264	0	5.2	8.4	46	2768	2449	1499	377	398	1471	160	5218

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 19, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Chemcal.
4) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
12:35	995	723	341	311	301	262	264	0	5.4	8.4	45	2794	2349	1544	368	405	1464	161	5144
12:36	996	723	342	312	301	262	264	0	5.4	8.4	44	2793	2336	1547	377	411	1439	159	5129
12:37	995	722	342	312	301	262	264	0	5.4	8.4	45	2775	2349	1564	384	412	1427	156	5125
12:38	996	722	341	311	301	262	264	0	5.4	8.4	46	2772	2375	1397	360	412	1423	155	5147
12:39	995	722	341	312	301	262	264	0	5.5	8.4	47	2758	2437	1356	372	417	1429	156	5179
12:40	993	721	342	312	301	262	264	0	5.4	8.4	46	2751	2449	1348	374	413	1418	155	5200
12:41	993	721	343	312	301	262	264	0	5.4	8.5	50	2756	2461	1350	380	412	1416	159	5218
12:42	993	722	342	311	301	262	264	0	5.5	8.3	45	2765	2424	1358	364	410	1417	159	5198
12:43	995	723	341	311	300	262	264	0	5.5	8.4	46	2768	2449	1375	365	408	1410	159	5218
12:44	995	725	342	312	301	262	264	0	5.6	8.2	47	2772	2437	1318	358	405	1416	165	5209
12:45	998	726	343	312	301	262	263	0	5.5	8.3	52	2774	2473	1013	359	399	1409	164	5247
12:46	1003	730	343	312	301	262	264	0	5.5	8.3	51	2767	2349	807	368	400	1410	165	5116
12:47	1014	736	342	312	301	262	264	0	5.5	8.2	53	2782	2364	727	376	395	1411	166	5146
12:48	1024	742	342	312	301	262	263	0	5.3	8.2	49	2776	2376	860	382	396	1394	163	5152
12:49	1032	746	342	312	301	262	264	0	5.2	8.2	51	2791	2438	950	383	404	1393	163	5089
12:50	1039	751	342	312	301	262	264	0	5.1	8.1	49	2784	2414	815	383	409	1398	160	5198
12:51	1042	754	342	312	301	262	263	0	5.0	8.0	51	2770	2414	733	375	412	1400	156	5184
12:52	1042	755	341	311	301	262	263	0	4.9	8.0	51	2793	2376	794	377	412	1400	156	5169
12:53	1042	757	342	312	301	261	263	0	4.9	8.7	51	2786	2376	854	390	412	1407	158	5162
12:54	1049	761	343	313	301	261	263	0	5.2	8.0	50	2810	2327	849	373	417	1437	161	5137
12:55	1051	765	342	312	301	261	263	0	5.2	7.6	52	2798	2428	764	358	412	1427	162	5226
12:56	1051	766	341	311	300	261	263	0	4.8	7.5	51	2791	2452	830	354	404	1403	160	5244
12:57	1050	766	341	312	300	261	263	0	4.4	7.6	52	2796	2428	902	353	399	1406	161	5224
12:58	1048	765	342	312	301	261	263	0	4.2	7.6	51	2805	2477	851	351	391	1415	160	5262
12:59	1047	765	342	312	301	261	263	0	4.2	7.6	53	2791	2440	755	350	378	1430	159	5231
13:00	1047	764	341	312	300	261	263	0	4.3	7.6	47	2784	2405	896	345	380	1441	162	5189
13:01	1046	764	341	312	301	261	263	0	4.3	7.6	51	2801	2405	995	342	380	1436	160	5206
13:02	1047	764	342	312	301	261	263	0	4.4	7.7	51	2798	2315	925	351	380	1445	158	5100
13:03	1049	765	341	312	301	261	263	0	4.4	7.7	55	2776	2417	872	359	379	1443	154	5193
13:04	1050	767	341	312	301	261	263	0	4.4	7.6	53	2779	2405	798	354	381	1442	152	5184
13:05	1051	768	341	312	301	261	263	0	4.4	7.6	51	2795	2365	926	345	384	1441	150	5160
13:06	1050	768	341	312	301	261	263	0	4.4	7.5	51	2762	2442	775	345	386	1437	152	5203
13:07	1050	769	341	312	301	261	263	0	4.4	7.5	54	2789	2341	779	342	384	1436	150	5131
13:08	1049	769	341	311	301	261	263	0	4.3	7.5	52	2784	2341	980	341	382	1432	147	5125
13:09	1049	769	341	311	301	261	263	0	4.2	7.5	51	2781	2442	867	338	379	1432	147	5223
13:10	1049	770	340	310	300	261	263	0	4.3	7.4	49	2782	2454	809	330	383	1451	150	5216
13:11	1055	772	339	310	300	261	263	0	4.3	7.4	52	2800	2328	887	330	383	1458	151	5126
13:12	1065	776	340	311	301	261	263	0	4.3	7.6	53	2795	2442	873	345	380	1457	153	5259
13:13	1073	779	340	311	301	262	263	0	4.4	7.7	54	2817	2367	838	346	381	1459	152	5184
13:14	1084	785	340	310	301	262	263	0	4.5	7.8	49	2760	2452	900	353	381	1457	153	5212
13:15	1090	788	339	310	301	261	263	0	4.6	7.8	51	2795	2442	818	355	384	1454	150	5236
13:16	1094	791	339	310	301	261	263	0	4.6	7.8	51	2776	2442	760	358	387	1446	148	5203
13:17	1094	792	339	310	301	261	263	0	4.7	7.8	50	2763	2442	879	359	388	1446	148	5205
13:18	1094	793	339	309	301	261	263	0	4.7	7.9	49	2767	2442	1052	368	388	1440	147	5209
13:19	1093	793	339	309	301	261	263	0	4.7	7.9	48	2788	2328	1056	373	390	1441	147	5107
13:20	1093	794	338	309	301	261	263	0	4.7	7.9	48	2772	2429	976	377	392	1442	148	5202
13:21	1096	795	339	309	301	261	263	0	4.7	7.9	56	2779	2379	832	360	398	1444	147	5159
13:22	1097	796	339	309	301	261	263	0	4.7	7.8	50	2781	2341	798	374	403	1444	146	5122

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 19, 1991.
Calcium injector Type is II—Staggered

3) Calcium Sorbent Type is Chemcal.
4) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
)	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	13:23	1099	796	338	309	301	261	263	0	4.7	7.9	52	2781	2442	865	376	408	1444	144	5240
6	13:24	1099	796	338	309	301	261	263	0	4.7	7.9	49	2779	2328	934	384	409	1444	146	5107
7	13:25	1099	797	339	310	301	261	263	0	4.7	8.0	50	2781	2328	1010	384	410	1442	147	5109
8	13:26	1097	796	339	309	301	262	263	0	4.7	8.0	53	2784	2328	974	384	412	1443	146	5113
9	13:27	1096	796	338	309	301	262	263	0	4.8	8.0	56	2793	2328	681	383	416	1453	148	5121
0	13:28	1087	793	337	308	301	262	263	0	4.9	8.0	47	2793	2379	970	376	417	1460	148	5172
1	13:29	1077	789	338	308	301	262	263	0	4.9	8.1	48	2795	2367	1422	376	416	1460	148	5177
2	13:30	1066	784	338	309	301	262	263	0	4.9	8.0	43	2796	2466	1504	370	414	1453	148	5263
3	13:31	1057	780	338	309	301	262	263	0	4.9	8.0	43	2815	2354	1529	372	413	1449	144	5169
4	13:32	1049	773	338	308	301	262	263	0	4.8	8.0	42	2786	2442	1506	375	408	1440	142	5235
5	13:33	1043	768	338	308	301	262	263	0	4.8	8.0	42	2789	2367	1614	377	407	1444	141	5156
6	13:34	1037	763	339	309	301	262	263	0	4.8	7.9	42	2791	2454	1604	370	406	1455	145	5245
7	13:35	1032	758	338	308	301	262	263	0	4.7	7.9	43	2777	2466	1633	373	404	1460	145	5244
8	13:36	1026	755	339	309	301	262	263	0	4.7	8.0	43	2781	2367	1635	376	403	1470	144	5148
9	13:37	1023	751	338	308	301	262	263	0	4.7	8.0	42	2777	2341	1687	373	403	1472	146	5119
0	13:38	1021	748	339	308	301	262	263	0	4.8	8.0	42	2781	2405	1687	377	406	1480	149	5185
1	13:39	1020	747	339	308	301	262	263	0	4.8	7.9	42	2763	2491	1647	369	406	1482	150	5254
2	13:40	1018	744	339	308	300	262	263	0	4.8	7.8	40	2793	2354	1604	358	408	1484	150	5147
3	13:41	1016	742	339	308	300	262	263	0	4.7	7.8	40	2791	2341	1612	350	404	1473	149	5132
4	13:42	1015	741	339	308	300	262	263	154	4.6	7.8	40	2786	2429	1585	351	401	1455	150	5215
5	13:43	1017	741	339	308	300	262	263	57	4.7	7.7	44	2779	2503	1572	344	399	1449	154	5262
6	13:44	1017	741	339	308	300	262	263	133	4.7	7.6	43	2763	2405	1429	334	397	1431	155	5168
7	13:45	1017	741	339	308	300	262	263	137	4.7	7.6	45	2781	2317	1409	328	392	1417	155	5158
8	13:46	1017	740	339	308	300	262	263	133	4.6	7.5	44	2774	2456	1415	325	387	1406	159	5230
9	13:47	1019	740	339	308	300	262	263	129	4.4	7.4	42	2801	2343	1415	324	379	1397	156	5144
0	13:48	1020	740	339	308	300	262	263	130	4.2	7.3	41	2748	2443	1407	315	370	1391	156	5263
1	13:49	1020	740	339	308	300	261	263	134	4.1	7.1	43	2783	2431	1387	307	367	1394	157	5214
2	13:50	1022	740	340	309	300	261	263	128	4.0	7.3	44	2777	2381	1379	309	362	1392	161	5158
3	13:51	1032	743	340	308	300	261	263	139	4.0	7.5	46	2783	2456	1381	315	359	1396	159	5235
4	13:52	1045	750	340	309	300	261	263	129	4.1	7.6	43	2777	2504	1254	330	358	1402	159	5282
5	13:53	1060	759	341	309	300	261	263	134	4.3	7.3	49	2774	2317	878	324	361	1412	160	5091
6	13:54	1072	766	340	309	300	262	263	128	4.3	7.3	47	2758	2492	723	315	364	1399	154	5250
7	13:55	1084	773	340	309	300	261	263	133	4.3	7.4	44	2756	2443	1002	314	370	1388	150	5200
8	13:56	1095	779	341	311	301	261	263	132	4.3	7.2	43	2760	2443	1348	299	368	1381	152	5203
9	13:57	1106	785	341	312	301	262	263	125	4.2	7.1	44	2763	2394	1371	297	364	1373	149	5157
0	13:58	1113	789	340	312	301	262	263	133	4.1	7.0	43	2755	2361	1357	297	360	1373	148	5157
1	13:59	1114	792	341	312	301	262	263	132	4.0	7.1	45	2817	2456	1270	293	356	1380	148	5273
2	14:00	1112	794	341	313	301	262	263	131	4.0	7.1	45	2791	2492	1160	296	350	1383	148	5283
3	14:01	1107	795	342	313	301	262	263	126	4.0	7.1	51	2791	2269	653	298	352	1391	151	5084
4	14:02	1103	795	341	313	301	262	263	135	3.9	7.1	48	2795	2405	750	296	352	1381	151	5199
5	14:03	1100	796	341	313	301	262	263	125	3.9	7.1	50	2803	2315	793	316	351	1386	150	5119
6	14:04	1101	797	341	314	301	262	263	133	3.8	7.2	45	2786	2454	1040	321	349	1380	147	5242
7	14:05	1103	798	342	314	301	262	263	137	3.9	7.2	44	2808	2368	1147	307	355	1388	145	5148
8	14:06	1104	799	341	314	301	262	264	128	3.9	7.2	43	2782	2429	1163	308	359	1387	144	5212
9	14:07	1103	798	341	313	301	262	263	137	4.0	7.0	47	2789	2354	1196	304	360	1385	148	5143
0	14:08	1102	797	341	313	301	262	263	129	4.0	7.1	45	2789	2394	1248	310	357	1374	149	5124
1	14:09	1101	797	342	314	301	262	263	133	3.9	7.1	51	2777	2302	983	322	353	1365	145	5080
2	14:10	1100	798	343	314	302	263	264	129	3.8	7.1	47	2762	2454	756	323	350	1362	142	5216

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
) All data on this sheet were taken on NOV. 19, 1991.
) Calcium Injector Type is II—Staggered
3) Calcium Sorbent Type is Chemcal.
4) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13	14:11	1099	797	341	313	302	263	264	132	3.8	7.2	48	2765	2417	851	327	352	1373	141	5184
14	14:12	1099	798	341	313	301	263	264	125	3.8	7.2	46	2782	2379	856	337	355	1360	141	5162
15	14:13	1100	798	342	314	302	263	264	141	3.8	7.2	45	2779	2429	1013	331	358	1373	140	5208
16	14:14	1102	799	342	314	302	263	264	130	3.9	7.2	46	2818	2315	1150	332	365	1372	140	5134
17	14:15	1100	798	342	314	302	263	264	125	3.9	7.2	45	2770	2341	1216	333	366	1357	141	5111
18	14:16	1102	799	341	314	302	263	264	135	3.9	7.2	44	2756	2454	1266	334	366	1346	144	5210
19	14:17	1102	799	342	314	302	263	264	129	3.9	7.2	50	2770	2428	964	334	369	1345	145	5198
10	14:18	1103	800	342	314	302	263	264	136	3.8	7.0	47	2767	2340	867	334	370	1342	142	5123
1	14:19	1101	800	341	313	302	263	264	128	3.7	7.0	50	2765	2465	843	323	366	1337	140	5230
2	14:20	1100	800	341	313	302	263	264	127	3.6	7.0	45	2767	2378	766	321	364	1330	142	5145
3	14:21	1100	799	343	314	303	263	264	131	3.5	7.1	45	2774	2340	912	331	360	1324	141	5172
4	14:22	1100	799	343	314	303	263	264	133	3.4	7.1	44	2784	2327	1192	329	356	1327	142	5111
5	14:23	1100	799	342	313	302	263	264	131	3.4	6.9	48	2775	2466	1115	307	356	1338	145	5242
6	14:24	1100	800	342	314	302	263	264	129	3.5	7.0	50	2799	2327	917	312	358	1349	148	5116
7	14:25	1100	800	343	314	303	263	264	134	3.5	7.0	49	2770	2465	859	308	354	1346	154	5235
8	14:26	1095	798	343	315	303	263	264	132	3.6	7.0	49	2768	2428	770	316	352	1343	152	5196
9	14:27	1086	794	341	313	303	263	264	125	3.6	7.1	48	2796	2340	767	311	350	1330	153	5113
0	14:28	1079	791	342	314	302	263	264	133	3.5	7.1	45	2777	2365	962	337	345	1314	150	5142
1	14:29	1074	788	342	314	303	263	264	129	3.5	7.3	58	2793	2415	1088	350	344	1310	152	5208
2	14:30	1066	784	342	314	302	263	263	135	3.5	7.2	51	2791	2415	1206	334	345	1306	150	5206
3	14:31	1062	781	342	313	302	263	263	132	3.5	7.1	45	2783	2452	1244	326	353	1305	149	5235
4	14:32	1057	778	342	313	303	263	264	133	3.5	7.2	43	2813	2327	1201	333	359	1302	155	5140
5	14:33	1049	774	341	313	302	263	264	129	3.4	7.5	49	2776	2352	942	361	356	1291	155	5126
6	14:34	1045	771	342	313	302	264	263	132	3.6	7.7	45	2783	2465	938	382	359	1295	152	5247
7	14:35	1041	770	342	313	302	263	264	128	3.9	7.8	48	2791	2327	665	396	375	1295	148	5118
8	14:36	1033	765	342	313	302	264	264	129	4.1	8.2	49	2784	2477	643	392	389	1279	147	5261
9	14:37	1034	764	342	313	302	264	264	134	4.5	8.3	46	2798	2314	603	405	405	1268	148	5118
0	14:38	1031	762	342	313	302	264	264	131	5.0	8.0	47	2779	2415	842	382	418	1268	150	5194
1	14:39	1034	761	342	313	302	264	264	127	4.9	8.4	47	2786	2378	727	404	414	1245	147	5164
2	14:40	1036	761	342	313	303	264	264	129	5.0	8.4	47	2767	2440	929	410	417	1233	145	5207
3	14:41	1041	762	342	313	303	264	264	134	5.1	8.3	47	2793	2351	867	405	419	1228	145	5143
4	14:42	1044	763	342	313	303	264	264	131	5.1	8.5	47	2777	2340	1088	420	420	1229	143	5117
5	14:43	1046	765	342	313	303	264	264	131	5.2	8.4	46	2781	2501	1064	404	424	1246	143	5261
6	14:44	1046	765	342	313	303	264	264	131	5.2	8.2	50	2791	2465	1040	390	425	1254	140	5256
7	14:45	1050	766	343	314	303	264	264	129	5.2	8.2	50	2782	2452	1054	396	422	1261	141	5214
8	14:46	1041	762	341	312	302	264	264	127	5.2	8.4	47	2718	2452	782	404	416	1266	141	5170
9	14:47	1033	757	340	312	302	264	263	136	5.4	9.6	48	2767	2440	1030	388	417	1277	146	5181
0	14:48	1000	743	342	313	302	263	263	129	5.8	11.1	49	2762	2452	1196	331	431	1311	151	5214
	14:49	965	726	341	311	301	263	262	134	6.9	12.8	57	2751	2477	1114	243	424	1386	203	5226
	14:50	937	709	340	310	301	263	262	133	9.3	14.9	50	2760	2378	1014	236	421	1550	467	5136
	14:51	917	696	341	311	301	262	262	132	–	16.1	49	2774	2429	865	242	–	–	–	5204
	14:52	899	683	341	311	301	262	262	127	–	16.7	48	2771	2417	827	269	–	–	–	5188
	14:53	884	670	340	310	300	262	262	133	–	17.0	52	2779	2405	753	275	–	–	–	5067
	14:54	868	659	341	311	300	262	262	130	–	17.2	49	2791	2466	663	247	–	–	–	5258
	14:55	842	643	341	311	300	262	262	125	6.2	17.4	58	2639	2328	624	220	104	577	–	5168

Nov. 21, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
10:13	1021	724	341	311	301	275	255	0	4.9	4.9	34	2789	2410	1613	309	336	1365	175	5200
10:14	1016	721	341	311	301	275	255	0	4.8	4.9	33	2798	2421	1636	307	332	1362	172	5219
10:15	1011	718	341	311	301	275	255	0	4.7	8.7	34	2807	2459	1539	310	333	1362	170	5265
10:16	1006	715	341	311	300	275	255	0	4.7	7.9	41	2812	2434	1586	298	333	1390	170	5246
10:17	1002	712	342	311	301	275	256	0	4.7	7.8	32	2787	2420	1604	283	331	1392	173	5207
10:18	1000	711	341	311	300	275	256	0	4.8	7.7	38	2789	2420	1596	285	330	1396	175	5209
10:19	998	709	340	310	300	275	256	0	4.7	7.7	34	2773	2407	1606	286	327	1384	170	5180
10:20	996	707	341	311	300	275	256	0	4.7	7.7	35	2801	2382	1615	278	325	1384	169	5183
10:21	993	705	342	312	300	276	256	0	4.7	7.7	33	2794	2420	1618	274	326	1390	170	5214
10:22	991	703	342	311	300	276	257	0	4.8	7.7	34	2782	2494	1634	275	327	1399	172	5276
10:23	991	702	341	310	300	276	256	0	4.8	7.6	35	2782	2445	1630	275	321	1394	173	5168
10:24	990	701	341	311	300	276	256	0	4.7	7.6	36	2812	2455	1633	271	316	1386	172	5267
10:25	990	701	342	311	300	276	256	0	4.7	7.6	34	2796	2468	1631	273	314	1387	170	5264
10:26	987	699	341	311	300	276	256	0	4.7	7.7	37	2799	2443	1634	274	309	1387	175	5223
10:27	986	698	341	311	300	276	257	0	4.8	7.7	34	2801	2416	1611	274	310	1394	176	5217
10:28	985	698	341	311	300	276	257	0	4.8	7.7	47	2801	2416	1626	270	312	1392	170	5217
10:29	985	697	341	311	300	276	257	0	4.9	7.7	33	2798	2378	1641	275	314	1395	169	5189
10:30	985	697	341	311	300	276	257	0	4.9	7.7	35	2805	2454	1635	278	312	1387	167	5259
10:31	987	697	342	312	300	276	257	0	4.9	7.7	33	2787	2440	1642	286	311	1384	169	5227
10:32	986	697	341	311	300	276	257	0	4.8	7.6	40	2796	2415	1647	284	311	1374	162	5210
10:33	986	696	341	311	300	277	257	0	4.7	7.6	34	2799	2299	1655	277	318	1377	162	5098
10:34	985	696	342	312	300	277	257	0	4.6	7.7	38	2805	2415	1702	277	318	1380	161	5219
10:35	984	696	341	311	300	277	258	0	4.7	7.6	34	2801	2415	1680	266	318	1399	167	5216
10:36	984	695	341	311	299	277	257	0	4.7	7.6	35	2758	2389	1658	265	355	1407	166	5147
10:37	985	695	343	312	300	277	257	0	4.8	7.6	35	2702	2331	1657	260	352	1418	169	5033
10:38	987	696	342	312	300	277	257	0	4.8	7.5	36	2776	2366	1643	254	346	1418	171	5143
10:39	987	696	341	311	299	277	257	0	4.7	7.5	44	2731	2378	1652	254	341	1407	168	5109
10:40	988	696	342	312	300	276	258	0	4.6	7.5	36	2727	2414	1640	256	339	1397	168	5101
10:41	987	696	343	312	300	277	258	0	4.6	7.5	33	2716	2414	1639	262	339	1399	166	5130
10:42	988	696	342	311	299	277	258	0	4.6	7.5	42	2734	2254	1639	263	339	1399	165	4988
10:43	988	696	341	311	299	277	258	0	4.6	7.6	33	2746	2354	1639	262	340	1397	164	5107
10:44	989	696	342	312	300	277	258	0	4.7	7.5	38	2727	2354	1630	264	345	1400	166	5082
10:45	988	695	342	312	300	277	258	0	4.7	7.6	34	2722	2366	1637	266	346	1394	167	5089
10:46	989	694	342	312	300	277	258	0	4.7	7.6	33	2738	2290	1633	266	346	1391	166	5028
10:47	988	693	342	312	300	277	258	0	4.7	7.6	34	2722	2377	1628	269	345	1389	164	5099
10:48	989	693	342	312	300	277	258	0	4.7	7.6	40	2721	2414	1643	276	345	1390	162	5135
10:49	987	693	342	312	299	277	258	0	4.6	7.6	34	2733	2267	1662	279	344	1388	159	4999
10:50	989	693	341	311	299	277	258	0	4.6	7.6	36	2726	2403	1637	280	347	1388	158	5113
10:51	989	693	342	312	300	277	258	0	4.6	7.6	33	2724	2290	1645	280	353	1392	155	5015
10:52	990	693	343	312	300	277	258	0	4.5	7.5	34	2724	2278	1644	275	353	1389	152	5002
10:53	990	694	342	312	300	278	258	0	4.5	7.5	38	2712	2303	1636	273	353	1394	152	5010
10:54	991	695	341	311	299	278	258	140	4.5	7.5	38	2719	2389	1457	273	353	1405	153	5108
10:55	990	695	342	312	300	278	258	136	4.5	7.5	37	2711	2365	1424	267	350	1407	156	5075
10:56	991	695	342	312	300	278	258	137	4.5	7.5	40	2726	2401	1395	274	348	1400	156	5127
10:57	991	695	342	312	300	278	259	138	4.5	7.6	39	2712	2314	1393	284	347	1395	155	5017
10:58	991	697	342	312	300	278	259	143	4.5	7.5	43	2747	2389	1324	269	350	1394	155	5136
10:59	991	697	342	312	300	278	258	138	4.4	7.6	38	2711	2425	1297	268	354	1386	152	5135
11:00	992	697	342	312	300	278	259	138	4.4	7.6	43	2724	2278	1358	293	360	1391	152	4989

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME H:M	SORB INJ.PT	ECO OUT	AH MID	HUM. CHM IN	ESP IN	ESP MID	ESP OUT	RATE PPH	O2 %	O2 %	CITY %	FLOW SCFM	FLOW SCFM	SO2	NOX	NOX	SO2	CO	FLOW SCFM
														CORRECTED @ 3% O2, PPM					
11:01	991	697	342	313	300	278	259	131	4.3	7.5	37	2714	2326	1377	286	366	1369	149	5040
11:02	994	698	343	313	300	278	259	134	4.3	7.5	38	2709	2399	1365	283	366	1390	149	5108
11:03	994	699	342	312	300	279	259	153	4.3	7.4	40	2710	2269	1378	288	363	1392	148	4999
11:04	994	703	342	313	300	279	259	134	4.2	7.4	49	2727	2314	876	296	360	1368	148	5041
11:05	993	705	343	313	300	279	259	134	4.2	7.5	42	2744	2264	820	290	357	1393	149	5008
11:06	993	704	341	312	300	279	259	133	4.3	7.5	37	2732	2423	1081	286	361	1405	152	5155
11:07	993	702	342	312	300	279	259	147	4.4	7.4	37	2747	2301	1409	291	363	1416	152	5050
11:08	995	702	343	313	301	278	259	136	4.4	7.4	34	2724	2411	1513	270	360	1414	151	5135
11:09	997	703	343	313	301	279	259	143	4.5	7.3	36	2726	2375	1554	262	358	1416	154	5101
11:10	996	703	342	312	301	279	259	135	4.5	7.3	35	2734	2375	1556	262	353	1408	153	5109
11:11	995	702	342	313	301	279	259	137	4.4	7.4	36	2724	2367	1604	263	344	1396	154	5111
11:12	996	702	343	313	301	278	259	122	4.4	7.4	37	2729	2367	1586	268	342	1396	156	5116
11:13	998	702	342	312	301	278	260	0	4.5	7.2	35	2712	2339	1623	257	343	1406	159	5050
11:14	1000	706	343	313	301	278	259	0	4.4	7.1	46	2724	2264	1496	248	342	1398	157	4991
11:15	1000	709	343	314	301	278	260	0	4.3	7.2	38	2720	2349	873	253	339	1395	155	5070
11:16	1001	709	342	312	301	279	260	0	4.2	7.2	45	2710	2312	1107	248	334	1398	153	5022
11:17	1001	708	341	312	301	279	260	0	4.2	7.1	36	2729	2423	1414	241	333	1406	153	5126
11:18	1002	708	343	314	301	279	260	0	4.1	7.1	36	2737	2398	1542	237	330	1404	153	5135
11:19	1002	708	343	314	302	279	260	0	4.1	7.0	36	2719	2409	1614	236	330	1414	153	5128
11:20	1004	707	342	313	301	279	260	0	4.0	7.0	42	2714	2421	1619	240	328	1416	150	5135
11:21	1004	706	342	313	301	279	260	0	3.9	6.9	34	2702	2398	1635	247	326	1417	155	5099
11:22	1005	705	342	313	301	280	260	0	3.8	7.0	39	2741	2275	1628	258	325	1412	154	5015
11:23	1006	706	343	314	302	280	260	0	3.7	7.0	36	2737	2337	1657	258	326	1412	149	5074
11:24	1007	706	342	313	301	280	260	0	3.6	7.0	37	2732	2409	1346	263	328	1411	147	5133
11:25	1007	706	341	312	301	280	260	147	3.6	6.9	36	2720	2335	1652	258	331	1420	148	5056
11:26	1006	705	342	313	301	280	260	141	3.6	7.0	36	2732	2312	1565	259	331	1438	149	5044
11:27	1005	705	343	314	302	280	261	142	3.6	7.1	35	2718	2325	1641	267	330	1443	151	5043
11:28	1004	704	341	312	301	280	260	0	3.7	7.3	36	2725	2273	1636	268	332	1448	149	4999
11:29	1002	704	341	312	301	280	260	0	3.8	7.5	35	2700	2408	1632	295	338	1446	147	5108
11:30	1000	703	343	314	302	280	260	0	4.0	7.8	48	2734	2235	1642	305	347	1445	147	4969
11:31	1001	706	343	314	302	280	260	0	4.2	7.7	42	2715	2286	1306	321	359	1445	147	5082
11:32	997	705	341	312	301	280	260	0	4.4	7.9	45	2712	2286	1121	322	370	1440	144	4998
11:33	999	704	341	312	301	280	260	0	4.4	8.0	36	2727	2235	1397	327	374	1422	143	4962
11:34	994	702	342	313	301	280	260	0	4.6	7.7	36	2700	2298	1527	306	363	1431	145	5028
11:35	997	701	342	313	301	280	260	0	4.6	8.4	36	2720	2273	1575	339	367	1423	145	4994
11:36	999	701	341	312	301	280	260	0	4.7	7.8	45	2727	2408	1591	327	390	1429	147	5135
11:37	1002	701	341	312	301	280	260	0	4.7	7.5	34	2715	2384	1622	315	369	1421	147	5099
11:38	1003	701	342	313	301	280	260	0	4.3	7.4	41	2730	2372	1656	308	363	1396	142	5102
11:39	1004	702	342	313	302	280	261	0	4.1	7.3	35	2708	2235	1669	304	378	1387	142	4943
11:40	1003	702	341	313	301	280	261	0	4.0	7.3	35	2729	2335	1666	301	374	1401	141	5064
11:41	1004	702	343	313	302	280	261	0	3.9	7.2	35	2713	2360	1668	298	367	1411	142	5136
11:42	1005	702	342	313	302	280	261	0	3.9	7.3	36	2705	2455	1593	305	365	1421	143	5160
11:43	1005	703	342	312	301	280	261	0	3.9	7.3	35	2720	2261	1628	305	363	1426	144	4981
11:44	1005	703	342	312	301	280	261	0	3.9	7.2	36	2718	2360	1648	299	362	1427	144	5097
11:45	1007	703	342	312	301	280	261	0	3.8	7.2	35	2734	2286	1666	297	363	1414	143	5019
11:46	1005	704	342	313	301	280	261	0	3.8	7.2	40	2717	2261	1675	298	361	1415	148	4977
11:47	1005	703	341	312	301	280	261	0	3.8	7.3	35	2729	2311	1699	299	358	1419	148	5039
11:48	1005	703	342	312	301	280	261	0	3.9	7.3	41	2722	2323	1703	297	357	1426	148	5048

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME H:M	SORB INJ.Pt	ECO OUT	AH MID	HUM. CHM IN	ESP IN	ESP MID	ESP OUT	RATE PPH	O2 %	O2 %	CITY %	FLOW SCFM	FLOW SCFM	SO2	NOX	NOX	SO2	CO	FLOW SCFM
														CORRECTED @ 3% O2, PPM					
11:49	1004	703	341	312	301	260	261	0	4.0	7.3	34	2717	2408	1703	287	361	1436	148	5125
11:50	1006	703	342	312	301	260	261	0	4.1	7.2	36	2725	2360	1683	281	362	1442	150	5085
11:51	1005	704	342	312	301	260	261	0	4.2	7.2	35	2715	2384	1692	284	360	1434	150	5099
11:52	1005	705	342	312	301	260	261	140	4.2	7.3	50	2727	2431	1495	294	358	1436	152	5158
11:53	1007	706	342	312	301	260	261	143	4.1	7.2	39	2724	2323	1449	291	354	1423	152	5047
11:54	1006	706	342	312	301	260	261	137	4.0	7.2	41	2718	2323	1456	293	354	1417	151	5042
11:55	1006	706	342	312	301	260	261	140	4.0	7.3	39	2717	2408	1466	296	356	1420	151	5130
11:56	1006	706	341	311	301	260	261	140	4.0	7.3	38	2718	2273	1446	291	359	1422	150	4992
11:57	1007	707	341	311	301	260	261	137	4.0	7.2	38	2715	2384	1441	284	362	1420	151	5099
11:58	1009	708	342	312	301	260	261	140	3.9	7.2	39	2720	2298	1159	291	360	1414	151	5045
11:59	1009	708	341	312	301	260	261	140	4.0	7.2	39	2710	2298	1454	281	360	1427	156	5008
12:00	1000	706	341	312	301	260	260	139	4.0	7.3	41	2693	2420	1443	284	359	1432	158	5113
12:01	997	705	342	312	301	260	261	145	4.1	8.3	45	2695	2273	1219	341	357	1436	160	4968
12:02	1004	710	342	313	301	260	261	138	4.6	7.8	50	2698	2348	861	322	369	1478	160	5046
12:03	1004	710	342	312	302	260	261	136	4.9	7.4	39	2745	2346	1168	293	383	1479	161	5091
12:04	1002	709	342	312	301	260	261	147	4.8	7.5	51	2747	2335	1347	298	385	1448	161	5082
12:05	1003	708	342	312	301	261	261	130	4.5	7.7	37	2747	2298	1511	311	373	1418	162	5045
12:06	1001	707	341	312	301	261	261	137	4.6	7.6	37	2737	2248	1622	307	369	1434	159	4985
12:07	1003	707	342	312	301	261	261	146	4.6	7.5	37	2715	2323	1647	302	370	1431	158	5039
12:08	994	704	341	312	301	261	261	145	4.7	7.7	49	2740	2360	1644	311	373	1439	158	5112
12:09	1001	706	343	312	301	261	261	0	4.8	8.2	38	2724	2348	1590	335	377	1448	159	5071
12:10	997	706	341	311	301	261	261	0	5.1	7.5	43	2729	2372	1578	293	385	1464	160	5100
12:11	1000	709	341	311	301	260	261	0	5.0	8.3	47	2722	2311	1449	335	386	1442	161	5033
12:12	998	711	342	312	301	260	261	0	5.1	7.6	44	2715	2372	814	287	385	1450	162	5087
12:13	998	710	342	312	301	260	261	0	5.0	8.4	43	2722	2235	997	322	381	1437	164	4957
12:14	1001	710	341	311	301	260	261	0	5.0	7.8	39	2707	2420	1331	292	378	1432	167	5126
12:15	1001	709	342	312	301	260	261	0	5.0	7.6	39	2700	2286	1427	279	376	1429	163	5012
12:16	994	706	342	312	301	260	261	0	4.8	7.7	43	2752	2287	1505	281	372	1410	165	5039
12:17	997	706	341	312	301	260	261	0	4.7	8.5	39	2710	2275	1545	329	366	1409	164	4985
12:18	997	705	341	312	301	260	261	0	4.9	7.8	47	2683	2421	1606	281	369	1426	162	5131
12:19	994	704	342	312	301	260	261	0	5.0	8.5	37	2691	2287	1604	323	377	1425	165	4979
12:20	998	704	342	312	301	260	261	0	5.1	8.0	46	2690	2421	1640	297	380	1422	169	5111
12:21	1000	704	342	312	301	260	261	0	5.2	7.6	39	2720	2275	1668	271	383	1415	166	4995
12:22	998	704	341	311	301	260	261	0	5.1	7.5	38	2705	2421	1691	269	381	1390	169	5126
12:23	992	701	341	311	301	279	261	0	4.8	8.3	38	2735	2224	1683	307	364	1369	167	4959
12:24	998	702	342	312	301	279	261	0	4.9	8.3	47	2742	2262	1672	321	355	1389	169	5004
12:25	1000	703	341	311	300	279	261	0	5.2	7.7	38	2717	2398	1687	279	367	1415	166	5116
12:26	995	702	341	311	300	279	261	0	5.1	7.6	41	2720	2386	1725	275	375	1397	163	5106
12:27	986	697	342	312	301	260	261	0	4.8	8.4	38	2722	2398	1697	318	366	1370	165	5119
12:28	978	693	342	312	301	260	261	0	4.9	9.1	39	2730	2373	1669	364	362	1386	167	5104
12:29	986	694	342	312	301	260	261	0	5.6	9.5	38	2729	2300	1650	400	367	1443	168	5027
12:30	994	696	342	311	301	260	261	0	6.1	8.0	38	2718	2386	1693	302	412	1455	174	5104
12:31	995	697	342	311	301	260	261	0	6.0	7.6	38	2710	2421	1715	277	419	1425	175	5131
12:32	996	698	341	311	300	260	261	0	5.1	7.6	41	2600	2361	1719	273	394	1328	170	5176
12:33	999	699	341	311	300	260	261	138	4.8	7.6	40	2683	2399	1680	275	367	1331	171	5082
12:34	1002	701	342	312	301	260	260	142	4.6	7.5	51	2719	2375	1560	260	356	1345	169	5094
12:35	1003	701	341	311	301	260	261	136	4.5	7.3	41	2676	2411	1532	251	351	1357	171	5087
12:36	1005	702	341	311	300	260	261	134	4.4	7.3	49	2684	2269	1487	251	345	1370	172	4968

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

n #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	12:37	1006	703	341	311	301	260	261	144	4.3	7.3	41	2730	2287	1515	250	339	1381	174	5018
6	12:38	1006	704	342	311	301	260	261	134	4.2	7.2	41	2703	2314	1505	248	334	1391	175	5017
7	12:39	1007	705	341	311	301	260	261	136	4.2	7.2	41	2735	2262	1525	248	331	1400	175	4991
8	12:40	1007	706	342	311	301	260	261	137	4.2	7.1	58	2739	2399	1540	244	329	1404	179	5136
9	12:41	1008	707	342	311	301	260	261	147	4.2	7.1	43	2755	2251	1511	246	327	1409	179	5006
0	12:42	995	705	340	310	300	260	261	132	4.1	7.3	45	2742	2276	1418	259	324	1402	177	5018
1	12:43	980	701	341	311	300	260	261	139	4.3	9.1	49	2710	2435	1033	347	327	1426	178	5145
2	12:44	972	698	342	312	301	260	261	142	5.2	9.9	51	2735	2276	895	399	347	1499	185	5012
3	12:45	968	696	341	311	301	260	261	142	6.5	10.0	51	2755	2411	877	419	367	1589	196	5166
4	12:46	975	698	341	311	300	260	261	131	6.8	9.9	48	2727	2276	884	420	419	1559	201	4979
5	12:47	988	702	343	312	301	260	261	151	7.4	8.7	48	2710	2423	955	377	447	1514	207	5133
6	12:48	993	704	342	312	301	260	261	131	6.7	7.8	47	2717	2421	1088	331	432	1412	193	5138
7	12:49	993	705	341	311	300	260	261	140	5.3	7.6	45	2717	2373	1245	312	412	1247	180	5090
8	12:50	991	704	341	312	301	260	261	133	4.8	7.7	55	2732	2312	1372	309	398	1267	180	5044
9	12:51	996	705	343	313	301	260	262	143	4.7	8.0	43	2696	2367	1396	318	386	1319	180	5083
0	12:52	996	705	341	312	301	260	261	137	4.8	7.6	56	2695	2375	1420	292	364	1362	180	5070
1	12:53	985	702	341	312	301	260	261	131	4.7	8.0	48	2696	2375	1321	309	379	1373	179	5072
2	12:54	980	700	342	313	301	260	261	142	4.7	9.2	49	2712	2225	906	367	378	1388	182	4937
3	12:55	991	704	343	313	302	260	262	141	5.4	8.9	48	2730	2237	924	372	393	1449	186	4967
4	12:56	998	707	341	312	301	260	261	140	5.9	7.8	58	2717	2312	855	306	408	1473	187	5029
5	12:57	1001	709	341	313	302	260	262	129	5.4	7.5	48	2745	2433	874	279	404	1400	185	5178
6	12:58	1002	710	342	314	302	260	262	146	4.8	7.4	51	2743	2398	1132	264	385	1329	182	5141
7	12:59	1003	711	341	313	302	261	262	135	4.6	7.4	46	2743	2300	1108	260	385	1334	186	5025
8	13:00	1004	712	341	313	302	261	262	132	4.5	7.3	48	2753	2323	1110	254	350	1356	186	5076
9	13:01	1007	713	341	313	302	261	262	143	4.4	7.3	46	2715	2337	1185	251	341	1373	187	5052
0	13:02	1010	714	342	314	303	261	262	142	4.4	7.2	47	2698	2237	1246	247	333	1390	186	4950
1	13:03	1011	715	342	314	302	260	262	138	4.3	7.2	46	2695	2349	1182	248	328	1394	187	5044
2	13:04	1011	716	341	313	302	261	262	139	4.1	7.2	48	2703	2360	1207	248	321	1390	185	5063
3	13:05	1014	717	341	313	302	261	262	136	4.0	7.0	48	2683	2348	1052	241	320	1393	182	5020
4	13:06	1016	718	342	314	303	261	262	131	4.0	7.1	55	2713	2335	994	240	319	1404	180	5049
5	13:07	1016	718	341	313	303	261	262	131	3.9	7.0	47	2708	2323	921	238	316	1407	178	5031
6	13:08	1017	719	341	313	302	261	262	132	3.9	7.1	68	2737	2335	1202	240	315	1413	178	5072
7	13:09	1017	721	342	314	303	261	262	131	3.9	7.0	45	2748	2248	1397	228	315	1418	183	4996
8	13:10	1018	721	341	314	303	261	263	132	3.9	7.0	46	2746	2360	1427	231	315	1416	183	5106
9	13:11	1020	721	341	313	303	261	263	0	3.8	6.9	48	2740	2335	1423	222	312	1410	185	5075
0	13:12	1012	721	341	314	303	261	262	0	3.8	6.9	61	2720	2348	1100	229	312	1413	184	5062
1	13:13	998	716	342	314	303	262	263	0	3.7	8.4	52	2711	2348	796	311	308	1417	180	5059
2	13:14	991	713	341	313	303	262	262	0	4.2	9.1	56	2716	2360	731	369	319	1461	183	5076
3	13:15	976	707	340	312	302	261	262	0	5.3	9.8	56	2723	2348	737	379	349	1533	184	5073
4	13:16	938	693	340	313	302	262	262	0	6.3	10.5	56	2718	2335	673	334	400	1589	191	5054
5	13:17	901	676	341	313	303	262	262	0	7.0	12.0	56	2735	2348	638	306	421	1575	200	5083
6	13:18	880	663	341	312	302	261	262	0	8.5	13.1	58	2674	2348	571	285	430	1658	282	5022
7	13:19	865	652	340	312	302	261	261	0	9.6	13.9	58	2669	2335	537	294	398	1679	535	5004
8	13:20	855	643	342	313	303	261	261	0	–	14.3	64	2698	2323	507	309	*******	*******	*******	5021
9	13:21	848	636	341	313	303	261	262	0	–	14.3	62	2723	2408	485	325	*******	*******	*******	5077
0	13:22	868	637	341	312	302	261	262	0	–	14.0	69	2737	2408	503	358	*******	*******	*******	5145
1	13:23	892	645	341	313	303	261	262	0	–	12.5	51	2742	2364	573	377	*******	*******	*******	5126
2	13:24	919	654	342	314	303	261	262	0	–	10.8	56	2730	2431	1026	321	*******	*******	*******	5162

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13:25	934	661	341	313	303	261	262	0	8.2	9.6	44	2718	2394	1220	258	319	1004	548	5113
13:26	945	666	341	314	303	261	262	0	6.4	9.2	42	2717	2297	1316	236	306	929	502	5013
13:27	954	671	342	314	304	261	262	0	5.5	8.7	43	2698	2346	1382	207	273	975	450	5044
13:28	958	674	341	313	303	261	262	0	4.9	8.6	52	2711	2272	1417	199	251	1031	398	4983
13:29	959	675	340	313	303	261	263	0	4.4	8.9	40	2708	2297	1398	218	226	1092	383	5005
13:30	954	675	341	314	303	261	262	0	4.5	9.1	45	2672	2362	1402	228	218	1173	392	5036
13:31	954	676	342	314	304	262	262	0	4.6	9.6	44	2713	2362	1487	253	227	1213	377	5095
13:32	962	680	342	314	304	262	263	0	5.5	9.8	44	2723	2308	1606	329	251	1294	369	5031
13:33	969	683	341	314	304	262	263	0	6.6	9.2	44	2726	2232	1609	361	297	1370	390	4972
13:34	969	685	340	313	303	262	263	0	6.6	8.9	43	2723	2321	1651	355	338	1361	369	5045
13:35	974	688	342	315	304	262	263	0	6.0	9.1	43	2745	2283	1650	361	362	1290	327	5027
13:36	982	691	342	314	304	262	263	0	5.9	8.6	42	2736	2393	1678	349	407	1298	308	5129
13:37	991	696	341	313	303	262	263	0	5.7	8.0	41	2713	2361	1691	323	399	1300	287	5094
13:38	995	700	341	314	304	262	263	0	5.0	7.4	50	2716	2245	1734	286	365	1268	267	4961
13:39	997	702	342	315	304	263	263	0	4.2	7.5	41	2701	2416	1770	269	369	1247	244	5118
13:40	1000	703	342	314	304	263	263	0	3.9	7.5	54	2710	2270	1782	293	350	1294	237	4989
13:41	1002	705	341	314	304	263	263	0	3.8	7.5	40	2703	2357	1758	281	340	1335	226	5059
13:42	1006	707	341	314	304	263	263	0	3.8	7.3	41	2677	2295	1770	263	338	1371	219	4972
13:43	1011	710	342	315	304	263	263	0	3.8	7.2	41	2708	2369	1770	251	336	1387	218	5087
13:44	1011	712	341	314	304	263	263	131	3.7	7.0	52	2716	2219	1767	242	329	1393	212	4936
13:45	1013	714	340	314	304	263	263	132	3.5	7.0	40	2701	2283	1781	240	320	1387	205	4984
13:46	1015	715	342	314	304	263	263	131	3.4	7.0	41	2720	2369	1798	237	312	1387	200	5088
13:47	1015	717	342	314	304	263	264	132	3.3	7.0	40	2713	2283	1822	236	306	1383	195	4995
13:48	1019	718	341	313	304	263	263	131	3.2	7.0	42	2715	2393	1843	245	302	1380	194	5107
13:49	1019	719	341	314	304	263	264	132	3.3	6.9	40	2699	2381	1789	244	305	1397	195	5080
13:50	1019	719	342	314	304	263	264	131	3.3	7.1	41	2711	2320	1787	248	307	1405	195	5031
13:51	1019	721	341	314	304	263	263	132	3.4	7.2	41	2716	2381	1770	256	310	1412	193	5097
13:52	1019	721	341	314	304	263	263	131	3.6	7.3	43	2736	2405	1740	274	317	1419	196	5141
13:53	1015	720	341	314	304	263	263	0	3.7	7.4	40	2740	2270	1754	284	324	1412	191	4995
13:54	1013	720	342	314	304	263	263	0	3.9	8.1	49	2725	2357	1741	319	333	1414	191	5081
13:55	1015	720	341	313	304	263	263	0	4.1	7.8	41	2726	2357	1731	317	343	1416	183	5063
13:56	1017	721	341	313	304	263	263	0	4.3	7.8	51	2710	2306	1722	310	349	1410	181	5016
13:57	1015	721	342	314	304	263	264	0	4.3	7.6	40	2723	2243	1709	303	363	1386	175	4966
13:58	1016	722	341	313	304	263	263	0	4.3	7.7	40	2745	2357	1752	305	364	1364	173	5101
13:59	1017	723	341	313	303	263	263	0	4.3	7.6	38	2726	2393	1755	302	362	1352	173	5119
14:00	1019	723	342	314	304	263	263	0	4.3	7.6	52	2716	2369	1760	296	359	1350	173	5085
14:01	1018	724	342	313	304	263	263	0	4.3	7.7	41	2706	2440	1781	290	357	1343	170	5146
14:02	1017	723	340	312	303	263	264	0	4.4	7.6	45	2738	2283	1739	299	357	1345	174	5021
14:03	1020	725	341	313	303	262	263	0	4.3	7.9	39	2728	2245	1754	313	354	1334	175	4969
14:04	1022	726	341	313	303	263	263	0	4.4	7.9	41	2708	2416	1716	326	358	1339	175	5124
14:05	1024	726	341	313	303	263	263	0	4.5	8.0	39	2718	2281	1771	329	365	1344	171	4999
14:06	1026	728	342	314	304	262	263	0	4.5	8.0	39	2721	2256	1746	326	369	1336	167	5010
14:07	1029	729	342	314	303	262	263	0	4.6	7.9	39	2726	2369	1735	329	378	1336	168	5095
14:08	1029	729	341	312	303	262	263	0	4.6	7.9	42	2723	2381	1738	333	378	1330	167	5104
14:09	1029	730	341	312	303	262	263	0	4.6	7.9	39	2711	2344	1738	332	380	1321	170	5051
14:10	1028	730	342	313	303	262	263	0	4.5	7.9	47	2705	2332	1731	330	382	1306	170	5037
14:11	1029	730	342	313	303	262	263	0	4.5	8.0	39	2718	2320	1714	334	384	1302	166	5038
14:12	1030	731	341	313	303	262	263	0	4.6	8.0	47	2718	2295	1721	333	389	1308	168	5006

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wultrasorp
4) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:18	1031	732	342	313	303	282	263	0	4.7	8.0	39	2694	2308	1744	332	383	1308	166	5005
14:19	1032	733	341	312	303	282	263	0	4.7	7.9	37	2706	2418	1746	326	380	1302	167	5124
14:20	1031	732	341	313	302	282	263	0	4.7	7.9	39	2693	2259	1728	325	380	1297	168	4952
14:21	1030	732	341	313	303	282	263	0	4.7	8.0	38	2706	2284	1780	332	378	1297	167	4994
14:22	1028	732	342	314	303	282	263	0	4.7	8.2	38	2696	2394	1791	345	378	1296	169	5090
14:23	1028	731	341	313	303	282	263	0	4.7	8.1	38	2706	2195	1800	340	380	1297	166	4901
14:24	1024	730	341	313	303	282	263	0	4.7	8.3	40	2701	2418	1753	348	383	1306	164	5119
14:25	1020	728	342	314	303	282	263	0	4.8	8.8	39	2721	2362	1743	368	390	1323	163	5104
14:26	1036	733	343	314	303	282	263	0	5.2	9.0	39	2720	2208	1718	391	401	1360	168	4927
14:27	1039	735	342	313	303	282	263	0	5.6	7.9	38	2731	2346	1747	326	412	1383	171	5102
14:28	1037	735	341	313	303	282	263	0	5.3	8.1	39	2726	2284	1765	333	408	1339	169	5011
14:29	1028	733	342	313	303	282	263	0	4.9	7.8	38	2758	2382	1768	324	401	1278	168	5140
14:30	1033	737	343	314	303	282	263	559	4.7	8.5	59	2726	2418	1752	342	389	1265	168	5124
14:31	1032	736	342	314	303	282	263	422	5.0	7.7	48	2736	2406	731	324	391	1298	173	5143
14:32	1034	736	341	313	303	282	263	140	4.9	7.9	49	2718	2284	1567	328	383	1293	173	5017
14:33	1032	737	342	314	303	282	263	156	4.6	7.7	54	2706	2406	1288	320	377	1262	174	5112
14:34	1030	736	343	314	303	282	263	159	4.5	7.8	58	2716	2430	1052	324	374	1265	172	5146
14:35	1029	735	342	313	303	282	263	148	4.4	8.1	58	2711	2309	908	337	372	1267	171	5020
14:36	1027	734	341	312	303	282	263	157	4.6	7.7	59	2731	2259	913	324	376	1308	171	4990
14:37	1030	734	343	314	303	281	263	151	4.6	8.1	59	2733	2394	901	338	376	1312	169	5127
14:38	1029	733	343	314	304	282	263	155	4.6	8.0	63	2708	2406	878	334	377	1316	168	5114
14:39	1031	734	341	312	303	282	263	155	4.6	7.9	64	2723	2272	920	333	377	1321	166	5069
14:40	1033	733	341	313	303	282	263	149	4.7	8.2	64	2730	2346	901	344	380	1329	169	5076
14:41	1030	733	343	314	303	281	263	157	4.6	7.9	63	2701	2358	892	325	377	1314	168	5059
14:42	1031	732	341	313	303	281	263	0	4.6	8.0	48	2723	2297	1404	333	379	1307	166	5020
14:43	1032	731	341	313	303	281	263	0	4.6	7.7	45	2696	2346	1692	319	379	1302	168	5056
14:44	1032	731	343	314	303	281	263	0	4.6	7.7	43	2705	2358	1725	319	380	1316	167	5063
14:45	1024	728	342	313	303	281	263	0	4.5	7.8	41	2721	2360	1737	317	379	1315	166	5081
14:46	1032	729	342	313	303	281	263	0	4.4	8.4	42	2701	2358	1753	354	376	1305	166	5059
14:47	1035	730	342	313	303	282	263	0	4.7	7.7	40	2733	2309	1747	315	382	1324	164	5042
14:48	1033	730	342	313	303	282	263	0	4.8	7.7	42	2716	2370	1798	301	386	1322	167	5087
14:49	1031	729	342	313	303	282	263	0	4.5	7.7	42	2686	2358	1791	300	382	1286	167	5044
14:50	1030	729	342	312	303	282	263	0	4.4	7.8	42	2698	2370	1774	297	374	1279	166	5078
14:51	1030	729	341	312	303	282	263	0	4.5	7.8	40	2699	2453	1785	297	370	1291	167	5153
14:52	1029	728	341	313	303	282	263	0	4.6	7.6	42	2689	2309	1790	283	368	1294	169	4947
14:53	1030	728	342	313	303	282	263	760	4.6	7.8	45	2699	2406	1776	294	365	1285	171	5106
14:54	1030	728	342	313	303	282	263	162	4.7	7.7	54	2728	2221	1424	266	362	1269	173	4937
14:55	1032	729	341	312	303	282	263	160	4.7	7.7	58	2699	2284	1276	263	358	1268	173	4984
14:56	1032	730	341	312	303	282	263	154	4.7	7.8	62	2721	2272	991	292	352	1265	177	4993
14:57	1034	732	342	313	303	282	263	164	4.6	7.8	62	2740	2370	925	286	350	1276	174	5110
14:58	1032	732	342	313	303	282	263	153	4.6	7.6	62	2736	2346	961	280	351	1272	174	5082
14:59	1030	731	341	313	303	282	263	163	4.7	7.8	64	2761	2234	894	292	352	1276	176	4995
15:00	1032	732	342	313	303	282	263	156	4.7	7.7	66	2726	2370	903	281	348	1275	177	5098
15:01	1033	732	342	313	303	282	263	159	4.8	7.6	66	2726	2309	878	271	349	1265	178	5036
15:02	1032	732	342	313	303	281	262	163	4.7	7.6	66	2696	2382	945	272	348	1281	177	5078
15:03	1032	732	341	312	302	281	262	154	4.7	7.5	66	2711	2394	890	269	346	1265	177	5099
15:04	1032	732	342	313	303	282	262	156	4.6	7.7	65	2696	2348	933	275	342	1277	175	5044
15:05	1032	732	342	313	303	282	263	157	4.5	7.5	69	2716	2358	923	263	341	1268	174	5076

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
) All data on this sheet were taken on NOV. 21, 1991.
) Calcium Injector Type is II–Staggered
3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
99	15:06	1031	732	342	313	303	282	262	158	4.5	7.6	70	2711	2273	946	264	342	1270	174	4965
00	15:07	1032	732	341	313	303	282	262	162	4.4	7.6	68	2728	2222	918	271	340	1273	171	4951
01	15:08	1031	732	342	314	303	282	263	153	4.5	7.5	69	2713	2396	906	271	339	1269	171	5109
02	15:09	1031	732	343	313	303	282	263	160	4.5	7.5	64	2741	2286	954	266	339	1292	170	5027
03	15:10	1029	731	341	312	303	282	263	157	4.5	7.6	68	2736	2372	914	271	336	1292	171	5108
04	15:11	1028	730	341	312	303	282	263	163	4.5	7.7	70	2710	2311	884	275	339	1294	170	5020
05	15:12	1029	731	342	313	303	282	262	152	4.6	7.6	70	2718	2273	906	269	340	1302	172	4991
06	15:13	1030	731	342	313	303	282	262	165	4.6	7.5	70	2723	2298	918	264	340	1302	172	5022
07	15:14	1030	731	341	312	303	282	262	159	4.6	7.6	67	2688	2396	921	264	339	1301	172	5100
08	15:15	1031	731	341	313	303	281	262	159	4.6	7.5	70	2705	2235	880	260	336	1299	172	4940
09	15:16	1031	732	342	313	303	281	262	160	4.6	7.6	69	2695	2408	926	264	333	1295	174	5102
10	15:17	1031	732	341	313	303	281	263	156	4.5	7.5	70	2696	2431	895	264	330	1284	171	5128
11	15:18	1034	732	341	313	303	281	262	162	4.5	7.5	69	2715	2384	910	270	330	1282	171	5099
12	15:19	1031	729	341	313	303	281	262	0	4.5	7.5	54	2713	2311	1449	269	331	1284	171	5024
13	15:20	1030	728	342	313	303	282	263	0	4.4	7.5	53	2740	2396	1727	264	332	1282	167	5136
14	15:21	1030	727	342	313	303	282	263	0	4.4	7.6	51	2736	2370	1770	271	337	1292	166	5107
15	15:22	1031	727	341	312	303	282	263	0	4.4	7.6	52	2746	2235	1812	268	340	1297	167	4962
16	15:23	1030	727	342	313	303	282	262	0	4.4	7.5	48	2733	2372	1803	273	342	1301	166	5088
17	15:24	1029	726	341	312	303	282	263	0	4.5	7.6	48	2716	2420	1736	279	344	1304	166	5136
18	15:25	1029	727	341	313	303	282	263	0	4.5	7.6	47	2705	2364	1766	279	345	1298	167	5089
19	15:26	1030	727	341	313	303	281	262	0	4.5	7.7	48	2718	2273	1787	274	346	1294	166	4991
20	15:27	1031	728	342	313	303	281	263	0	4.6	7.5	47	2713	2453	1801	270	350	1297	169	5166
21	15:28	1030	729	341	312	303	281	262	256	4.6	7.5	64	2693	2396	1819	266	351	1293	166	5089
22	15:29	1031	731	342	313	303	281	262	236	4.5	7.5	70	2691	2362	982	267	347	1281	163	5063
23	15:30	1032	733	342	313	303	281	262	241	4.5	7.5	71	2684	2418	792	267	344	1281	166	5102
24	15:31	1034	734	341	312	303	281	262	241	4.4	7.4	74	2703	2284	758	268	340	1277	164	4987
25	15:32	1033	735	341	312	303	282	262	236	4.4	7.4	88	2708	2418	736	265	338	1281	166	5129
26	15:33	1033	737	341	313	303	282	262	234	4.4	7.5	76	2718	2297	736	270	336	1266	166	5015
27	15:34	1031	737	342	313	303	282	262	247	4.4	7.5	76	2725	2246	721	275	335	1263	166	4971
28	15:35	1032	738	342	313	303	282	262	234	4.4	7.5	77	2732	2394	733	274	337	1278	166	5126
29	15:36	1032	739	341	313	303	282	263	241	4.3	7.4	77	2741	2297	704	277	336	1264	162	5036
30	15:37	1031	740	341	313	303	282	262	241	4.3	7.4	77	2736	2234	732	282	339	1258	161	4972
31	15:38	1030	740	341	313	303	282	262	236	4.3	7.4	79	2750	2259	704	284	341	1257	156	5009
32	15:39	1032	738	341	313	304	282	262	0	4.2	7.5	85	2733	2346	709	287	341	1257	154	5079
33	15:40	1032	737	341	313	303	282	263	0	4.2	7.5	55	2710	2370	1497	283	341	1262	154	5080
34	15:41	1030	735	341	313	303	282	263	0	4.2	7.4	52	2716	2284	1664	280	343	1265	154	4985
35	15:42	1031	734	341	313	303	282	263	0	4.2	7.4	50	2705	2362	1652	278	346	1266	153	5087
36	15:43	1028	733	341	313	303	282	263	0	4.2	7.5	51	2721	2418	1733	289	347	1264	154	5139
37	15:44	1029	733	342	313	303	282	263	0	4.2	7.7	49	2716	2284	1745	301	347	1269	154	5001
38	15:45	1031	733	342	314	303	282	263	0	4.3	7.6	47	2710	2370	1739	296	352	1265	156	5060
39	15:46	1032	733	341	313	303	282	263	0	4.4	7.4	49	2706	2362	1754	285	359	1300	157	5069
40	15:47	1032	733	342	313	303	282	263	61	4.3	7.5	54	2711	2309	1757	287	360	1292	156	5020
41	15:48	1033	734	342	314	304	282	263	70	4.2	7.4	58	2720	2369	1549	290	356	1280	159	5066
42	15:49	1034	734	342	313	304	282	263	82	4.2	7.4	58	2710	2369	1501	293	354	1276	156	5078
43	15:50	1034	734	341	313	303	282	263	71	4.1	7.3	55	2706	2405	1515	286	352	1265	157	5067
44	15:51	1034	733	341	314	304	282	263	76	4.1	7.3	56	2711	2309	1533	291	352	1264	156	5020
45	15:52	1033	733	343	314	304	282	263	81	4.0	7.2	56	2703	2332	1506	282	348	1261	154	5035
46	15:53	1033	733	341	313	304	283	263	75	3.9	7.2	58	2698	2283	1543	284	343	1261	156	4980

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 21, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Chemcal & H "Fresh" Wulfrasorp
4) Delta SO2 Vs T

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
)	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	15:54	1033	733	341	313	303	263	263	69	3.9	7.3	57	2713	2272	1561	283	343	1268	156	4985
8	15:55	1033	733	342	313	304	263	263	75	3.9	7.3	55	2708	2369	1531	290	344	1276	155	5077
9	15:56	1028	731	341	313	304	263	263	75	3.8	7.2	55	2718	2382	1536	278	342	1281	154	5100
0	15:57	1024	730	341	313	303	262	263	73	3.8	8.0	56	2713	2308	1447	323	342	1296	153	5021
1	15:58	1022	729	341	313	303	262	263	68	4.1	8.1	60	2721	2332	1294	334	347	1321	154	5054
2	15:59	1027	731	342	314	304	262	263	85	4.4	8.3	60	2715	2344	1135	355	356	1344	156	5059
3	16:00	1033	733	342	313	304	263	263	85	4.7	7.8	57	2721	2344	1416	321	370	1358	156	5066
4	16:01	1034	735	341	313	303	263	263	71	4.8	7.4	56	2701	2369	1470	297	382	1348	155	5098
5	16:02	1033	734	341	313	304	263	263	75	4.5	7.4	56	2715	2332	1520	309	378	1308	155	5047
5	16:03	1033	734	342	314	304	263	263	78	4.2	7.5	57	2723	2369	1550	313	368	1278	154	5092
7	16:04	1033	734	342	313	304	263	263	78	4.0	7.4	58	2720	2232	1557	305	358	1273	154	4952
8	16:05	1033	736	341	313	303	263	263	72	3.9	7.4	58	2751	2257	1557	305	356	1276	154	5009

NOV. 25, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

I #: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F						Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
10:22	919	647	340	306	292	266	249	0	6.4	9.3	34	2762	2292	1671	338	363	1402	254	5050
10:23	916	646	341	306	292	266	249	0	6.3	9.2	36	2723	2368	1671	332	359	1390	250	5092
10:24	920	647	341	307	292	267	249	0	6.2	9.1	35	2720	2405	1681	329	358	1383	250	5125
10:25	921	647	342	307	293	267	250	0	6.2	9.1	36	2692	2343	1682	332	354	1380	250	5035
10:26	917	646	342	307	293	267	250	0	6.1	9.2	37	2740	2430	-1672	329	353	1390	250	5190
10:27	914	645	342	308	293	267	250	0	6.1	9.5	36	2708	2428	1688	325	354	1396	249	5136
10:28	915	644	342	307	293	267	250	139	6.3	9.5	40	2725	2416	1668	325	357	1414	255	5141
10:29	914	644	341	307	293	267	250	146	6.4	9.4	43	2702	2426	1476	324	353	1427	259	5148
10:30	915	645	341	307	293	267	250	144	6.5	9.3	49	2750	2315	1201	323	348	1422	260	5065
10:31	913	645	342	308	293	267	250	139	6.5	9.2	50	2786	2276	1132	319	348	1420	260	5062
10:32	913	647	343	309	294	268	250	140	6.5	9.3	50	2754	2402	1097	319	348	1421	265	5168
10:33	913	647	342	308	293	268	250	146	6.4	9.3	52	2781	2353	1076	324	346	1412	269	5133
10:34	913	647	341	307	293	268	250	142	6.4	9.4	54	2781	2263	1037	332	348	1413	270	5044
10:35	911	647	342	308	294	268	250	141	6.4	9.2	53	2709	2426	1100	318	351	1415	273	5136
10:36	908	646	342	308	294	267	250	143	6.4	9.5	56	2754	2450	1074	336	353	1417	269	5204
10:37	910	647	341	307	293	267	250	143	6.4	9.5	55	2764	2449	1068	334	354	1423	269	5213
10:38	911	648	342	308	293	268	250	147	6.6	9.3	56	2747	2437	1048	330	355	1445	274	5184
10:39	922	652	342	308	293	268	250	135	6.6	9.3	59	2735	2425	1023	326	354	1445	269	5146
10:40	937	660	342	308	294	268	251	142	6.4	9.2	55	2748	2437	999	326	348	1421	270	5185
10:41	952	667	341	308	293	268	251	146	6.4	9.1	59	2707	2423	998	320	347	1421	268	5130
10:42	961	673	343	309	294	268	251	140	6.3	9.0	59	2730	2435	967	314	345	1415	270	5165
10:43	974	680	343	309	295	268	251	143	6.1	9.2	59	2678	2399	975	326	369	1410	266	5113
10:44	984	687	342	308	294	268	251	150	6.2	9.1	58	2764	2273	941	323	371	1422	265	5037
10:45	991	692	341	308	294	268	251	139	6.2	9.0	58	2735	2411	928	319	373	1426	264	5146
10:46	998	697	343	309	295	268	251	143	6.1	9.1	59	2760	2312	934	323	370	1419	264	5073
10:47	1004	702	343	309	295	269	252	146	6.1	9.2	64	2805	2348	913	327	374	1424	266	5153
10:48	1010	707	341	308	294	269	252	136	6.1	9.2	65	2787	2457	962	329	374	1432	264	5244
10:49	1019	712	342	309	295	269	252	0	6.1	9.3	62	2763	2297	796	338	377	1440	264	5072
10:50	1025	715	341	309	295	269	252	0	6.2	9.1	48	2753	2395	1303	323	384	1454	263	5149
10:51	1033	720	341	309	295	269	252	0	6.1	9.1	47	2755	2371	1532	326	383	1444	258	5126
10:52	1036	723	342	309	295	269	252	203	6.1	9.1	49	2740	2371	1576	322	385	1442	260	5110
10:53	1042	728	342	310	295	269	252	151	6.1	9.2	61	2772	2358	1199	335	387	1440	262	5130
10:54	1045	732	342	309	295	269	252	140	6.2	9.1	59	2718	2383	812	332	392	1450	264	5101
10:55	1051	737	341	309	295	269	252	145	6.2	9.1	60	2733	2371	802	326	393	1447	259	5104
10:56	1053	739	342	310	295	269	252	142	6.2	8.9	61	2700	2358	832	318	395	1443	259	5078
10:57	1051	741	342	310	296	269	252	140	6.1	9.1	61	2741	2383	854	337	391	1427	259	5124
10:58	1057	744	342	310	295	269	252	141	6.2	9.2	60	2741	2358	762	346	390	1433	259	5100
10:59	1057	746	341	309	295	270	252	145	6.3	9.0	65	2731	2357	769	343	392	1439	253	5107
11:00	1060	748	342	310	296	270	252	143	6.2	9.1	62	2797	2357	772	332	392	1426	247	5154
11:01	1063	751	342	310	296	270	253	145	6.2	9.1	64	2756	2406	778	335	392	1426	246	5162
11:02	1066	754	341	309	295	270	252	144	6.1	9.0	70	2777	2381	755	335	388	1426	246	5158
11:03	1068	756	342	311	296	270	253	140	6.1	8.9	64	2751	2442	798	319	383	1413	242	5193
11:04	1071	758	343	311	296	271	253	145	6.0	8.9	60	2714	2430	776	333	381	1404	241	5144
11:05	1070	758	341	310	296	271	252	144	5.9	8.9	66	2757	2267	765	337	377	1399	242	5024
11:06	1073	760	342	310	296	271	253	138	5.8	8.8	64	2736	2392	780	340	375	1394	238	5126
11:07	1075	761	342	311	296	271	253	145	5.8	8.8	67	2745	2404	783	343	378	1399	236	5149
11:08	1075	763	341	310	295	271	253	140	5.8	8.7	64	2756	2404	789	332	382	1400	236	5160
11:09	1077	764	342	310	295	271	253	141	5.7	8.8	66	2724	2404	828	336	379	1382	234	5126

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	11:10	1075	764	342	310	296	271	253	141	5.6	8.8	63	2709	2414	772	337	381	1383	236	5123
0	11:11	1060	759	341	309	295	271	253	150	5.6	8.9	61	2745	2402	791	340	383	1388	236	5147
1	11:12	1043	752	341	310	295	271	253	145	5.6	8.9	67	2738	2416	756	339	385	1391	235	5154
2	11:13	953	720	340	308	295	271	252	140	5.7	9.1	76	2780	2292	781	350	386	1404	238	5073
3	11:14	829	661	337	305	293	270	252	140	5.8	12.9	83	2789	2392	877	186	391	1411	241	5180
4	11:15	756	615	333	302	291	270	251	151	8.6	16.9	99	2714	2330	895	179	460	1707	–	5045
5	11:16	696	576	329	299	288	268	250	143	5.0	18.6	99	2740	2332	1004	179	253	1257	569	5045
5	11:17	647	541	325	295	286	267	249	148	6.2	19.5	99	2784	2420	972	179	170	1275	–	5204
7	11:18	607	512	320	291	283	266	248	134	7.0	19.9	99	2778	2407	841	179	113	1239	399	5185
3	11:19	575	488	314	286	279	265	247	151	7.5	20.1	99	2754	2481	873	157	73	1166	369	5235
9	11:20	572	471	308	281	276	263	245	0	7.8	20.2	83	2726	2323	946	153	44	1054	372	5048
0	11:21	614	476	304	279	273	262	243	0	7.9	19.6	98	2672	2437	537	248	33	965	336	5109
1	11:22	623	476	301	277	271	261	243	0	7.9	18.6	88	2730	2438	537	249	26	940	281	5168
2	11:23	624	474	298	274	269	259	241	0	7.4	18.1	77	2747	2353	416	179	36	835	239	5086
3	11:24	651	481	296	273	267	258	240	0	7.1	17.6	86	2742	2404	331	201	56	764	210	5146
4	11:25	660	483	295	272	265	256	239	0	6.8	16.7	87	2777	2416	584	251	56	721	291	5193
5	11:26	724	505	296	273	265	256	239	0	6.4	16.0	88	2762	2405	632	376	72	659	286	5188
6	11:27	780	531	299	275	266	255	238	0	6.0	13.9	92	2794	2382	977	384	95	642	296	5177
7	11:28	832	559	304	279	268	254	238	0	4.8	11.9	93	2786	2320	1160	294	137	587	246	5106
8	11:29	872	583	309	283	270	254	238	0	9.4	10.0	93	2758	2332	1240	204	288	861	472	5091
9	11:30	874	595	312	285	272	254	239	0	7.1	9.1	93	2621	2431	1311	190	266	789	560	5253
0	11:31	883	604	311	284	272	253	239	0	5.7	9.0	94	2797	2320	1434	284	221	836	357	5117
	11:32	888	611	311	283	271	253	239	0	5.8	8.9	93	2756	2419	1474	315	226	945	471	5176
	11:33	881	612	312	285	272	253	239	0	5.9	9.4	92	2772	2409	1466	321	277	1030	351	5087
	11:34	906	622	316	287	273	253	239	0	6.2	10.3	93	2753	2433	1510	368	334	1120	263	5186
	11:35	917	630	318	290	275	253	239	0	6.7	9.5	93	2760	2321	1481	341	367	1203	213	5081
	11:36	920	635	321	292	276	253	240	0	6.8	9.4	93	2744	2396	1496	336	382	1247	536	5151
	11:37	921	638	323	293	278	254	240	0	6.6	9.3	93	2741	2421	1528	329	391	1253	487	5162
	11:38	926	642	326	295	279	254	241	0	6.3	9.3	93	2735	2445	1548	330	389	1254	450	5181
	11:39	927	645	328	298	281	254	241	0	6.2	9.1	93	2754	2431	1535	323	387	1272	427	5186
	11:40	925	646	330	299	282	255	242	0	6.1	9.0	93	2739	2431	1533	319	385	1292	412	5170
	11:41	923	647	333	302	284	255	242	0	6.0	9.2	93	2775	2332	1527	326	382	1309	407	5107
	11:42	920	647	336	303	286	256	243	131	6.0	9.4	95	2742	2320	1532	336	382	1331	395	5061
	11:43	921	649	339	305	287	257	244	145	6.1	9.4	98	2796	2292	1230	346	383	1353	381	5088
	11:44	925	653	340	307	289	258	244	145	6.2	9.3	98	2769	2318	1051	355	387	1367	364	5087
	11:45	925	655	340	306	289	258	245	141	6.3	9.2	98	2765	2440	998	352	395	1376	357	5205
	11:46	927	657	340	307	290	259	245	145	6.2	9.1	94	2791	2291	980	346	395	1365	346	5092
	11:47	926	658	342	308	291	260	247	139	6.1	9.0	61	2761	2414	943	343	397	1362	337	5175
	11:48	925	659	341	308	291	261	247	147	6.0	9.0	58	2771	2363	957	343	396	1361	326	5135
	11:49	925	660	340	307	291	262	248	139	5.9	9.1	63	2759	2275	927	353	394	1359	322	5022
	11:50	939	665	341	308	292	262	248	143	5.8	9.1	61	2764	2425	945	358	391	1359	318	5189
	11:51	955	672	342	309	292	263	248	142	5.9	9.1	58	2718	2312	866	361	394	1372	311	5030
	11:52	967	679	342	310	293	263	249	143	5.9	9.1	59	2730	2286	833	358	400	1376	304	5016
	11:53	982	687	341	309	293	264	249	137	5.9	9.2	60	2723	2286	777	364	401	1377	300	5009
	11:54	994	694	341	309	293	264	249	147	5.9	9.1	62	2757	2297	783	364	403	1377	298	5055
	11:55	1004	701	342	310	293	265	249	146	6.0	9.3	61	2720	2323	767	366	407	1383	293	5042
	11:56	1012	706	342	310	294	265	250	141	6.0	9.2	60	2725	2297	744	364	406	1380	290	5009
	11:57	1020	712	341	309	293	265	250	145	6.0	9.1	63	2737	2407	730	364	405	1380	291	5144

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

1 #: --->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	11:58	1029	719	341	309	294	266	250	143	6.0	9.1	64	2755	2420	754	360	404	1383	266	5175
8	11:59	1032	724	341	310	294	266	250	139	5.9	9.0	63	2755	2407	731	356	401	1381	266	5148
9	12:00	1042	730	341	310	294	266	251	147	5.8	9.1	65	2721	2332	719	356	396	1380	279	5053
0	12:01	1047	735	341	309	294	267	251	147	5.8	9.0	67	2716	2442	731	353	391	1386	276	5158
1	12:02	1054	741	341	309	294	267	251	142	5.8	8.8	65	2743	2454	719	345	390	1387	275	5197
2	12:03	1056	745	341	310	295	267	251	136	5.7	8.7	63	2789	2394	779	337	386	1381	272	5182
3	12:04	1060	749	341	310	295	267	252	146	5.6	8.7	65	2792	2360	772	339	381	1379	271	5172
4	12:05	1065	753	341	310	295	268	251	143	5.3	8.6	66	2750	2416	741	335	372	1369	264	5166
5	12:06	1065	756	340	310	295	268	252	145	5.3	8.5	64	2726	2440	719	329	371	1382	263	5169
5	12:07	1059	755	341	310	295	268	252	137	5.2	8.2	66	2736	2440	763	309	367	1360	263	5176
7	12:08	1047	751	341	310	295	268	252	150	5.0	8.0	67	2721	2360	751	305	361	1368	263	5101
3	12:09	1032	745	340	309	294	268	252	137	4.7	8.1	70	2750	2360	720	306	350	1365	265	5130
9	12:10	1022	739	341	310	294	268	252	140	4.4	8.1	67	2746	2404	778	306	340	1343	257	5151
0	12:11	1011	732	341	310	294	269	252	148	4.4	8.1	64	2736	2427	761	310	337	1352	256	5163
1	12:12	1002	727	341	309	294	269	252	138	4.4	8.1	68	2770	2252	793	309	341	1353	256	5023
2	12:13	993	721	341	310	294	269	252	148	4.4	8.2	66	2745	2366	781	314	342	1353	248	5135
3	12:14	987	716	342	310	295	269	253	138	4.5	8.2	64	2743	2352	796	309	347	1358	247	5095
4	12:15	989	715	341	310	294	269	252	148	4.6	8.2	71	2738	2450	817	316	350	1363	244	5188
5	12:16	996	717	343	311	295	269	253	139	4.6	8.1	68	2751	2302	829	305	351	1358	238	5019
6	12:17	1006	721	342	310	294	269	253	153	4.6	8.2	69	2741	2277	798	309	351	1358	236	5018
7	12:18	1019	725	341	310	294	269	253	138	4.5	8.3	65	2724	2425	723	315	348	1351	227	5149
8	12:19	1027	730	342	311	295	269	253	142	4.5	8.1	69	2705	2401	750	306	345	1350	225	5106
9	12:20	1029	732	342	311	295	269	253	146	4.6	8.1	66	2714	2437	681	308	345	1355	222	5140
0	12:21	1028	733	342	311	295	269	253	146	4.5	8.1	70	2719	2399	692	309	342	1344	216	5118
1	12:22	1032	735	342	311	295	269	253	143	4.4	8.3	70	2763	2338	685	318	340	1333	215	5101
2	12:23	1034	739	342	311	295	270	253	212	4.5	8.3	74	2726	2423	693	318	344	1337	212	5166
3	12:24	1038	742	342	311	296	270	253	216	4.5	8.3	77	2729	2411	551	324	346	1330	211	5140
4	12:25	1037	744	342	311	295	270	253	219	4.6	8.4	77	2741	2313	541	322	348	1331	211	5054
5	12:26	1037	744	342	311	295	270	253	208	4.7	8.4	74	2736	2350	556	326	354	1333	211	5088
6	12:27	1038	744	342	311	295	270	253	222	4.7	8.4	73	2751	2314	560	326	355	1328	207	5066
7	12:28	1037	745	342	310	295	270	254	216	4.8	8.4	71	2700	2413	569	329	359	1334	209	5113
8	12:29	1035	747	341	310	295	270	254	221	4.8	8.5	78	2748	2399	341	325	361	1334	206	5147
9	12:30	1041	749	341	310	296	270	254	218	4.9	8.7	80	2778	2411	251	336	367	1349	208	5165
0	12:31	1040	749	342	310	296	270	254	216	5.0	8.6	77	2727	2409	226	330	372	1349	205	5137
	12:32	1040	748	341	309	296	270	254	219	5.1	8.6	78	2763	2385	202	327	380	1348	201	5148
	12:33	1039	748	341	309	295	270	254	223	5.2	8.7	79	2746	2421	202	324	384	1348	201	5123
	12:34	1041	748	342	310	296	271	254	219	5.2	8.6	79	2756	2409	199	319	386	1343	202	5166
	12:35	1042	749	342	310	296	271	254	212	5.2	8.7	81	2726	2299	194	251	384	1339	198	5024
	12:36	1040	750	341	309	296	271	254	213	5.3	8.6	80	2727	2359	201	303	387	1343	199	5087
	12:37	1039	749	342	310	296	271	254	0	5.2	8.5	81	2736	2384	185	297	383	1331	195	5120
	12:38	1039	750	342	310	297	271	255	0	5.1	8.5	81	2741	2396	156	313	378	1322	195	5137
	12:39	1041	754	341	310	296	271	254	0	5.1	8.5	84	2731	2396	172	315	374	1324	196	5127
	12:40	1040	754	341	310	297	271	255	162	5.0	8.5	88	2702	2432	160	312	370	1324	196	5138
	12:41	1041	755	342	311	287	271	254	295	5.0	8.4	80	2729	2384	140	301	369	1326	194	5113
	12:42	1040	755	342	310	248	270	241	218	4.9	8.3	66	2799	2394	182	308	367	1322	192	5193
	12:43	1040	755	341	310	242	266	237	219	4.9	8.2	63	2805	2345	202	299	367	1323	194	5121
	12:44	1040	754	341	311	234	262	234	211	4.8	8.2	61	2768	2406	207	299	364	1316	195	5174
	12:45	1041	755	342	311	231	257	230	220	4.7	8.1	59	2788	2333	207	298	359	1313	188	5121

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

1 #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	12:46	1042	757	342	311	232	254	229	213	4.6	8.1	61	2813	2263	210	296	356	1312	191	5095
6	12:47	1039	756	341	310	232	250	228	216	4.6	8.1	59	2693	2308	206	292	356	1317	191	5001
7	12:48	1038	755	341	310	232	247	227	219	4.6	8.2	54	2682	2245	223	299	356	1319	188	4864
8	12:49	1041	756	342	311	232	245	226	225	4.6	8.2	57	2661	2430	220	299	355	1320	189	5091
9	12:50	1042	757	343	312	221	242	222	213	4.6	8.3	53	2697	2418	205	305	356	1322	188	5105
0	12:51	1042	756	341	310	220	239	220	216	4.7	8.3	50	2706	2442	203	306	359	1333	187	5077
1	12:52	1044	756	341	311	221	236	219	220	4.8	8.3	52	2696	2406	196	304	364	1341	188	5102
2	12:53	1041	756	342	311	222	234	218	216	4.8	8.3	52	2715	2245	203	303	366	1337	185	4959
3	12:54	1040	756	342	311	223	232	218	220	4.8	8.2	55	2711	2428	211	299	367	1332	181	5140
4	12:55	1041	755	342	311	224	230	217	217	4.8	8.3	55	2692	2418	216	303	367	1331	180	5110
5	12:56	1043	757	342	311	208	229	213	214	4.7	8.1	45	2713	2418	213	292	362	1326	181	5131
6	12:57	1044	758	341	311	203	226	210	220	4.7	8.1	47	2704	2392	179	291	360	1333	183	5097
7	12:58	1042	758	341	310	204	223	209	223	4.6	8.1	46	2703	2368	207	287	356	1329	179	5073
8	12:59	1038	755	341	311	208	221	209	211	4.5	8.1	46	2698	2344	172	280	350	1325	178	5041
9	13:00	1040	755	342	311	210	219	209	216	4.4	8.0	45	2699	2319	189	279	346	1320	179	5018
0	13:01	1041	754	342	311	210	218	209	218	4.4	8.1	45	2703	2319	182	282	344	1324	176	5017
1	13:02	1042	754	341	311	200	217	205	217	4.4	8.2	43	2723	2416	187	282	342	1326	177	5139
2	13:03	1042	753	341	310	188	214	202	216	4.5	8.2	41	2804	2392	172	278	343	1334	175	5196
3	13:04	1042	752	340	310	183	211	198	223	4.6	9.1	37	2756	2243	161	279	343	1340	181	4999
4	13:05	1041	751	342	311	186	208	198	219	4.6	8.9	41	2675	2416	154	273	344	1334	181	5068
5	13:06	1040	751	341	310	181	205	196	216	4.5	8.0	35	2724	2392	157	265	342	1325	179	5117
6	13:07	1040	752	340	309	177	201	194	224	4.3	8.7	34	2740	2403	169	262	336	1312	175	5143
7	13:08	1041	752	341	310	178	198	192	213	4.1	9.0	33	2686	2317	159	275	329	1303	177	4993
8	13:09	1043	754	344	312	186	196	193	218	4.0	8.2	41	2687	2404	149	276	328	1303	174	5092
9	13:10	1041	754	342	311	188	195	193	221	3.9	8.0	40	2734	2415	158	278	331	1302	167	5148
0	13:11	1038	752	340	310	189	194	193	216	3.8	8.1	45	2736	2267	166	287	332	1299	169	5020
1	13:12	1040	754	341	311	189	194	193	221	3.9	8.1	41	2754	2317	169	284	334	1311	167	5072
2	13:13	1036	753	343	312	190	193	193	219	4.0	8.3	41	2768	2379	168	295	337	1322	168	5147
3	13:14	1038	756	342	312	190	193	193	216	4.1	8.7	40	2795	2319	160	315	341	1332	164	5114
4	13:15	1044	756	341	311	191	193	192	223	4.4	8.7	40	2775	2294	154	317	347	1355	167	5069
5	13:16	1040	754	342	312	190	192	192	219	4.6	8.4	40	2775	2317	146	299	354	1363	168	5092
6	13:17	1038	753	342	312	190	192	192	213	4.5	8.7	37	2753	2403	145	311	353	1343	166	5156
7	13:18	1040	754	342	312	189	192	192	219	4.6	8.8	39	2782	2267	146	320	354	1341	164	5049
8	13:19	1044	756	340	311	189	192	191	221	4.8	8.7	39	2728	2305	138	314	358	1351	162	5033
9	13:20	1043	756	341	311	189	192	191	216	4.8	8.6	36	2750	2305	144	310	360	1344	163	5055
0	13:21	1039	755	342	312	189	192	191	223	4.7	8.7	38	2733	2305	146	310	359	1333	165	5043
	13:22	1042	757	342	312	189	191	191	223	4.6	8.8	36	2726	2403	132	318	360	1322	160	5129
	13:23	1039	757	341	312	190	192	191	223	4.7	8.9	38	2730	2379	122	328	364	1327	160	5108
	13:24	1036	755	341	312	189	191	191	214	4.8	8.9	39	2736	2379	118	325	368	1336	158	5115
	13:25	1038	755	341	311	189	191	190	229	4.9	9.3	37	2749	2391	125	344	374	1345	158	5133
	13:26	1040	755	341	311	189	191	190	211	5.1	9.4	37	2740	2403	121	349	378	1358	160	5143
	13:27	1041	756	341	311	189	190	190	220	5.4	9.4	39	2739	2354	120	355	387	1375	163	5093
	13:28	1044	757	341	311	190	190	190	219	5.5	9.5	37	2754	2342	111	358	395	1372	165	5157
	13:29	1041	758	341	311	190	190	190	220	5.6	9.4	39	2793	2403	117	353	402	1366	168	5196
	13:30	1044	759	340	310	190	190	190	218	5.7	9.4	35	2773	2379	134	347	406	1364	168	5151
	13:31	1044	760	341	311	191	190	190	219	5.7	9.0	36	2771	2317	137	325	407	1357	171	5088
	13:32	1040	758	341	312	190	190	190	214	5.6	8.8	36	2757	2367	146	305	406	1348	171	5124
	13:33	1040	758	341	311	190	190	190	223	5.3	8.8	36	2749	2379	143	308	396	1328	170	5127

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

#: --->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13:34	1041	757	341	311	189	190	190	207	5.1	8.9	36	2747	2379	149	310	361	1322	171	5126
13:35	1042	758	341	312	189	189	190	228	5.0	8.8	36	2735	2403	143	314	373	1322	165	5151
13:36	1043	759	341	312	188	189	189	211	5.0	8.9	35	2735	2391	142	310	372	1328	164	5126
13:37	1043	759	341	311	188	189	189	222	5.0	8.9	35	2730	2354	152	310	369	1334	162	5085
13:38	1040	759	340	311	188	189	189	226	5.0	8.8	34	2730	2391	149	291	368	1339	160	5137
13:39	1038	758	340	311	188	189	189	210	5.0	8.8	36	2729	2403	141	302	367	1340	160	5131
13:40	1039	757	340	311	188	189	188	223	4.9	8.8	36	2736	2427	143	309	364	1336	154	5163
13:41	1043	757	340	311	189	189	189	215	4.8	8.8	36	2725	2367	139	311	364	1331	152	5092
13:42	1042	758	340	311	189	189	188	221	4.7	8.8	37	2756	2292	136	311	367	1325	152	5049
13:43	1037	757	340	312	189	189	189	211	4.7	8.7	35	2761	2379	131	304	373	1330	147	5140
13:44	1038	755	341	311	189	188	188	227	4.7	9.1	35	2756	2280	136	305	378	1333	149	5036
13:45	1041	756	341	311	191	189	189	215	4.7	8.8	40	2773	2305	143	305	379	1333	147	5070
13:46	1040	756	340	311	191	189	190	226	4.7	8.7	36	2756	2401	136	298	378	1330	146	5157
13:47	1040	757	339	311	192	190	190	212	4.7	8.7	36	2761	2316	138	299	378	1329	147	5076
13:48	1041	757	340	312	190	190	189	214	4.6	8.8	34	2754	2365	145	305	369	1323	145	5088
13:49	1038	756	341	312	190	190	189	225	4.6	8.7	36	2758	2413	142	299	374	1327	143	5171
13:50	1040	756	340	311	189	190	189	217	4.6	8.7	36	2761	2413	139	296	374	1330	144	5174
13:51	1040	758	340	311	190	190	189	220	4.6	8.8	55	2753	2401	126	302	374	1330	142	5154
13:52	1039	756	338	310	186	190	178	216	4.7	9.4	38	2821	2413	135	294	371	1335	140	5234
13:53	1041	756	342	313	187	190	186	212	4.7	9.1	43	2712	2316	129	308	371	1334	140	5028
13:54	1041	757	342	313	188	189	187	225	4.7	8.7	40	2703	2253	131	293	371	1333	135	4956
13:55	1037	752	338	309	183	189	178	216	4.7	9.6	37	2821	2316	130	293	372	1331	140	5131
13:56	1039	752	339	312	182	189	176	217	4.7	9.6	35	2806	2401	130	295	371	1333	140	5208
13:57	1040	754	343	314	183	188	176	218	4.8	9.8	35	2817	2400	119	300	370	1340	141	5216
13:58	1041	755	342	313	182	188	175	222	4.8	9.8	34	2800	2339	116	302	370	1336	139	5139
13:59	1041	755	340	312	182	187	175	220	4.8	9.7	37	2782	2302	112	299	371	1333	139	5064
14:00	1043	756	342	314	183	187	181	216	4.8	9.6	34	2637	2353	120	293	371	1333	141	4990
14:01	1045	757	344	315	188	187	186	218	4.7	8.9	37	2684	2351	124	294	371	1328	138	5035
14:02	1039	757	342	314	191	187	188	226	4.7	8.9	36	2736	2291	130	291	369	1330	136	5027
14:03	1039	758	341	314	193	188	189	213	4.8	8.9	39	2753	2277	142	291	368	1341	143	5029
14:04	1039	759	342	314	194	188	189	226	4.8	8.9	39	2781	2368	145	294	368	1340	145	5169
14:05	1040	759	342	314	195	189	190	226	4.8	9.0	38	2762	2339	156	301	368	1341	147	5129
14:06	1040	759	341	314	195	189	190	219	4.8	9.0	50	2776	2351	149	301	367	1342	145	5127
14:07	1042	760	342	314	194	190	190	215	4.8	9.1	39	2757	2363	153	297	370	1342	143	5121
14:08	1043	760	342	315	193	190	190	219	4.8	9.0	37	2747	2339	155	302	372	1341	146	5074
14:09	1042	760	342	315	194	190	190	217	4.9	9.0	38	2750	2327	149	296	376	1345	147	5077
14:10	1041	759	342	315	193	191	190	219	4.9	8.9	35	2762	2351	148	289	375	1340	145	5114
14:11	1039	759	342	314	193	191	190	221	4.8	9.0	37	2739	2351	165	292	374	1330	146	5090
14:12	1037	757	341	314	193	191	190	223	4.8	9.1	36	2728	2339	170	296	370	1330	146	5067
14:13	1040	758	342	315	193	191	190	213	4.8	9.2	37	2714	2351	150	300	368	1332	145	5066
14:14	1042	761	343	315	193	191	190	227	4.9	9.1	37	2754	2337	176	287	369	1337	143	5091
14:15	1042	760	342	314	194	191	191	210	5.0	9.2	41	2755	2351	184	291	372	1341	145	5106
14:16	1041	760	341	314	194	191	190	217	5.1	9.1	37	2732	2325	173	297	372	1343	146	5057
14:17	1043	761	342	314	195	191	191	225	5.1	8.9	38	2717	2337	183	286	369	1337	147	5055
14:18	1043	761	342	315	196	192	192	225	5.0	8.9	36	2760	2350	198	283	367	1328	146	5111
14:19	1039	760	342	315	197	192	192	212	4.9	8.9	37	2717	2337	189	283	365	1323	148	5054
14:20	1041	760	342	315	197	192	192	222	4.8	8.7	37	2727	2337	186	286	364	1322	148	5065
14:21	1043	761	342	314	195	193	192	223	4.7	8.8	37	2772	2337	206	299	362	1318	146	5109

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium injector Type is II—Staggered

3) Calcium Sorbent Type is Wultrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

h #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
O	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1	14:22	1040	760	341	314	195	193	192	221	4.7	8.6	38	2767	2350	201	293	360	1324	144	5116
2	14:23	1040	760	342	314	195	193	192	213	4.7	8.6	39	2743	2362	210	293	361	1329	146	5105
3	14:24	1043	762	342	315	195	193	192	225	4.5	8.6	38	2765	2348	199	294	357	1321	143	5113
4	14:25	1041	761	342	315	195	193	191	214	4.5	8.6	38	2774	2350	162	297	356	1325	144	5113
5	14:26	1037	760	342	314	194	193	191	212	4.4	8.6	38	2764	2350	156	294	355	1320	144	5113
6	14:27	1039	760	342	315	194	193	191	224	4.2	8.7	37	2740	2337	154	299	353	1307	139	5077
7	14:28	1042	761	343	315	195	193	192	223	4.4	8.7	39	2731	2350	160	304	359	1322	143	5080
8	14:29	1043	762	342	315	194	193	191	218	4.4	8.6	36	2745	2325	183	301	358	1322	141	5070
9	14:30	1038	761	341	314	194	193	191	219	4.4	8.7	38	2762	2325	217	299	358	1324	140	5087
0	14:31	1036	759	342	314	194	193	191	219	4.4	8.8	38	2745	2362	185	308	358	1326	139	5107
1	14:32	1036	759	342	315	194	192	191	218	4.5	9.0	39	2740	2362	191	314	359	1334	140	5102
2	14:33	1005	746	341	313	192	192	190	219	4.7	9.5	42	2699	2362	204	314	362	1346	140	5060
3	14:34	993	735	340	312	189	192	189	220	5.1	12.2	38	2715	2314	191	360	370	1361	143	5029
4	14:35	1008	739	344	315	192	191	189	218	6.9	13.5	40	2765	2363	145	394	406	1516	198	5103
5	14:36	1034	749	344	316	192	191	189	222	8.4	12.8	37	2722	2351	99	391	431	1667	263	5073
6	14:37	1021	748	341	313	191	191	189	0	8.7	11.4	39	2756	2351	111	307	411	1658	267	5107
7	14:38	1020	745	340	314	192	191	190	0	8.0	11.8	37	2747	2351	118	328	379	1529	246	5098
8	14:39	1026	745	342	315	193	191	190	0	7.4	11.6	34	2747	2375	148	314	343	1375	237	5123
9	14:40	1008	736	341	315	193	191	190	0	7.4	11.6	32	2778	2389	460	296	341	1364	229	5167
0	14:41	1003	731	341	314	192	191	190	0	7.0	12.7	33	2744	2389	550	356	332	1312	228	5133
1	14:42	993	726	342	315	192	191	189	0	7.9	13.2	31	2744	2388	586	370	350	1386	238	5132
2	14:43	982	718	341	314	190	191	188	0	8.6	13.8	35	2805	2277	580	373	377	1455	258	5081
3	14:44	982	716	342	314	192	191	188	0	9.6	14.4	32	2770	2388	609	391	410	1551	326	5158
4	14:45	990	719	342	315	192	191	188	0	10.4	14.3	30	2753	2375	624	401	428	1614	426	5128
5	14:46	995	721	341	314	191	190	188	0	–	13.8	31	2746	2363	668	413	–	–	–	5109
3	14:47	996	721	341	314	191	190	188	0	–	13.6	34	2746	2302	679	412	–	–	–	5048
7	14:48	998	722	342	314	191	190	188	0	10.4	13.5	30	2738	2425	718	409	423	1468	413	5170
3	14:49	986	717	342	314	192	190	188	0	10.1	13.5	32	2758	2253	745	409	433	1420	373	5011
9	14:50	969	709	341	313	192	190	188	0	10.0	14.2	31	2739	2316	740	409	437	1393	356	5055
0	14:51	951	700	341	313	192	190	188	0	10.3	14.9	33	2741	2413	722	400	449	1422	409	5154
1	14:52	947	694	342	314	193	190	188	0	–	15.4	31	2756	2389	687	397	–	–	–	5146
2	14:53	953	695	343	315	192	190	189	0	–	15.3	30	2781	2292	700	425	–	–	–	5074
3	14:54	966	700	342	314	191	190	188	0	–	14.9	29	2777	2254	713	437	–	–	–	5031
4	14:55	987	709	341	314	192	190	188	0	–	14.1	31	2756	2266	719	437	–	–	–	5022
5	14:56	1022	725	343	316	193	190	189	0	–	12.8	31	2766	2328	785	365	–	–	–	5094
6	14:57	1030	732	342	314	193	190	189	0	9.7	10.9	32	2741	2365	902	265	396	1186	515	5105
7	14:58	1021	730	340	313	193	190	189	0	7.2	10.3	30	2734	2291	988	226	342	975	502	5025
8	14:59	996	720	340	313	192	190	189	0	5.7	10.6	31	2739	2379	1013	245	289	919	519	5118
9	15:00	986	714	342	314	192	190	189	0	5.6	12.0	30	2765	2280	963	312	259	983	481	5044
0	15:01	994	715	343	314	192	190	189	0	6.6	12.8	29	2756	2291	904	356	282	1093	449	5047
1	15:02	1013	723	342	314	192	190	188	0	7.8	12.4	30	2748	2328	918	358	321	1209	396	5076
2	15:03	1007	723	341	313	191	190	188	0	8.2	11.5	31	2782	2278	952	312	348	1245	366	5080
3	15:04	997	718	342	313	190	190	188	0	8.0	12.2	30	2765	2278	996	335	354	1216	340	5043
4	15:05	1012	722	343	314	192	190	188	0	7.7	12.7	32	2787	2291	980	380	354	1185	338	5078
5	15:06	1033	732	343	314	192	190	188	0	8.3	11.4	30	2780	2316	1033	405	372	1242	330	5096
6	15:07	1036	739	341	313	191	190	188	229	8.4	10.6	34	2756	2365	1110	379	385	1247	325	5024
7	15:08	1034	741	342	313	191	190	188	211	7.5	10.0	37	2744	2377	613	353	398	1159	319	5122
8	15:09	1029	740	341	313	188	190	188	220	6.8	9.9	35	2724	2365	490	332	425	1118	321	5069

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

DTE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
9	15:10	1030	741	341	313	187	190	183	221	6.5	10.0	36	2736	2353	453	335	418	1127	327	5091
0	15:11	1031	743	343	314	189	189	186	213	6.2	10.3	36	2721	2353	449	344	404	1143	323	5074
1	15:12	1033	745	342	313	190	189	186	222	5.9	9.6	36	2694	2292	453	331	394	1156	313	4987
2	15:13	1039	749	342	313	189	189	186	219	5.7	9.6	39	2741	2292	447	337	397	1178	292	5033
3	15:14	1041	749	342	313	190	188	186	207	5.6	9.6	37	2750	2450	379	329	381	1186	268	5200
4	15:15	1042	752	342	313	192	189	186	230	5.6	9.5	37	2756	2317	331	323	380	1199	259	5074
5	15:16	1040	752	341	312	191	189	186	208	5.7	9.3	36	2751	2415	309	318	384	1218	247	5166
5	15:17	1037	752	341	313	191	189	186	230	5.6	9.5	35	2772	2403	312	316	381	1221	230	5175
7	15:18	1037	751	342	313	192	189	186	213	5.6	9.5	36	2768	2330	286	309	381	1232	222	5098
3	15:19	1040	753	342	313	192	189	189	218	5.7	9.5	41	2770	2317	279	311	383	1246	212	5087
9	15:20	1042	754	342	313	192	189	189	221	5.7	9.5	36	2754	2401	253	311	382	1252	204	5155
0	15:21	1041	754	341	312	191	189	186	227	5.7	9.5	36	2756	2401	237	305	382	1253	198	5158
1	15:22	1040	755	341	313	192	189	186	208	5.6	9.5	39	2775	2353	229	295	379	1248	192	5128
2	15:23	1038	755	342	313	192	189	189	229	5.7	9.4	37	2746	2365	229	304	379	1260	188	5111
3	15:24	1034	754	341	313	192	189	189	229	5.7	9.2	36	2753	2377	219	306	374	1260	184	5130
4	15:25	1038	756	341	313	193	189	189	229	5.7	9.0	38	2742	2400	215	302	373	1259	179	5142
5	15:26	1041	758	342	314	192	189	189	229	5.6	8.9	37	2753	2423	212	300	372	1249	171	5176
5	15:27	1040	758	342	314	193	189	190	221	5.4	8.8	42	2750	2269	212	296	370	1237	165	5040
7	15:28	1039	757	341	313	193	190	189	209	5.2	8.8	39	2749	2269	210	300	368	1235	158	5038
3	15:29	1041	758	341	313	192	189	189	219	5.0	9.1	41	2749	2368	208	323	365	1234	153	5137
9	15:30	1042	758	341	313	192	189	189	223	5.1	9.2	38	2727	2411	213	334	366	1252	150	5138
0	15:31	1041	757	342	313	192	189	189	212	5.2	8.9	39	2735	2411	207	309	374	1267	148	5147
1	15:32	1038	756	341	313	192	190	189	224	5.2	9.3	37	2732	2411	211	326	383	1270	147	5143
2	15:33	1041	757	342	313	191	190	189	226	5.2	9.0	38	2744	2435	203	313	388	1275	146	5179
3	15:34	1045	759	342	314	192	190	189	209	5.3	9.0	37	2730	2423	196	304	389	1286	149	5154
4	15:35	1045	761	342	314	192	190	189	216	5.3	8.7	41	2753	2398	214	292	389	1290	149	5150
5	15:36	1041	760	342	314	193	190	189	218	5.2	8.8	37	2734	2388	213	299	384	1285	150	5121
6	15:37	1038	757	342	314	192	190	189	232	5.1	8.8	40	2732	2251	212	296	381	1282	151	4983
7	15:38	1036	756	341	313	193	190	189	212	5.1	8.8	37	2773	2289	189	300	378	1285	151	5062
8	15:39	1040	757	341	313	193	190	189	216	5.2	8.8	38	2776	2289	198	296	377	1297	154	5066
9	15:40	1045	759	342	313	193	190	190	229	5.1	8.8	37	2757	2411	191	296	376	1293	153	5169
0	15:41	1044	761	342	313	193	190	190	207	5.1	8.6	38	2759	2368	194	285	377	1296	153	5147
1	15:42	1042	760	341	313	192	190	189	215	5.1	8.7	39	2773	2366	200	288	376	1297	153	5159
2	15:43	1038	758	341	313	192	190	189	220	5.0	8.7	41	2775	2288	200	289	373	1290	153	5062
3	15:44	1042	758	342	314	191	190	189	219	5.0	8.7	38	2758	2325	183	285	370	1292	152	5083
4	15:45	1042	758	342	314	192	190	189	215	5.1	8.7	39	2744	2362	204	285	370	1304	152	5106
5	15:46	1040	758	341	313	192	190	189	221	5.1	8.7	37	2727	2362	210	286	369	1310	152	5089
6	15:47	1041	758	341	313	191	190	189	218	5.1	8.7	39	2739	2400	201	200	368	1318	151	5121
7	15:48	1044	758	342	314	191	190	189	221	5.1	8.7	36	2730	2366	197	276	367	1321	150	5116
8	15:49	1042	759	342	314	191	190	189	229	5.1	8.7	36	2737	2275	185	147	366	1320	148	5012
9	15:50	1041	758	341	314	190	190	189	208	5.1	5.5	38	2735	2337	1103	318	367	1316	145	5073
0	15:51	1039	758	342	314	191	190	189	228	5.1	5.3	40	2759	2410	1497	314	368	1315	147	5169
1	15:52	1040	758	342	314	191	190	189	218	5.1	5.3	39	2749	2398	1614	313	369	1313	145	5147
2	15:53	1044	760	342	314	192	190	189	218	5.1	5.2	41	2775	2262	1662	312	370	1311	143	5037
3	15:54	1043	759	341	314	192	189	189	215	5.1	5.3	37	2761	2300	1701	316	372	1305	143	5061
4	15:55	1039	757	342	314	192	189	189	226	5.1	5.3	37	2771	2366	1671	324	372	1301	142	5157
5	15:56	1041	757	342	314	192	190	189	206	5.0	5.4	39	2763	2398	1687	327	373	1289	141	5161
6	15:57	1041	757	342	314	192	190	188	222	5.0	5.6	39	2660	2410	1717	326	378	1289	143	5236

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on NOV. 25, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) ESP Efficiency

#: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
)	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
7	15:58	1039	757	341	314	191	190	187	0	5.1	5.3	38	2767	2325	1697	311	386	1298	142	5092
3	15:59	1043	758	343	315	192	190	189	0	5.1	5.4	41	2743	2288	1710	316	390	1299	138	5030

DEC.02,1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
All data on this sheet were taken on DEC. 02, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
11:40	1015	712	342	324	312	265	266	0	7.3	10.8	41	2594	2319	1244	434	434	1497	298	4984
11:41	1005	706	341	323	311	265	266	0	7.8	11.9	41	2607	2331	1285	463	454	1504	314	4938
11:42	1003	704	342	324	312	265	266	0	8.6	12.4	42	2630	2355	1318	497	488	1530	341	4985
11:43	1020	708	343	325	313	265	267	0	9.4	12.3	44	2655	2403	1309	525	512	1560	403	4958
11:44	1028	712	341	324	312	265	267	0	9.8	11.0	40	2631	2391	1305	468	519	1559	458	5023
11:45	1032	714	341	324	312	265	267	0	9.8	10.8	42	2610	2355	1352	457	518	1522	464	4965
11:46	1043	719	343	325	313	265	267	0	8.9	9.8	41	2602	2269	1413	423	488	1390	415	4871
11:47	1041	720	341	323	312	266	268	0	8.3	8.9	41	2605	2366	1422	373	482	1344	365	4977
11:48	1036	719	341	324	312	266	268	0	7.2	8.7	41	2621	2378	1447	355	449	1275	327	4999
11:49	1033	718	342	325	312	266	268	0	6.5	8.6	41	2618	2366	1444	348	429	1314	314	4984
11:50	1034	719	342	325	313	266	268	0	6.1	8.5	40	2629	2242	1483	335	406	1367	317	4865
11:51	1036	720	341	324	312	266	268	0	5.9	8.4	43	2584	2354	1484	334	393	1403	332	4938
11:52	1041	721	342	325	312	266	268	0	5.6	8.4	40	2596	2354	1502	331	384	1420	339	4949
11:53	1041	722	342	325	312	266	268	0	5.4	8.4	41	2605	2305	1490	325	376	1430	343	4910
11:54	1039	722	342	324	312	266	268	0	5.3	8.4	40	2588	2378	1491	328	372	1439	341	4965
11:55	1033	719	341	324	312	266	268	0	5.3	8.5	41	2596	2292	1510	332	369	1448	337	4888
11:56	1036	721	343	325	312	266	268	0	5.3	8.8	40	2594	2390	1459	355	367	1460	336	4984
11:57	1042	723	342	325	312	267	268	0	5.5	8.6	41	2592	2305	1511	346	370	1468	336	4960
11:58	1041	723	341	324	312	267	268	0	5.6	8.6	40	2589	2305	1499	342	373	1453	326	4894
11:59	1038	723	343	325	312	267	268	0	5.6	8.8	44	2620	2260	1496	354	376	1431	316	4900
12:00	1038	725	342	325	312	267	268	0	5.6	8.8	41	2584	2305	1499	354	376	1420	307	4869
12:01	1040	726	341	324	312	267	268	0	5.7	8.9	43	2539	2292	1502	359	377	1418	306	4831
12:02	949	697	339	322	311	266	267	0	5.8	9.9	54	2718	2306	1476	297	379	1417	306	5026
12:03	873	662	337	320	309	265	266	0	6.2	14.4	52	2737	2375	1468	256	392	1441	312	5111
12:04	816	628	333	318	307	265	266	0	9.1	17.3	49	2740	2376	1541	219	452	1717	–	5116
12:05	775	601	329	315	305	264	265	0	5.2	18.7	60	2755	2376	1513	203	253	1155	–	5138
12:06	742	578	326	312	304	263	264	0	6.3	19.3	55	2756	2414	1387	179	178	1038	–	5170
12:07	729	561	321	309	301	262	263	0	7.0	19.7	54	2685	2426	1313	164	108	877	534	5110
12:08	776	570	319	308	300	261	262	0	7.5	19.2	53	2650	2404	695	190	71	733	565	5061
12:09	820	586	319	308	299	261	261	0	7.6	17.1	58	2674	2330	806	443	39	585	532	5005
12:10	823	589	319	307	298	260	261	0	7.0	15.9	54	2723	2307	891	351	35	511	440	5030
12:11	853	599	320	308	298	279	260	0	6.3	15.6	52	2704	2269	861	341	91	378	286	4973
12:12	890	615	322	309	298	278	260	0	6.0	14.1	51	2726	2381	945	363	144	362	276	5107
12:13	926	632	325	311	299	278	260	0	5.4	12.6	52	2731	2321	1042	364	143	364	268	5053
12:14	957	649	328	313	301	278	261	0	4.6	11.0	52	2705	2309	1146	309	170	388	198	5014
12:15	979	663	332	316	302	278	261	0	8.9	9.9	53	2736	2309	1217	246	268	622	233	5017
12:16	996	675	336	319	304	279	262	0	6.8	9.2	53	2717	2284	1239	211	275	655	244	5001
12:17	1013	686	339	321	306	280	263	0	5.5	8.9	55	2763	2346	1257	194	246	759	269	5109
12:18	1022	695	339	321	307	280	263	0	4.6	8.7	54	2759	2383	1268	186	213	884	325	5142
12:19	1021	699	340	321	307	280	264	0	4.1	8.8	54	2761	2417	1267	183	191	1004	335	5178
12:20	1021	702	341	323	308	281	264	0	4.0	8.7	54	2784	2393	1336	214	160	1085	312	5177
12:21	1026	706	341	323	309	282	264	0	4.2	8.7	55	2761	2320	1353	217	182	1162	273	5080
12:22	1030	710	341	324	309	283	264	0	4.2	8.5	53	2744	2343	1373	214	192	1189	249	5061
12:23	1035	713	342	324	309	283	265	0	4.1	8.6	59	2707	2330	1383	217	198	1202	212	5037
12:24	1033	716	342	324	310	283	265	0	4.0	8.6	58	2737	2392	1371	218	204	1217	189	5129
12:25	1033	717	341	324	309	283	265	0	4.0	8.9	56	2737	2379	1384	297	209	1230	179	5116
12:26	1037	720	342	324	310	284	265	0	4.3	8.9	55	2732	2318	1436	364	216	1254	177	5050
12:27	1041	722	341	324	310	284	265	0	5.0	8.7	55	2727	2292	1517	383	256	1295	543	5018

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
All data on this sheet were taken on DEC. 02, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
12:28	1044	724	341	324	310	264	265	0	5.4	8.6	53	2720	2292	1547	390	308	1307	532	5011
12:29	1043	725	341	324	310	265	265	0	5.5	8.6	58	2698	2378	1598	375	349	1310	501	5067
12:30	1039	724	341	324	310	265	265	0	5.5	8.9	54	2701	2379	1598	382	377	1326	474	5081
12:31	1035	723	341	324	310	264	265	0	5.5	9.1	60	2688	2414	1597	393	396	1360	448	5102
12:32	1039	724	342	325	311	265	266	0	5.7	9.3	60	2679	2390	1579	405	403	1393	436	5069
12:33	1041	726	342	325	311	265	266	0	5.9	9.0	59	2713	2390	1609	390	407	1420	430	5103
12:34	1040	726	341	324	311	265	265	0	6.0	9.1	57	2739	2329	1606	393	411	1432	410	5068
12:35	1039	726	341	324	311	265	266	0	6.0	9.3	56	2691	2414	1611	400	412	1431	399	5105
12:36	1041	726	342	324	311	265	266	0	6.2	9.3	56	2669	2290	1580	398	418	1445	391	4974
12:37	1044	728	342	324	311	266	266	0	6.3	9.2	55	2733	2302	1570	401	421	1443	387	5036
12:38	1041	728	341	324	311	266	266	0	6.3	9.1	55	2744	2277	1590	397	422	1431	374	5021
12:39	1037	726	341	324	311	266	267	0	6.2	9.2	58	2728	2400	1578	384	419	1415	362	5129
12:40	1042	728	342	324	312	266	267	0	6.2	9.4	56	2732	2400	1567	411	418	1417	353	5132
12:41	1043	729	341	324	311	266	267	0	6.3	9.1	58	2701	2376	1579	396	422	1427	348	5077
12:42	1041	728	341	324	311	266	266	0	6.3	9.4	57	2701	2352	1566	400	422	1426	343	5053
12:43	1039	729	343	325	312	266	266	0	6.3	9.2	57	2730	2364	1579	395	424	1423	343	5057
12:44	1041	735	344	326	312	266	267	0	6.4	9.5	56	2740	2400	1584	397	427	1426	339	5140
12:45	1043	740	346	328	314	266	267	0	6.4	9.4	56	2718	2252	1557	388	425	1417	337	4970
12:46	1044	745	348	329	315	267	268	0	6.5	9.2	54	2718	2326	1574	387	423	1418	339	5031
12:47	1040	749	350	330	316	267	268	0	6.5	9.2	63	2726	2375	1583	381	420	1411	334	5101
12:48	1036	751	352	332	317	267	268	221	6.4	9.3	57	2703	2326	1600	400	416	1401	327	5028
12:49	1040	755	354	334	318	268	269	220	6.3	9.4	60	2733	2361	1597	415	414	1394	324	5094
12:50	1042	759	356	335	319	268	269	110	6.3	9.2	64	2714	2373	1562	405	417	1395	321	5087
12:51	1044	763	357	337	320	269	270	130	6.3	9.3	72	2723	2336	1284	415	419	1393	315	5059
12:52	1042	767	359	339	321	269	271	131	6.3	9.1	58	2687	2395	869	410	422	1393	315	5082
12:53	1037	768	361	340	323	290	271	128	6.2	9.2	50	2692	2363	822	402	421	1387	312	5092
12:54	1040	770	363	342	324	291	272	136	6.1	9.5	50	2717	2394	804	426	422	1387	311	5111
12:55	1043	773	365	343	326	291	273	123	6.1	9.1	51	2698	2406	834	404	425	1392	310	5094
12:56	1039	774	367	345	327	292	273	131	6.2	9.0	52	2737	2380	802	400	429	1402	309	5117
12:57	1036	774	368	346	328	293	274	126	6.1	9.5	60	2695	2332	842	411	429	1393	306	5027
12:58	1039	776	370	348	330	293	274	132	6.1	9.6	56	2690	2367	809	423	429	1404	308	5056
12:59	1043	778	371	349	331	294	275	131	6.3	9.4	56	2702	2268	831	406	436	1419	310	4970
13:00	1041	779	371	349	331	295	276	132	6.4	9.3	61	2700	2401	807	399	437	1417	311	5085
13:01	1043	781	371	349	332	296	276	126	6.4	9.6	61	2756	2367	811	426	436	1406	307	5144
13:02	1045	783	372	350	333	296	277	127	6.4	9.3	58	2730	2375	772	415	432	1400	304	5105
13:03	1042	783	371	350	333	296	277	134	6.3	9.1	63	2715	2374	807	404	429	1388	295	5088
13:04	1040	783	371	350	334	297	278	132	6.2	9.1	65	2736	2312	831	394	426	1385	293	5049
13:05	1041	783	371	351	334	298	278	131	6.0	9.0	64	2719	2312	808	403	420	1386	293	5031
13:06	1043	784	371	350	334	299	278	126	5.8	9.0	61	2701	2384	844	399	415	1388	289	5085
13:07	1043	785	371	350	334	299	279	127	5.8	8.7	62	2719	2394	813	384	416	1402	289	5114
13:08	1041	785	372	351	335	299	279	134	5.7	8.7	62	2701	2260	826	379	413	1408	290	4961
13:09	1041	785	371	351	335	300	280	123	5.6	8.7	64	2721	2259	861	364	409	1416	283	4980
13:10	1039	784	370	350	335	300	280	133	5.5	8.7	63	2689	2308	845	382	404	1425	280	5024
13:11	1041	786	372	352	336	301	280	129	5.5	8.7	62	2696	2270	861	361	401	1442	286	4966
13:12	1041	786	371	351	336	301	280	123	5.5	8.7	66	2671	2331	863	364	398	1454	286	5002
13:13	1041	786	371	351	336	301	280	129	5.5	8.7	68	2669	2343	819	367	398	1460	282	5012
13:14	1041	786	371	352	336	301	281	128	5.3	8.6	65	2657	2295	860	368	391	1443	274	4952
13:15	1041	786	366	348	335	302	281	130	5.3	8.6	68	2694	2268	821	364	390	1447	269	4962

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 02, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wultrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13:16	1039	785	364	347	334	302	281	131	5.4	8.9	66	2692	2293	859	370	393	1460	269	4965
13:17	1038	784	363	348	334	302	281	131	5.4	8.9	67	2696	2366	789	367	393	1457	262	5053
13:18	1040	784	368	351	336	302	281	129	5.4	8.8	68	2675	2366	855	365	395	1464	261	5041
13:19	1041	785	370	349	336	302	281	127	5.3	8.8	67	2697	2304	837	373	394	1465	257	5001
13:20	1043	786	363	343	332	302	281	125	5.2	8.7	68	2696	2267	801	368	389	1470	251	4962
13:21	1038	784	358	340	330	302	280	130	5.2	8.8	70	2696	2340	817	370	387	1478	244	5036
13:22	1039	784	358	341	330	302	280	133	5.2	9.1	70	2727	2292	742	378	384	1478	246	5019
13:23	1041	785	366	345	331	302	281	129	5.4	9.0	71	2686	2217	790	369	389	1489	252	4902
13:24	1033	783	367	344	332	302	280	129	5.4	8.7	69	2689	2340	829	370	391	1472	253	4997
13:25	1035	784	364	341	330	301	280	130	5.3	9.6	71	2692	2327	828	402	390	1452	248	5019
13:26	1023	780	369	341	329	301	280	131	5.6	9.7	74	2716	2328	777	412	398	1476	256	5044
13:27	1016	775	370	339	328	301	280	124	6.1	11.0	76	2686	2328	756	447	412	1507	265	5032
13:28	1009	771	369	337	327	301	279	135	6.9	11.7	86	2699	2328	695	488	439	1546	279	5027
13:29	1004	767	370	336	327	300	278	131	7.9	12.3	99	2733	2340	697	518	471	1593	307	5073
13:30	1013	767	371	339	327	300	278	0	8.7	12.5	99	2633	2378	1204	535	502	1605	351	5011
13:31	1014	766	371	339	327	300	277	0	9.3	12.5	98	2691	2256	1283	445	522	1598	409	4947
13:32	1014	764	370	338	326	299	277	0	9.3	12.5	97	2720	2268	1230	437	515	1489	426	4988
13:33	1011	762	371	339	326	299	277	0	9.3	12.7	95	2703	2256	1340	439	492	1437	407	4959
13:34	1009	761	372	339	326	298	277	0	9.2	12.8	94	2718	2307	1306	438	464	1365	379	4963
13:35	1017	763	370	337	326	298	277	0	9.3	12.8	94	2745	2282	1322	446	448	1367	381	5027
13:36	1037	770	372	338	326	298	277	0	9.5	12.1	94	2696	2355	1316	419	444	1360	391	5052
13:37	1046	776	372	338	326	298	277	0	9.4	10.8	96	2743	2245	1352	330	436	1328	388	4968
13:38	1047	778	370	337	326	297	277	0	8.1	9.8	97	2684	2207	1398	261	392	1186	351	4891
13:39	1039	776	371	338	326	297	276	0	6.7	9.4	97	2728	2262	1429	233	339	1088	352	5010
13:40	1035	775	372	339	326	297	276	0	5.7	9.2	98	2728	2257	1470	222	287	1088	383	4986
13:41	1033	773	371	337	326	297	276	0	5.2	9.2	97	2716	2391	1478	220	251	1163	422	5108
13:42	1036	774	370	337	325	297	276	0	4.8	9.0	98	2686	2367	1476	212	233	1213	444	5054
13:43	1038	775	371	337	325	297	276	0	4.6	9.0	98	2706	2257	1486	211	222	1262	457	4964
13:44	1040	777	372	338	326	297	276	0	4.4	9.0	97	2683	2403	1486	209	214	1299	470	5059
13:45	1040	777	371	337	325	297	276	0	4.3	8.9	98	2711	2367	1519	204	209	1322	490	5079
13:46	1039	777	369	336	325	297	276	0	4.2	8.8	98	2728	2379	1497	206	206	1330	480	5107
13:47	1039	778	371	337	325	297	276	0	4.2	8.9	97	2700	2367	1439	219	206	1343	473	5064
13:48	1039	778	372	338	326	297	276	0	4.2	8.9	98	2725	2367	1486	218	208	1345	459	5092
13:49	1037	778	372	337	325	297	277	0	4.3	8.7	98	2738	2379	1505	265	214	1350	444	5117
13:50	1038	779	370	336	324	297	277	0	4.4	8.7	98	2718	2257	1527	343	220	1346	425	4975
13:51	1042	780	372	337	325	297	277	0	4.7	8.6	98	2711	2403	1544	355	249	1356	399	5121
13:52	1043	781	372	337	325	297	277	0	5.0	8.4	98	2718	2262	1561	357	295	1359	364	5000
13:53	1042	781	371	336	325	297	276	0	5.0	8.4	98	2711	2354	1568	357	330	1340	326	5065
13:54	1041	781	371	337	325	297	276	121	4.9	8.4	80	2679	2391	1548	359	356	1328	296	5114
13:55	1040	782	372	337	325	297	277	133	4.8	8.3	64	2710	2218	1303	355	375	1332	279	4928
13:56	1039	783	371	336	325	297	276	130	4.8	8.3	88	2691	2367	918	351	386	1343	274	5059
13:57	1039	785	371	336	325	297	277	130	4.7	8.3	70	2716	2257	791	354	386	1344	266	4957
13:58	1040	786	371	337	325	297	277	130	4.7	8.3	68	2698	2295	752	354	387	1350	264	4993
13:59	1041	786	370	336	325	297	277	127	4.7	8.3	67	2689	2295	733	349	386	1357	262	4984
14:00	1042	787	371	337	325	297	277	3	4.8	8.3	65	2705	2319	813	351	385	1362	260	5024
14:01	1042	785	371	337	325	297	277	3	4.8	8.3	58	2696	2319	1179	345	386	1375	261	5015
14:02	1041	786	372	337	325	297	277	127	4.8	8.3	65	2700	2295	1181	349	382	1380	257	4994
14:03	1040	786	371	337	324	297	277	136	4.7	8.3	69	2689	2331	804	352	379	1377	252	5021

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 02, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wultrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:04	1040	788	372	338	325	297	277	123	4.8	8.3	68	2683	2245	815	352	379	1386	252	4932
14:05	1038	786	370	336	325	297	277	127	4.8	8.3	67	2664	2245	766	354	378	1386	253	4909
14:06	1039	786	371	337	325	297	277	135	4.8	8.5	67	2703	2270	791	358	377	1385	252	4973
14:07	1040	787	373	338	325	297	277	125	4.8	8.4	70	2657	2426	777	345	378	1385	253	5102
14:08	1043	788	370	336	325	297	277	138	4.8	8.3	69	2696	2355	818	330	377	1384	252	5052
14:09	1043	789	371	337	325	297	277	126	4.9	8.3	72	2676	2379	842	257	380	1395	252	5055
14:10	1042	789	373	339	326	297	278	131	5.0	8.3	72	2716	2343	859	33	377	1395	251	5060
14:11	1040	788	371	337	325	297	277	125	5.0	8.2	73	2723	2331	822	304	374	1405	258	5054
14:12	1040	788	370	336	324	297	277	130	5.0	8.2	70	2746	2331	830	302	367	1407	262	5077
14:13	1040	788	373	338	325	298	278	125	5.0	8.1	71	2724	2331	668	291	363	1408	270	5056
14:14	1039	788	373	338	326	298	278	132	5.0	8.1	73	2711	2343	596	291	359	1406	274	5024
14:15	1041	789	371	336	325	298	278	129	5.0	8.1	75	2739	2343	585	288	357	1400	278	5083
14:16	1040	789	370	336	325	298	278	132	5.0	8.1	72	2714	2331	576	296	355	1397	280	5046
14:17	1039	789	373	339	326	299	278	131	5.0	8.2	74	2709	2331	558	300	352	1395	285	5041
14:18	1038	789	372	338	326	299	279	127	5.0	8.3	73	2741	2342	584	307	352	1395	281	5083
14:19	1039	789	371	337	325	299	279	125	5.0	8.3	73	2718	2330	554	300	351	1390	278	5048
14:20	1041	789	372	338	326	299	279	131	5.1	8.3	73	2679	2281	520	304	355	1395	275	4960
14:21	1041	789	372	338	326	299	279	125	5.2	8.4	73	2694	2281	544	314	357	1401	276	4975
14:22	1040	789	371	337	325	299	279	129	5.2	8.4	74	2714	2401	517	319	359	1394	272	5116
14:23	1042	789	372	338	326	299	279	136	5.2	8.5	73	2699	2366	512	322	359	1384	269	5065
14:24	1043	790	372	337	325	299	279	126	5.2	8.3	73	2691	2268	592	320	361	1377	267	4978
14:25	1041	790	369	328	322	299	278	129	5.2	8.4	75	2706	2268	495	315	367	1375	266	4976
14:26	1041	790	336	312	313	299	276	131	5.2	8.3	76	2711	2378	523	311	371	1376	265	5089
14:27	1041	790	318	299	303	297	273	132	5.2	8.3	76	2729	2262	536	313	373	1376	269	5027
14:28	1040	790	303	288	295	295	270	129	5.2	8.3	78	2724	2394	440	310	374	1375	269	5119
14:29	1037	789	290	278	287	293	267	130	5.2	8.3	77	2748	2299	469	301	374	1376	271	5048
14:30	1041	790	280	271	280	290	264	128	5.2	8.3	77	2762	2302	479	304	375	1383	270	5031
14:31	1042	790	273	265	275	287	261	131	5.3	8.3	77	2736	2268	448	304	378	1390	271	5004
14:32	1040	790	267	260	269	284	258	134	5.3	8.3	75	2752	2406	449	310	375	1385	271	5158
14:33	1040	790	263	256	265	281	256	128	5.3	8.4	79	2759	2249	475	308	376	1380	272	5003
14:34	1038	790	260	253	260	278	254	127	5.3	8.3	76	2761	2402	479	305	375	1372	270	5163
14:35	1037	789	258	251	258	275	252	130	5.4	8.4	73	2750	2453	477	309	376	1373	270	5203
14:36	1040	790	259	251	256	273	250	126	5.4	8.4	74	2756	2298	475	309	375	1370	270	5042
14:37	1042	791	260	251	255	270	248	131	5.4	8.3	74	2765	2388	456	300	374	1365	266	5152
14:38	1042	791	261	251	254	267	247	131	5.4	8.5	73	2741	2304	531	309	376	1360	262	5045
14:39	1042	792	262	251	252	264	246	129	5.5	8.4	74	2727	2394	475	308	380	1368	265	5142
14:40	1041	792	264	252	252	262	244	129	5.5	8.2	76	2767	2336	416	302	380	1368	265	5103
14:41	1040	791	276	261	256	260	244	129	5.5	8.4	77	2733	2399	385	301	380	1372	266	5132
14:42	1039	791	290	271	261	259	245	135	5.4	8.3	74	2727	2328	375	294	379	1371	271	5064
14:43	1042	792	305	280	268	258	246	125	5.4	8.2	72	2727	2317	499	289	378	1379	276	5044
14:44	1041	791	318	289	273	259	248	130	5.4	8.3	73	2727	2360	456	288	376	1381	275	5106
14:45	1042	792	331	298	280	259	249	134	5.4	8.2	71	2735	2453	492	289	375	1369	273	5188
14:46	1043	792	342	307	286	260	251	128	5.3	8.3	74	2774	2378	571	297	375	1371	274	5152
14:47	1042	792	348	311	291	262	253	129	5.2	8.2	74	2750	2353	533	288	371	1368	275	5103
14:48	1040	791	353	315	295	264	255	129	5.2	8.2	70	2763	2351	541	293	369	1378	271	5115
14:49	1039	791	358	319	298	265	256	128	5.1	8.4	72	2752	2399	493	308	367	1388	271	5064
14:50	1041	792	364	324	303	267	258	129	5.2	8.3	76	2754	2410	517	315	365	1389	268	5163
14:51	1040	792	368	327	306	269	259	127	5.2	8.3	73	2740	2444	506	305	365	1385	263	5184

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 02, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:52	1040	791	368	328	308	270	260	130	5.2	8.4	70	2700	2394	520	311	367	1377	261	5119
14:53	1038	791	369	329	310	272	262	131	5.2	8.4	75	2714	2393	470	325	371	1369	255	5105
14:54	1041	791	371	332	312	274	263	124	5.2	8.5	73	2712	2329	491	332	373	1375	252	5041
14:55	1041	791	371	332	313	276	263	0	5.2	8.4	76	2714	2401	463	341	376	1391	249	5115
14:56	1040	790	370	332	314	277	264	0	5.2	8.4	72	2736	2288	417	338	381	1400	242	5024
14:57	1041	791	372	333	316	279	265	0	5.1	8.4	75	2703	2287	424	337	382	1398	238	4990
14:58	1042	791	372	334	317	280	265	131	5.0	8.3	77	2742	2396	428	334	385	1393	235	5138
14:59	1042	792	371	333	317	281	267	128	5.0	8.1	73	2720	2369	536	309	388	1396	234	5077
15:00	1041	791	371	334	318	283	267	126	4.9	8.1	73	2735	2344	554	315	388	1393	230	5079
15:01	1041	790	373	335	319	284	268	129	4.8	8.2	75	2746	2355	565	327	387	1399	228	5102
15:02	1040	790	360	325	315	285	268	119	4.7	8.2	75	2728	2353	571	330	383	1410	228	5049
15:03	1038	789	339	311	308	285	266	135	4.7	8.3	76	2745	2304	500	331	385	1417	224	5049
15:04	1039	789	321	299	299	285	264	129	4.7	8.3	75	2730	2366	513	328	385	1420	221	5096
15:05	1040	790	306	288	292	284	261	122	4.7	8.3	80	2753	2390	509	324	383	1420	220	5143
15:06	1041	790	299	284	287	283	259	132	4.8	8.2	74	2762	2429	444	317	387	1425	221	5191
15:07	1042	790	301	285	285	281	258	133	4.8	8.2	74	2750	2309	486	309	388	1419	221	5059
15:08	1041	790	302	285	284	280	257	126	4.9	8.3	75	2737	2272	514	298	386	1422	223	5009
15:09	1041	791	294	277	280	278	256	128	5.0	8.3	74	2744	2274	469	290	392	1424	226	5018
15:10	1041	790	286	270	275	276	254	124	5.1	8.2	69	2750	2326	361	288	389	1424	228	5076
15:11	1041	790	278	265	270	274	252	135	5.1	8.2	74	2755	2264	474	286	383	1415	229	5019
15:12	1042	791	272	260	265	272	250	123	5.1	8.2	72	2759	2329	495	282	378	1408	232	5084
15:13	1041	790	267	256	262	270	248	131	5.1	8.2	74	2783	2406	489	280	375	1405	236	5190
15:14	1039	789	264	253	258	267	246	128	5.1	8.1	73	2780	2434	508	273	372	1399	237	5214
15:15	1041	790	265	254	256	265	244	135	5.2	8.1	74	2811	2449	486	275	373	1405	242	5234
15:16	1040	790	276	262	259	263	244	123	5.2	8.1	74	2779	2328	513	271	371	1402	242	5107
15:17	1042	790	290	272	264	261	244	131	5.2	8.2	69	2731	2418	512	279	371	1400	245	5149
15:18	969	774	303	279	268	260	244	128	5.1	8.6	85	2754	2408	483	268	366	1395	245	5125
15:19	899	737	312	284	272	259	245	126	5.2	12.9	86	2762	2408	494	224	366	1409	245	5170
15:20	847	706	315	285	274	259	245	135	7.3	16.7	99	2699	2372	354	196	412	1599	545	5072
15:21	863	698	317	287	275	258	245	125	–	18.0	90	2667	2374	216	179	–	–	–	5073
15:22	886	701	320	290	277	258	246	0	5.5	16.7	80	2699	2423	183	239	212	1158	–	5122
15:23	881	696	323	293	280	258	246	0	6.0	16.4	75	2791	2411	226	198	148	1010	297	5202
15:24	868	688	326	295	282	259	248	0	6.1	16.7	72	2807	2423	200	192	117	830	279	5230
15:25	857	680	328	296	283	259	248	0	6.2	17.1	69	2771	2347	160	179	111	704	247	5119
15:26	832	668	328	297	284	260	248	0	6.3	17.7	71	2820	2323	129	162	103	611	230	5144
15:27	773	641	328	296	284	260	248	0	6.5	18.5	87	2834	2335	119	134	91	535	218	5283
15:28	727	615	325	294	283	260	247	0	6.8	19.6	98	2772	2422	138	124	77	477	227	5193
15:29	693	593	322	291	282	260	247	0	7.3	20.2	93	2767	2411	230	126	59	434	262	5178
15:30	665	572	318	289	280	259	246	0	7.7	20.4	92	2786	2411	251	143	5	381	321	5207
15:31	641	554	315	286	279	259	246	0	7.9	20.5	93	2797	2350	313	134	0	335	325	5148
15:32	617	536	311	284	277	258	245	0	8.0	20.5	91	2801	2425	269	134	0	298	308	5226
15:33	597	519	307	282	275	258	244	0	8.1	20.6	85	2789	2363	298	119	0	266	284	5153
15:34	577	503	302	278	273	257	243	0	8.2	20.6	77	2761	2475	239	119	0	245	214	5236
15:35	559	488	298	275	271	257	242	0	8.2	20.6	80	2786	2301	239	119	0	226	185	5087
15:36	541	473	293	271	268	256	241	0	8.2	20.6	72	2754	2303	119	119	0	206	193	5057
15:37	523	459	291	268	265	255	240	0	8.2	20.6	76	2758	2457	60	119	0	195	195	5224
15:38	506	446	288	264	262	254	238	0	8.2	20.6	73	2762	2344	60	119	0	185	183	5108

DEC. 04, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 04, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs Na2/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
10:19	1043	752	345	306	290	256	241	0	5.1	8.4	31	3161	2306	1565	326	364	1412	345	5457
10:20	1042	755	342	306	291	258	243	0	5.1	8.3	30	2972	2329	1588	325	363	1414	339	5301
10:21	1038	752	335	302	288	258	242	0	5.1	8.3	29	2762	2317	1574	317	363	1418	343	5079
10:22	1037	750	335	302	287	258	241	124	5.0	8.4	28	2607	2317	1604	318	360	1417	338	4924
10:23	1038	749	337	304	287	257	241	125	5.0	8.4	28	2690	2304	1624	319	357	1425	337	4994
10:24	1040	749	339	305	288	257	241	0	5.0	8.4	28	2676	2342	1618	305	353	1434	337	5003
10:25	1043	749	341	307	289	257	241	0	5.0	8.4	35	2632	2379	1602	315	349	1447	338	5012
10:26	1043	750	340	305	289	257	242	0	5.0	8.4	29	2683	2379	1598	312	347	1455	337	5062
10:27	1040	749	338	304	288	257	242	0	5.0	8.4	30	2699	2340	1592	319	347	1453	334	5039
10:28	1039	749	338	305	288	257	242	0	5.0	8.5	28	2692	2289	1576	326	346	1450	333	4981
10:29	1038	749	340	305	288	258	242	0	5.0	8.6	28	2690	2315	1569	332	347	1444	330	5005
10:30	1042	751	343	308	290	258	243	0	5.1	8.6	30	3029	2378	1548	332	351	1446	327	5406
10:31	1043	753	342	307	290	258	243	0	5.1	8.4	33	2797	2439	1552	331	352	1435	329	5235
10:32	1042	752	338	304	289	258	243	0	5.1	8.6	28	2757	2425	1537	336	355	1423	326	5181
10:33	1039	750	338	304	288	258	243	0	5.1	8.6	28	2728	2413	1554	338	358	1410	321	5141
10:34	1042	744	339	304	288	258	243	0	5.2	8.6	28	2738	2326	1547	330	363	1410	318	5064
10:35	1042	737	340	305	289	258	243	136	5.2	8.5	30	2686	2388	1491	326	365	1406	318	5075
10:36	1041	732	340	306	289	258	243	130	5.2	8.5	33	2686	2299	1048	325	367	1407	320	4965
10:37	1041	728	341	306	290	258	242	136	5.1	8.6	36	2726	2411	821	336	364	1406	315	5137
10:38	1041	725	342	307	290	258	243	135	5.0	8.7	36	2757	2411	801	342	360	1405	313	5168
10:39	1038	722	341	306	290	258	243	130	5.1	8.7	36	2740	2445	782	330	361	1415	312	5185
10:40	1041	720	341	306	290	258	242	134	5.2	8.7	37	2755	2409	757	337	364	1423	311	5164
10:41	1042	719	340	306	290	258	242	135	5.3	8.6	45	2772	2335	758	336	366	1431	317	5112
10:42	1040	716	340	306	290	258	242	134	5.3	8.6	42	2769	2297	781	338	368	1433	314	5066
10:43	1039	714	341	306	290	258	243	136	5.2	8.7	43	2775	2409	753	339	367	1431	309	5184
10:44	1040	714	340	306	290	258	242	135	5.2	8.8	45	2772	2432	781	346	366	1435	311	5204
10:45	1041	713	322	292	284	258	241	135	5.3	8.7	45	2752	2270	759	335	367	1445	313	5022
10:46	1042	713	300	277	275	257	239	134	5.4	8.7	44	2754	2310	767	336	370	1449	314	5064
10:47	1042	712	292	272	270	255	237	136	5.3	8.7	55	2757	2312	748	333	366	1439	311	5068
10:48	1041	711	292	273	268	254	236	130	5.4	8.6	47	2740	2351	733	329	366	1444	312	5091
10:49	1039	711	296	275	267	252	235	137	5.4	8.7	47	2806	2427	703	335	365	1437	312	5233
10:50	1040	711	299	277	268	251	234	132	5.3	8.6	48	2768	2428	729	335	363	1422	311	5196
10:51	1041	711	301	277	268	250	234	137	5.4	8.7	52	2757	2304	741	343	365	1422	313	5061
10:52	1041	711	301	276	267	249	233	130	5.4	8.7	48	2771	2267	769	339	366	1416	309	5038
10:53	1041	710	299	275	266	248	233	129	5.4	8.7	51	2764	2333	726	339	366	1414	305	5097
10:54	1042	710	301	276	266	247	232	136	5.4	8.7	51	2746	2395	703	337	368	1417	305	5141
10:55	1040	711	303	277	266	247	232	134	5.4	8.6	49	2795	2409	729	336	370	1420	307	5204
10:56	1040	711	302	275	265	246	231	132	5.4	8.6	48	2744	2309	739	335	370	1424	304	5053
10:57	1038	709	300	274	264	245	231	137	5.4	8.7	64	2750	2310	719	330	368	1427	307	5060
10:58	1042	710	301	274	264	245	231	130	5.3	8.7	53	2762	2361	725	340	367	1423	296	5123
10:59	1043	711	302	275	264	245	230	134	5.5	8.4	53	2743	2423	739	326	371	1436	302	5166
11:00	1042	712	302	275	264	244	230	138	5.5	8.3	53	2818	2310	759	315	372	1432	307	5128
11:01	1038	711	300	274	263	244	230	128	5.3	8.2	53	2788	2312	768	311	365	1417	306	5100
11:02	1038	710	300	274	263	243	229	134	5.2	8.4	51	2743	2449	748	316	363	1423	306	5192
11:03	1039	711	302	275	263	243	229	136	5.0	8.4	60	2712	2439	755	321	356	1423	304	5151
11:04	1040	711	302	275	263	243	229	131	5.1	8.4	51	2747	2327	733	315	355	1437	309	5073
11:05	1042	712	301	274	263	242	229	138	5.1	8.4	55	2776	2365	720	322	353	1442	308	5140
11:06	1042	712	301	274	262	242	228	134	5.2	8.4	54	2733	2439	763	321	356	1446	306	5172

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 04, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs Na2/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
11:07	1041	712	302	275	263	241	226	134	5.2	8.4	50	2792	2439	749	325	356	1438	306	5230
11:08	1040	712	302	275	263	241	226	139	5.2	8.3	53	2757	2301	692	317	356	1435	301	5058
11:09	1039	711	301	274	262	241	226	135	5.2	8.3	53	2781	2328	744	322	356	1438	302	5110
11:10	1040	712	301	274	262	241	227	135	5.1	8.3	51	2797	2453	757	321	352	1438	299	5250
11:11	1041	712	302	273	262	240	227	131	5.1	8.2	50	2831	2430	662	304	352	1443	301	5261
11:12	1041	712	301	273	262	240	227	139	5.1	8.2	55	2747	2355	536	299	356	1447	299	5103
11:13	1040	712	301	273	261	240	227	131	5.1	8.3	64	2803	2330	511	305	355	1450	300	5133
11:14	1042	712	301	273	261	240	227	131	5.1	8.5	56	2775	2278	511	307	353	1454	298	5053
11:15	1041	713	302	273	262	240	227	140	5.1	8.2	56	2794	2393	472	297	353	1452	296	5185
11:16	1040	712	302	273	261	240	227	129	5.1	8.1	48	2785	2393	499	298	353	1447	297	5178
11:17	1039	711	299	271	260	240	227	137	5.1	8.3	58	2775	2430	472	300	355	1441	299	5205
11:18	1039	711	301	272	260	240	226	134	5.0	8.3	55	2761	2454	483	301	351	1431	294	5215
11:19	1040	712	303	274	261	240	227	135	5.0	8.3	58	2758	2430	485	300	350	1430	292	5188
11:20	1042	712	302	273	261	240	226	135	5.1	8.3	52	2779	2265	455	301	353	1439	292	5044
11:21	1042	712	300	272	260	240	226	137	5.1	8.3	51	2785	2444	448	298	356	1437	288	5229
11:22	1041	711	300	272	260	240	226	137	5.0	8.3	53	2761	2432	467	303	356	1425	284	5183
11:23	1036	710	301	273	260	240	226	137	5.0	8.2	53	2727	2432	493	289	356	1424	281	5158
11:24	1040	711	302	273	261	240	226	140	4.9	8.3	57	2789	2418	487	295	352	1417	283	5207
11:25	1042	712	302	273	261	240	226	140	4.9	8.1	60	2796	2304	422	288	352	1425	285	5100
11:26	1042	713	301	274	261	240	226	141	4.9	8.0	58	2782	2442	404	293	350	1435	288	5224
11:27	1039	712	301	274	261	240	226	134	4.8	8.0	56	2754	2355	529	296	347	1440	286	5110
11:28	1040	712	301	274	261	240	226	137	4.7	8.0	55	2767	2430	644	293	343	1447	278	5197
11:29	1039	712	302	275	262	240	226	127	4.7	8.0	71	2796	2343	694	293	341	1459	281	5139
11:30	1038	711	303	275	262	240	226	140	4.7	8.3	56	2784	2330	638	304	338	1466	281	5114
11:31	1040	712	303	275	262	240	226	134	4.7	8.2	68	2767	2430	699	311	338	1470	276	5197
11:32	1041	712	302	275	261	240	225	127	4.8	8.1	58	2794	2454	723	301	339	1479	275	5249
11:33	1040	711	303	275	262	239	225	135	4.8	8.5	54	2734	2267	674	322	340	1475	272	5001
11:34	1040	711	303	275	262	239	225	134	4.8	8.4	53	2769	2407	656	318	340	1470	267	5176
11:35	1038	710	302	275	261	239	225	136	4.9	8.3	66	2770	2468	713	315	343	1470	269	5239
11:36	1040	711	302	275	261	239	225	131	4.9	8.5	58	2808	2395	681	332	346	1458	271	5203
11:37	1042	713	302	274	261	239	225	140	5.0	8.4	53	2755	2382	680	328	352	1457	269	5137
11:38	1042	712	302	272	261	238	225	139	5.1	8.6	60	2699	2319	456	311	357	1454	266	5017
11:39	1043	712	302	272	260	239	225	136	5.0	8.3	64	2774	2444	368	294	359	1435	261	5218
11:40	1040	712	302	273	261	239	225	129	5.1	8.3	62	2786	2456	354	288	363	1441	266	5242
11:41	1040	710	302	273	260	239	225	138	5.1	8.3	58	2763	2306	313	290	364	1438	267	5069
11:42	1042	710	302	272	260	239	225	133	5.1	8.3	60	2775	2344	308	283	363	1435	267	5112
11:43	1041	710	302	272	260	239	225	135	5.1	8.1	64	2820	2444	309	283	363	1434	266	5264
11:44	1032	709	302	273	260	239	225	134	5.1	8.1	58	2798	2456	313	280	363	1447	271	5254
11:45	1045	709	301	275	261	239	224	136	5.0	9.8	78	2786	2357	456	202	357	1467	271	5143
11:46	1043	709	302	275	262	239	224	136	5.5	9.9	59	2801	2444	448	159	357	1533	301	5245
11:47	1018	700	302	275	262	239	224	138	5.6	10.6	73	2781	2382	394	196	322	1541	344	5163
11:48	990	689	300	274	261	239	223	137	5.5	12.7	54	2767	2357	304	265	272	1501	375	5124
11:49	959	674	300	273	261	238	223	0	7.1	14.4	48	2771	2344	518	226	243	1584	355	5115
11:50	937	661	300	274	261	238	223	0	9.0	15.8	48	2776	2359	498	221	271	1671	454	5135
11:51	918	649	301	275	261	238	222	0	4.7	16.7	48	2761	2421	418	226	4	1058	452	5182
11:52	903	639	302	275	261	238	223	0	5.4	17.0	40	2694	2448	363	220	2	922	–	5141
11:53	854	619	302	274	261	238	222	0	5.9	17.5	55	2802	2448	311	190	2	770	–	5250

DEC: 06, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
09:59	1026	689	300	273	257	227	219	0	5.1	8.3	41	2652	2433	1762	293	334	1480	342	5265
10:00	1031	689	302	273	257	228	219	0	5.0	8.4	40	2803	2444	1747	295	328	1487	351	5247
10:01	1032	686	302	274	258	229	219	0	5.0	8.4	40	2764	2481	1714	296	325	1496	357	5153
10:02	1033	689	301	273	258	229	219	0	5.0	8.3	41	2868	2518	1743	293	325	1495	356	5366
10:03	1033	689	301	273	258	230	220	0	5.0	8.2	41	2842	2580	1748	280	328	1486	352	5422
10:04	1031	686	302	274	258	230	220	0	5.0	8.2	41	2821	2554	1748	280	331	1480	350	5374
10:05	1029	686	302	273	258	231	221	0	4.9	8.2	41	2811	2463	1751	282	328	1478	347	5274
10:06	1030	686	301	273	258	231	221	0	4.8	8.2	40	2825	2435	1773	279	322	1476	348	5260
10:07	1032	686	302	274	259	231	221	0	4.8	8.1	40	2792	2395	1784	280	319	1479	350	5187
10:08	1032	686	302	274	259	232	221	0	4.8	8.2	41	2841	2394	1790	283	318	1489	348	5312
10:09	1033	689	302	274	259	232	221	0	4.8	8.0	40	2836	2510	1753	272	318	1500	350	5348
10:10	1030	686	300	273	259	232	221	0	4.8	8.0	41	2803	2405	1730	272	319	1506	344	5208
10:11	1027	686	302	274	259	232	221	0	4.7	8.0	43	2852	2392	1740	269	317	1498	341	5235
10:12	1008	681	301	273	259	232	221	0	4.7	8.9	41	2834	2392	1748	310	316	1498	337	5226
10:13	983	670	299	272	258	232	220	0	4.7	11.0	43	2871	2470	1707	340	314	1494	338	5341
10:14	954	657	299	272	258	232	220	0	6.0	12.9	41	2850	2569	1487	336	341	1576	396	5419
10:15	939	647	300	272	258	232	220	0	7.7	14.4	41	2840	2377	1319	328	381	1633	525	5286
10:16	954	646	301	273	259	232	220	0	9.5	14.6	41	2778	2664	1261	369	405	1644	–	5442
10:17	972	651	302	275	260	232	221	0	4.4	13.2	40	2843	2530	1332	411	242	965	–	5373
10:18	991	657	303	275	260	233	221	0	4.5	11.8	40	2857	2553	1393	366	218	902	–	5390
10:19	1007	664	302	275	260	233	222	0	3.9	10.5	38	2830	2452	1468	284	214	799	177	5282
10:20	1013	668	301	274	260	233	222	0	7.8	9.4	40	2749	2385	1524	215	318	969	142	5133
10:21	1015	670	301	274	260	234	222	0	6.0	8.5	49	2841	2513	1573	159	281	966	119	5349
10:22	1015	672	303	275	261	234	223	0	4.6	8.1	40	2846	2437	1611	137	235	1042	356	5263
10:23	1015	673	301	274	260	234	223	0	3.6	7.8	39	2847	2499	1656	119	182	1148	377	5346
10:24	1016	674	301	274	260	234	223	0	3.0	8.1	39	2816	2422	1686	214	146	1260	416	5236
10:25	1021	676	303	276	261	235	223	0	2.9	8.5	39	2823	2381	1685	258	130	1382	486	5204
10:26	1025	677	301	274	261	235	223	0	3.7	8.5	39	2765	2420	1705	263	175	1469	–	5185
10:27	1030	680	301	274	260	235	223	0	4.3	8.6	39	2754	2420	1761	274	217	1524	–	5174
10:28	1029	682	301	274	260	235	223	0	4.7	8.5	41	2788	2366	1751	273	266	1525	–	5154
10:29	1027	681	301	274	260	235	223	0	4.9	8.6	38	2749	2379	1775	275	292	1515	–	5126
10:30	1028	682	302	275	261	235	223	0	5.0	8.6	41	2823	2470	1791	277	306	1507	572	5293
10:31	1028	683	301	274	261	235	223	0	5.0	8.4	39	2844	2419	1758	268	313	1501	539	5263
10:32	1031	684	301	274	260	235	223	0	5.1	8.4	41	2828	2493	1760	263	318	1511	508	5322
10:33	1032	685	302	275	261	236	223	0	5.0	8.3	38	2830	2568	1745	257	316	1503	487	5398
10:34	1032	686	302	275	261	236	223	0	5.0	8.4	39	2791	2404	1751	268	314	1501	471	5222
10:35	1030	685	301	274	261	235	223	0	5.0	8.3	40	2793	2428	1740	261	313	1495	454	5221
10:36	1029	686	301	274	261	235	223	259	5.0	8.3	39	2813	2270	1754	263	312	1491	441	5082
10:37	1028	688	303	275	261	235	223	249	5.0	8.3	53	2839	2428	1681	269	311	1485	424	5267
10:38	1030	693	303	275	261	235	223	230	4.9	8.4	46	2839	2626	802	284	309	1472	409	5465
10:39	1031	696	301	274	261	235	223	228	4.9	8.4	43	2772	2376	727	286	310	1473	394	5148
10:40	1033	700	301	274	261	235	223	231	5.0	8.4	46	2811	2413	670	285	314	1495	383	5224
10:41	1032	700	302	275	262	235	223	237	5.0	8.3	51	2821	2490	662	277	319	1500	377	5251
10:42	1032	702	303	276	262	235	223	227	5.0	8.2	49	2802	2348	669	271	321	1496	370	5150
10:43	1031	703	301	274	261	235	223	238	4.9	8.3	51	2860	2412	661	281	321	1492	354	5271
10:44	1031	702	300	274	261	235	223	229	4.9	8.3	55	2795	2562	661	286	319	1478	352	5357
10:45	1031	703	302	276	262	235	223	233	4.9	8.2	54	2870	2450	671	276	317	1475	346	5320
10:46	1031	704	303	276	262	236	223	226	4.8	8.3	55	2861	2488	678	283	314	1460	336	5349

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: —>	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
10:47	1030	703	300	274	262	236	223	232	4.8	8.3	53	2793	2319	662	277	312	1458	334	5112
10:48	1030	703	301	275	262	236	222	236	4.9	8.3	58	2858	2397	655	278	314	1464	332	5245
10:49	1030	703	302	274	262	236	223	234	4.9	8.3	54	2860	2384	594	271	313	1464	327	5243
10:50	1032	704	303	274	262	236	223	229	4.9	8.3	56	2839	2474	401	259	313	1468	324	5312
10:51	1031	703	301	272	262	236	223	236	4.9	8.2	60	2837	2472	357	252	312	1472	317	5309
10:52	1030	702	300	272	261	236	223	227	4.9	8.3	58	2820	2484	337	253	311	1475	313	5295
10:53	1031	702	303	274	261	237	223	234	4.9	8.3	58	2865	2495	320	259	311	1473	313	5360
10:54	1032	702	303	274	262	237	223	226	4.8	8.3	61	2863	2367	315	254	311	1472	304	5230
10:55	1032	701	302	273	262	237	223	230	4.9	8.4	61	2807	2354	291	261	312	1467	305	5171
10:56	1033	702	302	273	261	237	223	236	4.9	8.4	57	2832	2470	289	262	317	1459	300	5302
10:57	1032	701	302	273	261	236	223	229	4.9	8.3	59	2837	2496	307	253	319	1450	295	5332
10:58	1030	701	302	273	261	236	223	232	4.9	8.3	60	2814	2495	308	256	321	1447	292	5309
10:59	1029	701	302	273	262	236	223	234	4.8	8.2	75	2865	2493	337	257	319	1449	282	5358
11:00	1029	702	301	272	261	236	223	240	4.7	8.3	63	2906	2379	301	251	315	1454	277	5284
11:01	1032	702	302	273	261	236	223	223	4.6	8.4	64	2851	2392	274	253	309	1456	273	5243
11:02	1032	702	302	273	262	236	222	240	4.7	8.3	65	2788	2351	246	251	310	1482	281	5164
11:03	1032	703	301	272	262	236	222	225	4.7	8.4	77	2783	2377	256	252	313	1481	282	5160
11:04	1029	704	301	272	262	236	223	233	4.8	8.3	61	2809	2364	253	250	316	1486	280	5173
11:05	1029	704	302	273	262	236	223	233	4.8	8.2	64	2774	2491	238	241	315	1481	281	5265
11:06	1029	704	303	273	262	236	223	233	4.8	8.3	60	2847	2479	242	239	311	1478	278	5326
11:07	1032	706	302	273	262	236	223	240	4.8	8.3	59	2863	2477	229	239	312	1481	276	5340
11:08	1032	706	301	272	262	236	223	230	4.9	8.2	60	2741	2375	235	230	312	1494	276	5116
11:09	1031	705	301	272	261	236	223	231	4.9	8.4	77	2772	2388	255	235	312	1494	275	5163
11:10	1029	705	302	273	262	236	223	230	4.9	8.4	61	2784	2401	256	242	310	1496	277	5185
11:11	1030	705	302	273	262	236	223	235	4.9	8.4	63	2868	2463	245	238	309	1499	280	5331
11:12	1030	706	301	272	262	236	223	233	4.9	8.4	60	2854	2475	248	246	311	1500	280	5330
11:13	1032	706	303	276	263	239	223	230	4.9	8.4	63	2866	2475	249	243	313	1500	281	5342
11:14	1032	707	302	273	262	239	224	230	4.9	8.2	58	2789	2461	273	240	315	1495	282	5250
11:15	1031	707	301	271	261	239	223	234	4.8	8.3	63	2806	2473	219	242	316	1482	276	5279
11:16	1030	708	303	272	261	239	223	239	4.7	8.3	62	2865	2360	202	242	316	1477	269	5238
11:17	1030	707	303	272	261	236	223	226	4.5	8.3	63	2854	2486	212	242	312	1472	264	5342
11:18	1031	708	302	272	261	236	223	230	4.5	8.3	61	2825	2475	257	251	311	1464	262	5300
11:19	1032	710	301	270	260	236	223	236	4.4	8.2	62	2842	2475	217	207	309	1461	258	5314
11:20	1032	711	302	273	261	236	223	233	4.4	8.2	63	2814	2360	207	211	308	1461	258	5175
11:21	1031	710	303	278	263	236	224	233	4.4	8.2	57	2770	2461	265	216	308	1465	258	5231
11:22	1029	709	301	276	264	236	224	235	4.4	8.2	57	2772	2365	371	218	308	1469	259	5156
11:23	1028	710	299	275	263	239	224	227	4.3	8.3	58	2811	2473	412	232	305	1466	253	5197
11:24	1032	711	302	278	264	239	224	230	4.3	8.2	60	2835	2398	426	237	303	1490	254	5233
11:25	1034	711	303	278	264	239	224	233	4.3	8.0	57	2905	2559	451	229	300	1491	252	5365
11:26	1030	710	301	277	264	240	224	236	4.2	7.9	62	2871	2652	467	224	299	1498	252	5494
11:27	1029	711	301	277	264	240	224	231	4.1	8.0	64	2835	2447	504	226	293	1491	243	5262
11:28	1030	713	302	278	264	240	224	231	4.0	8.0	60	2816	2605	502	223	290	1498	243	5421
11:29	1031	712	302	278	265	240	224	233	4.0	8.0	58	2771	2396	494	233	288	1507	239	5167
11:30	1031	712	301	277	265	240	225	237	3.9	7.9	60	2746	2370	538	229	284	1503	238	5116
11:31	1031	711	301	277	264	240	224	229	3.9	8.0	61	2782	2545	531	226	283	1508	237	5326
11:32	1031	711	301	278	265	240	224	233	3.9	7.9	62	2833	2470	534	226	284	1522	235	5303
11:33	1030	711	302	278	265	240	225	233	3.9	7.9	61	2791	2396	547	226	285	1528	233	5152
11:34	1029	713	303	278	265	240	225	231	3.9	7.9	62	2780	2407	569	229	285	1526	226	5187

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
11:35	1028	712	300	277	264	240	225	231	3.9	8.0	63	2786	2603	541	236	283	1522	225	5389
11:36	1030	713	301	278	265	240	225	241	3.8	7.9	64	2754	2407	551	234	279	1509	222	5161
11:37	1033	716	303	279	265	240	225	241	3.8	7.8	63	2829	2543	562	225	277	1506	223	5373
11:38	1030	717	303	279	266	240	225	233	3.9	7.8	70	2842	2432	562	227	280	1510	220	5274
11:39	1029	716	302	278	265	240	225	243	3.8	7.9	64	2854	2381	582	231	278	1497	219	5235
11:40	1031	716	301	278	265	240	225	229	3.8	7.9	65	2842	2269	589	231	277	1497	214	5162
11:41	1032	715	301	277	265	240	225	232	3.9	7.9	59	2710	2615	593	237	277	1503	214	5325
11:42	1032	717	303	279	265	240	225	236	3.9	7.9	62	2849	2342	589	248	277	1496	213	5191
11:43	1031	716	302	278	265	240	225	236	4.0	8.0	74	2824	2470	593	250	281	1496	210	5280
11:44	1031	716	301	277	265	240	225	229	4.1	7.8	66	2840	2556	590	242	282	1495	209	5395
11:45	1031	713	301	278	265	240	225	235	4.1	7.9	57	2754	2394	600	237	282	1488	207	5148
11:46	1030	711	301	277	265	240	225	0	4.1	8.0	49	2728	2381	1368	233	283	1483	208	5109
11:47	1028	709	302	278	265	240	225	0	4.0	8.1	65	2787	2355	1484	241	282	1473	201	5143
11:48	1030	709	302	278	265	240	225	0	4.0	8.2	46	2793	2445	1525	248	284	1472	199	5238
11:49	1029	709	302	278	265	240	225	0	4.0	8.2	45	2840	2481	1557	252	287	1471	196	5320
11:50	1030	709	301	278	265	240	225	0	4.0	8.3	46	2759	2327	1537	261	290	1471	194	5143
11:51	1032	710	302	278	265	240	225	0	4.0	8.3	42	2752	2367	1533	269	292	1471	190	5118
11:52	1033	710	302	278	265	240	225	0	4.1	8.2	43	2873	2456	1560	264	296	1475	186	5328
11:53	1031	710	301	278	265	241	226	0	4.1	8.3	42	2867	2379	1567	264	299	1465	185	5247
11:54	1030	711	302	278	265	241	226	0	4.1	8.2	41	2810	2340	1584	265	302	1461	184	5150
11:55	1028	711	301	278	265	241	226	0	4.2	8.3	43	2819	2339	1583	266	303	1466	183	5157
11:56	1029	711	301	278	265	240	226	0	4.2	8.4	43	2808	2454	1587	275	303	1461	184	5262
11:57	1030	711	302	278	265	240	226	0	4.3	8.4	67	2836	2491	1615	276	304	1462	189	5336
11:58	1030	711	302	278	265	240	226	0	4.4	8.4	42	2855	2391	1627	272	307	1460	187	5246
11:59	1030	711	302	278	265	241	226	0	4.5	8.5	40	2776	2466	1641	279	312	1457	184	5243
12:00	1030	710	302	278	265	240	226	0	4.6	8.6	42	2759	2266	1631	285	314	1458	183	5044
12:01	1031	709	301	277	265	240	226	0	4.6	8.4	41	2721	2441	1612	281	315	1450	182	5162
12:02	1028	708	301	277	265	241	226	0	4.7	8.5	41	2768	2503	1631	289	317	1461	181	5271
12:03	1028	707	301	277	265	240	226	0	4.7	8.6	42	2819	2431	1653	293	318	1477	180	5249
12:04	1028	707	302	278	265	240	226	0	4.8	8.6	40	2771	2479	1698	297	324	1496	181	5269
12:05	1026	706	302	278	265	240	226	210	4.8	8.6	40	2857	2540	1658	300	325	1496	180	5397
12:06	1031	711	302	278	265	241	226	229	4.8	8.9	50	2794	2391	1149	330	327	1496	177	5185
12:07	1029	713	302	278	265	241	226	233	4.8	8.7	50	2836	2429	647	323	330	1494	176	5253
12:08	1032	715	301	278	265	241	226	236	4.9	9.0	49	2750	2599	626	337	336	1494	177	5349
12:09	1032	717	300	277	265	241	226	235	4.9	8.8	55	2745	2339	618	317	339	1485	178	5083
12:10	1028	716	301	277	265	241	226	233	5.0	8.9	57	2852	2503	650	315	342	1478	174	5355
12:11	1028	716	302	279	265	241	225	241	5.1	9.0	61	2869	2479	636	319	347	1469	176	5348
12:12	1029	717	302	279	265	240	225	232	5.1	8.7	58	2750	2365	637	295	346	1466	179	5115
12:13	1030	717	301	278	265	240	225	243	5.2	8.5	59	2831	2429	648	281	345	1474	186	5260
12:14	1033	719	301	278	265	240	226	230	5.0	8.5	56	2794	2403	668	279	338	1465	185	5205
12:15	1041	721	301	278	265	240	225	236	4.8	8.4	73	2833	2392	666	275	328	1464	187	5225
12:16	1052	727	301	279	265	240	225	231	4.7	8.3	57	2748	2367	662	270	320	1475	185	5115
12:17	1062	731	302	279	266	240	225	241	4.6	8.4	62	2815	2367	636	272	312	1492	189	5182
12:18	1073	736	302	278	265	240	225	236	4.6	8.5	64	2862	2491	644	277	307	1512	191	5353
12:19	1082	741	301	278	265	240	225	237	4.6	8.4	68	2842	2479	653	275	306	1520	194	5320
12:20	1092	747	302	280	266	240	225	234	4.6	8.5	67	2871	2379	699	280	305	1520	191	5250
12:21	1101	753	303	280	266	241	225	232	4.5	8.4	70	2878	2274	676	279	303	1512	193	5296
12:22	1108	756	301	279	266	241	225	236	4.5	8.3	66	2780	2517	703	274	302	1514	193	5298

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

OTE:
All data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

) #: -->		02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
		TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
D	TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
	H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
5	12:23	1114	760	301	280	266	240	225	236	4.4	8.2	62	2754	2354	710	269	303	1509	192	5107
6	12:24	1119	765	301	280	266	241	225	235	4.4	8.1	67	2840	2431	703	259	304	1513	191	5270
7	12:25	1125	770	302	281	266	241	225	236	4.3	8.2	67	2800	2365	755	262	304	1509	193	5164
8	12:26	1131	775	302	281	267	241	226	241	4.3	8.0	66	2829	2231	765	246	304	1514	199	5060
9	12:27	1134	779	301	281	267	241	226	229	4.3	8.1	62	2824	2491	776	250	302	1520	197	5315
0	12:28	1138	783	301	280	266	241	225	229	4.3	8.0	67	2854	2452	710	244	300	1523	193	5271
1	12:29	1142	787	301	281	267	241	226	229	4.2	8.1	66	2810	2402	724	250	295	1513	195	5212
2	12:30	1133	786	301	281	267	242	226	237	4.3	8.0	64	2817	2378	708	247	293	1522	199	5195
3	12:31	1117	782	300	280	267	242	226	237	4.3	8.0	66	2812	2311	719	247	293	1516	197	5122
4	12:32	1099	775	300	280	266	242	225	232	4.3	8.0	65	2864	2598	702	247	292	1512	197	5462
5	12:33	1083	768	301	280	266	241	225	232	4.3	8.0	65	2845	2465	692	243	292	1512	191	5310
6	12:34	1071	763	302	281	267	242	226	239	4.3	8.1	67	2822	2477	656	253	291	1512	189	5299
7	12:35	1060	758	302	281	267	242	226	232	4.3	7.9	83	2858	2389	661	244	290	1507	188	5258
8	12:36	1055	752	300	279	267	242	226	235	4.3	8.0	66	2836	2489	663	248	290	1504	187	5325
9	12:37	1054	749	300	279	266	242	226	235	4.3	8.2	65	2819	2414	655	261	291	1511	188	5233
0	12:38	1053	748	301	280	267	242	226	235	4.3	8.1	67	2732	2348	646	260	290	1517	187	5065
1	12:39	1053	743	301	280	267	242	226	239	4.3	8.1	70	2806	2389	647	260	289	1516	184	5195
2	12:40	1053	743	302	281	267	242	226	231	4.2	8.1	67	2810	2574	649	256	287	1505	183	5384
3	12:41	1052	743	302	281	267	242	226	232	4.1	7.9	68	2796	2463	663	243	286	1496	182	5259
4	12:42	1053	743	302	280	267	242	226	233	4.2	8.1	69	2829	2463	670	248	290	1501	183	5292
5	12:43	1053	743	301	279	267	242	226	233	4.2	8.0	65	2775	2335	647	243	290	1493	181	5110
6	12:44	1051	743	301	280	267	242	226	234	4.2	8.0	68	2735	2424	663	253	292	1486	180	5159
7	12:45	1052	742	302	280	268	243	227	233	4.2	8.0	89	2850	2424	652	253	293	1478	181	5269
8	12:46	1050	742	301	280	268	243	227	235	4.2	8.0	66	2799	2321	658	251	295	1473	182	5120
9	12:47	1050	741	301	280	267	243	227	227	4.2	8.0	68	2836	2510	666	248	297	1472	179	5346
0	12:48	1051	740	301	280	268	243	227	241	4.1	7.9	66	2758	2422	651	248	295	1469	175	5180
	12:49	1051	740	302	280	268	243	227	236	4.1	7.9	66	2778	2411	657	242	294	1476	175	5139
2	12:50	1051	742	302	280	268	243	227	237	4.1	8.0	65	2837	2534	656	255	293	1479	176	5372
3	12:51	1051	742	302	280	268	243	227	232	4.1	7.9	69	2850	2486	673	249	292	1486	174	5335
	12:52	1051	740	301	279	267	243	227	241	4.0	8.0	67	2751	2373	669	247	288	1486	169	5099
	12:53	1050	740	302	280	268	243	227	232	4.1	7.9	66	2868	2213	679	242	290	1501	173	5081
	12:54	1050	741	303	281	268	243	227	233	4.1	8.0	66	2856	2449	691	244	288	1509	170	5305
	12:55	1051	739	301	280	268	243	227	234	4.0	7.9	64	2829	2472	679	245	285	1507	169	5300
	12:56	1067	768	326	302	278	243	226	0	4.0	8.2	70	2757	4702	1239	252	285	1511	169	7458
	12:57	1066	779	327	302	281	244	227	0	4.0	8.0	66	2817	4816	1592	251	283	1514	171	7633
	12:58	1066	782	322	299	281	245	228	0	4.0	8.0	64	2822	4735	1660	254	282	1521	171	7557
	12:59	1064	785	318	296	280	246	228	0	4.0	8.0	63	2818	4799	1691	246	282	1518	166	7595
	13:00	1064	787	314	294	279	246	228	0	4.1	7.9	58	2802	4857	1658	246	284	1526	167	7659
	13:01	1062	787	310	292	278	247	228	0	4.1	7.9	60	2834	4637	1698	238	286	1524	167	7470
	13:02	1060	787	307	290	277	247	227	0	4.1	7.9	58	2822	4678	1706	244	287	1518	169	7483
	13:03	1059	787	305	288	275	247	228	0	4.1	8.0	78	2835	4795	1728	237	287	1513	164	7631
	13:04	1058	787	302	287	274	247	227	0	4.1	8.0	53	2837	4706	1743	240	287	1510	167	7543
	13:05	1054	785	300	285	273	247	227	0	4.1	8.0	55	2801	4681	1725	244	287	1508	164	7481
	13:06	1053	785	298	284	272	247	227	0	4.2	8.3	56	2810	4804	1772	256	288	1518	166	7614
	13:07	1052	783	297	283	271	247	226	0	4.3	8.2	52	2820	4786	1753	249	290	1523	169	7606
	13:08	1050	781	296	282	270	246	226	0	4.4	8.3	48	2789	4759	1763	254	292	1524	170	7547
	13:09	1051	781	296	281	269	246	226	0	4.4	8.3	52	2834	4783	1762	260	294	1525	170	7617
	13:10	1050	782	297	282	269	246	225	233	4.4	8.3	53	2824	4734	1756	261	296	1531	171	7558

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
) TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
3 13:11	1051	785	300	284	271	246	226	233	4.5	8.5	60	2787	4740	1291	271	299	1539	174	7527
4 13:12	1051	787	302	286	271	246	226	236	4.6	8.4	59	2787	4749	944	255	302	1536	175	7507
5 13:13	1050	786	303	286	272	246	227	235	4.7	8.4	62	2804	4730	945	255	303	1531	177	7535
5 13:14	1051	786	303	287	272	246	227	235	4.7	8.5	60	2813	4740	931	260	303	1519	178	7553
7 13:15	1051	789	303	287	272	246	227	235	4.7	8.4	62	2813	4789	921	255	303	1508	182	7577
3 13:16	1047	786	303	287	272	245	226	235	4.7	8.5	64	2798	4746	918	261	304	1496	185	7543
) 13:17	1050	789	303	287	272	245	227	229	4.8	8.7	65	2792	4727	911	267	308	1496	185	7519
) 13:18	1050	789	304	288	272	245	227	232	4.9	8.5	65	2806	4764	904	261	311	1496	186	7570
1 13:19	1047	786	304	288	272	245	227	231	4.9	8.6	81	2846	4652	923	260	312	1481	186	7477
2 13:20	1049	787	304	289	272	245	227	224	4.9	8.6	62	2803	4740	930	262	314	1473	186	7542
1 13:21	1049	787	304	289	272	245	227	234	4.9	8.6	65	2803	4779	934	260	314	1470	185	7582
1 13:22	1052	788	305	289	272	245	227	218	5.0	8.5	64	2824	4776	935	258	317	1460	187	7591
1 13:23	1051	788	304	289	272	245	227	229	4.9	8.5	74	2820	4696	902	253	318	1477	186	7516
1 13:24	1053	788	305	289	272	245	227	224	4.9	8.5	65	2833	4699	898	260	317	1483	186	7532
1 13:25	1051	788	305	289	273	245	227	237	4.8	8.5	63	2824	4767	879	261	312	1479	185	7577
1 13:26	1053	788	304	289	273	245	227	224	4.8	8.4	59	2811	4755	941	256	311	1475	182	7566
1 13:27	1054	788	304	288	272	245	227	227	4.8	8.4	63	2782	4749	908	262	309	1475	182	7530
13:28	1053	788	303	288	272	244	226	232	4.7	8.4	64	2810	4804	914	262	308	1476	177	7613
13:29	1049	787	302	287	272	244	226	227	4.8	8.4	63	2820	4807	934	261	309	1498	177	7654
13:30	1046	785	301	287	272	244	226	234	4.8	8.9	69	2850	4633	904	262	309	1503	179	7483
13:31	1048	785	301	286	272	244	226	224	4.9	8.8	66	2857	4646	877	263	311	1510	178	7503
13:32	1047	786	301	286	272	244	226	231	5.0	8.6	66	2833	4652	892	275	313	1510	177	7485
13:33	1049	786	301	286	271	244	226	235	5.1	8.6	86	2803	4780	885	269	319	1503	176	7583
13:34	1050	785	300	286	272	244	225	226	5.0	8.5	65	2824	4674	937	266	320	1479	176	7498
13:35	1050	786	300	285	271	244	225	232	5.0	8.5	84	2800	4792	902	263	321	1470	177	7592
13:36	1048	785	299	285	271	244	225	224	5.0	8.4	60	2782	4823	922	263	321	1469	180	7605
13:37	1049	785	299	285	272	244	225	228	5.0	8.6	68	2801	4792	907	268	321	1470	179	7594
13:38	1048	785	299	284	271	244	226	226	4.9	8.5	65	2835	4643	898	269	321	1474	184	7477
13:39	1050	785	299	284	272	244	226	228	5.0	8.5	80	2799	4668	927	267	320	1470	185	7467
13:40	1051	786	299	284	272	244	225	230	5.0	8.3	66	2807	4810	921	259	320	1467	185	7617
13:41	1051	786	299	284	272	245	226	226	4.9	8.3	66	2812	4792	898	254	319	1462	185	7604
13:42	1050	786	299	285	272	245	225	229	4.8	8.3	67	2794	4693	911	256	317	1465	189	7528
13:43	1050	786	299	284	272	244	226	225	4.8	8.4	68	2784	4693	908	261	316	1474	190	7477
13:44	1048	785	298	284	272	244	226	233	4.8	9.9	67	2813	4630	949	262	314	1473	189	7443
13:45	1050	786	298	284	272	244	222	230	4.8	9.5	63	2832	4737	935	227	312	1470	186	7566
13:46	1049	786	297	283	271	245	216	0	4.8	20.8	60	2864	4804	1980	0	311	1462	187	7668
13:47	1049	784	296	281	270	244	215	0	4.8	21.2	70	2522	4693	1975	0	310	1454	189	7215
13:48	1052	793	304	289	274	244	218	0	4.8	21.3	93	2186	4761	1969	0	309	1452	187	6948
13:49	1055	799	311	294	279	245	217	0	4.7	21.3	98	2225	4699	1924	0	308	1446	183	6907
13:50	1055	802	316	299	283	246	218	0	4.5	9.4	84	2288	4733	883	263	306	1444	178	7021
13:51	1055	805	319	301	285	248	219	0	4.2	6.9	85	2355	4736	867	244	300	1450	173	7092
13:52	1058	809	323	305	288	249	234	0	4.0	7.0	90	2107	4708	881	248	294	1469	173	6815
13:53	1057	811	326	307	291	251	237	0	4.1	7.2	89	1942	4751	862	259	292	1492	173	6693
13:54	1057	811	328	309	293	253	239	234	4.2	7.4	88	2171	4760	858	268	294	1501	175	6931
13:55	1059	811	330	311	294	255	240	223	4.5	7.4	86	2292	4741	918	267	297	1506	177	7033
13:56	1061	812	330	312	295	257	242	234	4.7	7.3	86	2327	4633	979	258	305	1508	176	6964
13:57	1061	813	331	312	296	259	243	233	4.8	7.2	90	2427	4722	1057	251	310	1484	170	7150
13:58	1061	814	332	314	298	260	244	224	4.8	7.2	91	2602	4676	1062	250	312	1464	170	7278

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13:59	1061	819	336	317	300	262	246	234	4.7	7.3	94	2742	4691	1044	253	312	1450	166	7414
14:00	1062	820	339	319	302	264	247	230	4.7	7.1	92	2849	4779	1047	254	312	1455	164	7629
14:01	1064	822	340	320	303	265	248	230	4.6	7.0	95	2959	4764	1102	249	307	1458	163	7723
14:02	1064	819	336	319	302	266	248	231	4.6	7.0	90	2869	4731	1066	243	306	1466	158	7619
14:03	1064	818	337	318	302	267	248	235	4.6	7.2	89	2854	4727	1073	250	306	1469	157	7581
14:04	1062	817	335	316	301	268	248	225	4.6	7.1	87	2764	4730	1071	244	303	1472	157	7494
14:05	1064	817	333	314	300	268	247	234	4.6	7.2	99	2829	4638	1070	246	301	1470	154	7468
14:06	1065	817	331	313	299	268	247	225	4.6	7.1	88	2794	4666	1079	248	300	1469	154	7460
14:07	1065	816	330	312	298	268	246	230	4.6	7.2	87	2782	4703	1030	246	299	1465	157	7485
14:08	1063	814	327	309	296	268	245	235	4.6	7.2	81	2683	4657	1049	248	298	1463	155	7540
14:09	1060	808	323	305	293	267	244	236	4.6	7.3	79	2964	3411	983	247	298	1458	156	6491
14:10	1044	780	297	281	282	266	241	0	4.6	7.8	88	2870	2510	1264	243	298	1456	154	5380
14:11	1034	761	285	273	274	264	239	0	4.7	8.0	53	2849	2347	1765	237	299	1464	154	5195
14:12	1034	750	286	274	271	262	237	0	4.7	8.1	52	2733	2460	1854	242	301	1464	158	5148
14:13	1039	746	293	279	272	260	237	0	4.7	8.0	49	2767	2315	1934	243	302	1466	154	5082
14:14	1045	743	298	280	272	258	236	0	4.6	7.9	49	2760	2367	1952	241	302	1464	152	5127
14:15	1050	742	299	279	272	257	236	0	4.6	8.0	49	2755	2676	1941	251	303	1477	150	5431
14:16	1053	741	299	278	271	256	235	0	4.6	7.8	48	2771	2334	1966	243	304	1488	153	5105
14:17	1050	738	299	278	270	255	235	0	4.6	7.6	48	2748	2247	2031	233	305	1490	150	4995
14:18	1049	735	301	278	270	254	235	0	4.5	7.5	48	2630	2363	2049	228	306	1487	145	5193
14:19	1045	733	302	278	270	253	234	0	4.3	7.6	45	2811	2404	2038	237	302	1490	147	5222
14:20	1047	732	301	277	269	252	234	0	4.2	7.7	46	2780	2317	2053	248	298	1512	143	5097
14:21	1050	732	301	277	268	252	233	0	4.2	7.8	48	2794	2355	2037	260	296	1534	140	5149
14:22	1050	731	302	277	268	251	233	0	4.3	7.7	46	2796	2306	1993	252	299	1553	140	5087
14:23	1052	731	303	277	268	250	233	0	4.4	7.7	75	2803	2494	2037	255	304	1559	141	5296
14:24	1051	730	301	276	267	250	232	0	4.4	7.7	46	2787	2360	2044	255	306	1551	140	5147
14:25	1050	730	301	276	266	249	232	0	4.4	7.6	45	2815	2400	2056	248	306	1543	139	5215
14:26	1049	729	301	276	266	249	232	0	4.4	7.5	45	2808	2312	2064	242	309	1537	142	5120
14:27	1050	729	302	277	266	248	231	0	4.3	7.5	46	2810	2428	2057	239	307	1526	138	5238
14:28	1049	730	302	276	266	248	231	197	4.2	7.5	52	2801	2452	1870	242	304	1521	139	5254
14:29	1050	732	302	276	266	248	231	191	4.1	7.5	57	2749	2442	1102	246	300	1520	136	4995
14:30	1052	734	302	276	266	248	231	187	4.2	7.4	59	2791	2478	955	244	301	1537	138	5270
14:31	1052	734	301	276	266	247	230	200	4.1	7.4	62	2805	2394	936	245	299	1533	137	5199
14:32	1050	734	302	277	266	247	230	183	4.1	7.5	59	2804	2431	899	246	302	1534	140	5235
14:33	1052	736	302	277	266	247	230	192	4.2	7.5	62	2795	2357	927	244	304	1539	140	5152
14:34	1049	734	302	276	266	247	230	190	4.2	7.5	61	2814	2447	944	243	305	1531	139	5261
14:35	1049	734	301	276	265	247	230	186	4.2	7.6	66	2802	2435	911	252	305	1524	139	5236
14:36	1049	734	301	276	265	246	229	191	4.2	7.6	65	2818	2359	919	252	303	1517	140	5240
14:37	1049	734	302	277	266	246	229	194	4.2	7.6	89	2833	2335	903	252	303	1532	141	5168
14:38	1053	735	302	277	266	246	229	185	4.3	7.6	66	2825	2522	866	248	304	1541	142	5346
14:39	1054	736	302	276	266	246	229	198	4.3	7.4	84	2823	2461	916	237	305	1541	142	5305
14:40	1052	736	301	276	265	246	229	184	4.2	7.4	62	2807	2487	922	236	304	1532	143	5295
14:41	1049	735	302	277	266	246	229	187	4.2	7.4	63	2720	2559	920	236	303	1539	144	5260
14:42	1049	735	303	277	266	246	229	186	4.2	7.5	64	2840	2311	919	243	300	1546	145	5151
14:43	1049	735	303	277	266	246	229	190	4.2	7.5	77	2826	2377	930	250	297	1545	145	5206
14:44	1051	736	302	277	266	246	229	196	4.2	7.5	66	2809	2364	891	248	298	1542	145	5173
14:45	1052	736	302	277	266	246	229	183	4.3	7.5	69	2830	2440	878	252	301	1554	144	5270
14:46	1052	737	302	277	266	246	229	191	4.3	7.5	66	2809	2390	903	254	303	1551	144	5199

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
All data on this sheet were taken on DEC. 06, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:47	1052	736	304	278	266	246	229	195	4.3	7.6	67	2639	2477	923	254	304	1539	142	5315
14:48	1050	736	302	278	266	246	229	185	4.3	7.5	65	2616	2379	892	246	303	1526	143	5195
14:49	1050	736	301	277	266	245	229	189	4.3	7.5	66	2625	2479	895	249	307	1516	143	5303
14:50	1051	739	302	277	266	245	228	244	4.3	7.5	69	2615	2466	894	247	308	1514	144	5281
14:51	1050	740	303	278	266	245	229	285	4.3	7.4	72	2602	2379	752	251	308	1513	147	5181
14:52	1050	741	303	278	266	245	229	283	4.3	7.4	73	2601	2429	713	245	311	1510	147	5230
14:53	1050	740	302	278	266	245	229	290	4.3	7.4	92	2609	2404	701	256	313	1507	148	5195
14:54	1049	741	302	278	266	245	228	288	4.3	7.5	68	2625	2429	697	256	313	1503	147	5254
14:55	1049	742	302	278	266	245	228	285	4.3	7.6	68	2771	2355	681	262	314	1505	147	5125
14:56	1051	743	303	278	266	245	228	289	4.4	7.7	73	2630	2431	671	275	316	1519	149	5247
14:57	1051	743	302	278	266	245	228	284	4.5	7.8	73	2912	2456	664	280	321	1516	147	5368
14:58	1051	742	301	277	266	245	228	284	4.5	7.6	73	2749	2406	626	271	324	1499	150	5155
14:59	1051	743	302	278	266	245	228	284	4.6	7.6	73	2604	2393	594	269	326	1490	145	5197
15:00	1051	743	303	280	267	245	228	297	4.6	7.6	73	2760	2342	595	265	329	1481	144	5105
15:01	1053	744	302	279	267	245	228	281	4.5	7.5	74	2792	2380	675	255	326	1473	144	5172
15:02	1055	745	302	279	267	245	228	284	4.5	7.3	74	2630	2368	707	242	325	1478	145	5198
15:03	1052	745	301	279	267	245	228	295	4.4	6.9	71	2622	2316	729	225	320	1475	145	5153
15:04	1048	744	302	280	267	245	227	280	4.2	7.1	76	2773	2329	724	226	313	1479	141	5101
15:05	1046	741	302	279	267	244	228	292	3.9	7.4	70	2787	2329	716	241	302	1501	141	5115
15:06	1049	743	303	280	267	245	228	287	3.8	7.5	72	2799	2380	697	252	293	1528	141	5179
15:07	1050	743	302	280	267	244	228	283	4.0	7.5	71	2644	2368	652	260	294	1557	144	5212
15:08	1053	744	302	279	267	244	228	286	4.1	7.6	77	2609	2329	643	265	299	1562	146	5136
15:09	1053	744	300	279	267	244	228	282	4.2	7.4	80	2618	2431	554	247	307	1553	148	5249
15:10	1052	745	304	283	269	244	228	290	4.3	7.3	75	2644	2380	473	232	313	1536	151	5211
15:11	1051	746	306	285	270	245	228	288	4.3	7.2	88	2630	2431	507	240	316	1513	149	5261
15:12	1051	747	302	282	270	245	228	287	4.2	7.1	73	2611	2431	590	237	315	1493	149	5242
15:13	1050	745	299	280	268	245	228	282	4.2	7.1	77	2602	2456	634	240	313	1492	151	5258
15:14	1051	747	301	282	269	245	228	291	4.2	7.2	75	2625	2456	647	244	312	1497	150	5281
15:15	1050	747	303	284	270	245	228	285	4.2	7.2	82	2630	2456	674	250	310	1501	151	5286
15:16	1051	747	304	284	270	245	228	281	4.3	7.2	78	2623	2342	651	251	309	1518	154	5165
15:17	1050	747	302	283	270	246	228	292	4.3	7.2	78	2630	2456	655	255	308	1523	153	5267
15:18	1050	748	301	282	270	246	228	287	4.3	7.2	74	2740	2353	653	256	309	1527	151	5093
15:19	1050	748	301	282	269	246	228	284	4.4	7.2	77	2760	2466	665	253	311	1532	152	5226
15:20	1051	748	302	283	270	246	228	292	4.4	7.2	73	2609	2431	659	253	311	1525	152	5271
15:21	1051	749	303	284	270	245	228	282	4.4	7.3	76	2627	2355	679	259	310	1518	148	5181
15:22	1051	749	302	283	270	245	228	288	4.4	7.4	78	2799	2443	676	261	309	1511	151	5242
15:23	1051	748	301	281	269	245	228	0	4.4	7.4	75	2746	2379	654	269	310	1520	150	5124
15:24	1052	749	302	283	270	245	228	0	4.5	7.4	76	2792	2380	618	268	314	1541	148	5172
15:25	1051	749	302	283	270	245	228	0	4.5	7.2	94	2653	2479	618	252	318	1543	150	5331
15:26	1050	749	299	281	269	245	228	0	4.4	7.1	79	2647	2466	619	241	320	1530	151	5314
15:27	1049	748	301	283	270	245	228	290	4.3	7.4	92	2661	2442	621	253	320	1518	150	5313
15:28	1050	749	304	285	271	245	229	276	4.2	7.4	80	2640	2429	625	256	316	1520	150	5269
15:29	1051	751	302	284	271	245	229	291	4.2	7.3	75	2769	2366	624	250	315	1532	149	5134
15:30	1050	751	301	282	270	245	228	280	4.2	7.3	78	2794	2417	584	247	315	1534	147	5236
15:31	1050	752	301	283	270	245	229	286	4.2	7.4	90	2626	2429	590	248	316	1531	147	5256
15:32	1051	751	301	283	270	246	229	292	4.2	7.4	79	2626	2417	554	248	315	1527	147	5243
15:33	1051	750	302	284	271	246	229	285	4.3	7.3	77	2737	2327	495	241	315	1532	144	5064
15:34	1053	749	302	284	271	246	229	286	4.3	7.2	77	2654	2466	470	231	316	1528	142	5320

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 06, 1991.
alcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Sesquicarbonate
5) Delta SO2 Vs T

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15:35	1051	749	302	284	271	247	229	292	4.2	7.2	82	2811	2465	482	234	314	1517	141	5275
15:36	1051	749	302	284	271	247	229	282	4.2	7.2	75	2807	2440	506	233	312	1525	140	5247
15:37	1049	747	302	284	271	247	229	288	4.1	7.2	77	2786	2351	508	239	308	1531	140	5138
15:38	1049	747	301	283	271	247	229	283	4.1	7.4	78	2821	2465	505	240	306	1547	137	5286
15:39	1046	746	302	284	271	247	229	283	4.1	7.4	79	2804	2465	492	245	305	1557	135	5268
15:40	1042	746	302	285	272	247	229	284	4.2	7.9	78	2779	2351	489	263	307	1570	134	5122
15:41	1036	742	298	284	271	247	229	290	4.3	8.6	95	2788	2364	490	306	309	1576	136	5152
15:42	1037	743	302	288	272	247	229	286	4.7	9.9	83	2729	2338	470	369	319	1600	137	5068
15:43	1057	752	305	291	274	247	230	286	5.5	10.2	91	2798	2259	438	422	341	1613	143	5058
15:44	1066	757	304	289	275	247	230	283	6.3	8.9	82	2817	2427	456	359	371	1645	150	5245
15:45	1061	756	301	287	274	247	230	288	6.4	8.4	77	2845	2337	481	328	386	1560	153	5182
15:46	1056	752	300	286	273	247	230	281	6.3	8.3	79	2821	2524	510	321	396	1492	157	5344
15:47	1053	752	301	288	274	247	230	290	5.9	7.8	89	2779	2350	549	290	395	1421	153	5106
15:48	1046	749	303	289	275	247	230	279	5.5	7.5	77	2845	2463	600	264	382	1409	150	5308
15:49	1019	739	301	287	274	246	230	295	5.1	8.5	82	2814	2362	569	231	366	1409	148	5176
15:50	991	726	300	286	273	247	230	286	4.7	11.4	86	2830	2337	502	278	347	1436	146	5239

DEC. 11, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 11, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
12:48	1028	745	341	317	307	266	268	0	4.8	8.1	29	2711	2373	810	306	178	565	350	5084
12:49	1031	745	342	318	308	267	268	0	4.8	7.9	29	2669	2310	806	291	176	570	352	4979
12:50	1031	745	341	317	308	267	268	0	4.8	8.1	28	2723	2410	811	301	175	574	354	5133
12:51	1031	745	341	317	307	267	268	0	4.8	8.0	31	2720	2410	808	301	173	575	350	5129
12:52	1028	744	342	318	308	267	268	0	4.8	7.9	29	2716	2420	808	297	171	575	354	5137
12:53	1031	744	341	317	308	267	269	0	4.7	7.8	33	2723	2359	813	299	169	572	343	5082
12:54	1030	744	341	317	307	267	268	0	4.7	8.2	29	2686	2456	799	320	169	572	340	5142
12:55	1027	743	341	317	307	267	268	0	4.7	7.9	37	2733	2403	799	310	169	573	329	5135
12:56	1028	743	342	318	308	266	269	0	4.7	8.2	30	2734	2403	785	326	169	572	330	5137
12:57	1027	742	341	317	308	266	269	0	4.7	8.5	28	2690	2509	791	342	170	571	323	5208
12:58	1028	743	341	317	308	266	269	0	4.7	8.6	29	2726	2214	787	349	171	569	316	4939
12:59	1028	744	342	318	308	266	269	0	4.9	8.6	31	2746	2555	787	351	176	572	310	5301
13:00	1027	743	342	318	308	267	269	29	5.0	8.5	31	2746	2365	788	352	179	570	306	5146
13:01	1025	742	340	317	307	267	269	66	5.1	9.1	38	2699	2277	694	381	184	566	302	4975
13:02	1024	740	341	318	308	267	269	62	5.2	9.4	32	2695	2352	662	397	188	563	302	5047
13:03	1026	742	342	318	308	267	269	75	5.5	9.1	35	2724	2413	661	393	195	566	303	5137
13:04	1033	745	341	317	308	267	269	62	5.7	8.5	32	2726	2369	657	358	200	564	309	5115
13:05	1031	746	341	317	308	267	269	55	5.8	8.1	38	2687	2352	657	330	205	557	308	5039
13:06	1029	744	342	318	308	267	269	76	5.7	8.6	35	2702	2352	626	354	204	549	306	5054
13:07	1037	748	342	318	308	267	269	67	5.3	8.3	39	2737	2340	561	345	199	535	296	5077
13:08	1031	748	341	317	308	267	269	72	5.2	7.9	41	2727	2401	574	321	194	539	298	5129
13:09	1027	747	340	317	308	267	268	76	5.1	8.6	47	2739	2377	530	361	188	536	295	5116
13:10	1023	746	342	318	309	267	269	60	4.9	8.7	47	2734	2369	526	365	185	536	290	5136
13:11	1021	744	342	318	309	267	269	76	4.9	9.1	43	2694	2338	451	391	183	546	296	5032
13:12	1024	745	341	318	308	266	269	62	5.1	9.3	45	2699	2401	486	407	185	556	296	5100
13:13	1030	748	342	318	309	267	269	51	5.4	8.4	39	2719	2338	541	355	191	566	301	5057
13:14	1029	748	340	318	308	267	269	68	5.6	8.5	45	2736	2326	583	355	197	566	305	5061
13:15	1027	747	341	318	308	267	269	71	5.5	8.5	45	2697	2338	586	361	198	556	300	5035
13:16	1024	746	341	318	309	267	269	61	5.4	9.1	46	2700	2471	491	388	197	550	297	5171
13:17	1020	745	341	318	309	267	269	57	5.3	9.4	50	2719	2338	462	403	197	546	299	5057
13:18	1024	745	340	318	308	266	269	68	5.5	9.5	43	2680	2424	584	418	199	557	295	5103
13:19	1024	745	341	318	309	266	269	65	5.7	9.2	44	2749	2363	545	402	204	559	299	5112
13:20	1023	746	342	319	309	266	270	61	5.9	9.2	51	2729	2351	494	401	209	560	298	5056
13:21	1021	746	340	318	309	266	269	0	5.9	9.5	49	2731	2399	419	411	211	553	297	5130
13:22	1023	746	341	318	309	266	269	0	6.0	9.4	45	2651	2299	565	406	215	553	297	4950
13:23	1025	746	341	318	309	266	269	0	6.0	9.1	46	2676	2367	690	394	215	549	298	5086
13:24	1034	748	341	318	309	266	270	0	6.0	8.8	38	2714	2299	737	376	215	548	297	5013
13:25	1039	752	341	318	309	266	269	0	6.0	7.7	38	2692	2410	766	309	214	545	296	5102
13:26	1034	750	339	317	308	266	269	0	5.8	7.6	37	2702	2386	805	293	207	535	292	5078
13:27	1029	748	339	317	308	266	269	0	5.1	8.3	35	2721	2410	794	327	197	519	281	5130
13:28	1028	747	340	318	309	266	270	0	4.8	8.3	37	2755	2386	787	331	182	521	286	5141
13:29	1027	747	339	316	308	266	269	136	5.2	8.2	42	2712	2422	758	330	339	547	295	5141
13:30	1031	749	339	317	308	267	269	141	5.5	7.9	49	2752	2398	525	311	300	536	312	5150
13:31	1026	749	340	317	309	267	269	143	5.5	8.2	58	2719	2386	392	326	295	518	313	5105
13:32	1024	749	338	316	308	267	269	146	5.1	8.6	56	2726	2434	345	355	300	510	308	5159
13:33	1026	751	338	316	309	267	269	143	5.3	8.8	63	2732	2299	361	367	328	551	291	5123
13:34	1029	754	339	317	309	266	269	143	5.7	8.6	67	2697	2386	349	355	330	578	214	5083
13:35	1029	755	338	317	309	266	270	142	5.6	8.6	71	2710	2410	357	357	332	590	159	5120

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
All data on this sheet were taken on DEC. 11, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.P1	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
13:36	1031	756	337	317	309	266	270	140	5.3	8.8	71	2705	2398	340	365	328	615	129	5131
13:37	1034	758	338	317	309	266	270	149	5.0	8.6	89	2727	2398	332	358	313	691	116	5125
13:38	1032	757	338	317	309	266	269	135	4.9	8.7	86	2721	2299	343	358	317	765	131	5020
13:39	1035	758	337	317	309	266	269	146	4.9	8.4	87	2752	2265	341	347	328	863	156	4997
13:40	1036	760	338	318	309	266	269	143	4.9	8.0	87	2726	2298	346	321	333	1008	182	5023
13:41	1030	757	337	317	309	266	269	144	4.8	7.8	88	2717	2265	363	306	335	1081	201	5002
13:42	1023	754	337	318	309	266	269	149	4.7	8.6	88	2700	2298	351	352	333	1110	214	5012
13:43	1021	752	337	318	310	266	269	133	4.5	8.9	88	2700	2310	349	374	326	1102	234	5010
13:44	1023	752	338	319	310	266	269	153	4.7	9.0	89	2693	2298	328	379	326	1074	246	4991
13:45	1024	752	338	318	310	266	270	139	5.0	9.0	91	2710	2347	346	378	335	1021	258	5015
13:46	1025	754	337	318	310	266	269	137	5.2	9.1	89	2744	2347	344	393	344	954	262	5091
13:47	1025	755	338	319	310	266	270	149	5.3	9.0	91	2724	2360	337	387	351	875	260	5083
13:48	1026	756	338	319	310	266	270	146	5.4	9.0	89	2720	2372	372	382	357	808	260	5068
13:49	1029	758	338	320	310	266	269	143	5.5	9.1	91	2719	2333	356	387	361	753	259	5052
13:50	1029	759	338	320	310	266	270	141	5.5	9.0	90	2720	2265	341	384	363	707	260	5005
13:51	1030	759	338	320	311	266	270	147	5.5	9.2	91	2760	2308	334	395	364	672	260	5025
13:52	1037	763	338	320	311	266	270	137	5.6	8.9	90	2735	2296	348	380	369	649	263	5031
13:53	1036	764	338	320	310	266	270	145	5.7	8.4	90	2693	2308	332	345	374	632	266	5002
13:54	1035	763	338	320	311	266	270	144	5.6	8.5	89	2745	2333	344	357	374	612	264	5045
13:55	1035	760	338	320	311	266	270	140	5.4	8.6	90	2666	2430	343	359	372	594	266	5097
13:56	1031	759	339	321	311	266	270	145	5.1	8.4	90	2742	2283	335	342	364	582	264	5025
13:57	1027	756	338	320	311	266	270	149	5.1	8.8	91	2675	2370	322	358	363	585	264	5045
13:58	1026	756	339	321	311	267	270	183	5.0	8.8	93	2690	2382	339	365	358	584	267	5072
13:59	1025	756	339	321	311	267	271	221	5.0	8.9	95	2708	2395	260	370	356	583	271	5103
14:00	1029	759	339	322	311	267	271	236	5.2	9.0	96	2719	2382	275	375	358	587	276	5133
14:01	1032	762	339	321	311	267	271	230	5.3	8.7	98	2685	2283	277	362	360	584	278	4968
14:02	1033	764	339	322	311	267	270	228	5.4	8.9	98	2775	2296	269	371	363	577	281	5071
14:03	1035	766	339	322	311	267	271	231	5.3	8.5	98	2737	2263	277	349	364	569	276	5023
14:04	1036	766	339	322	311	267	271	219	5.3	8.4	98	2717	2382	264	341	360	562	273	5099
14:05	1036	767	339	322	311	267	271	235	5.3	8.3	98	2724	2346	267	335	358	560	275	5069
14:06	1028	764	339	323	311	267	271	223	5.1	8.4	99	2737	2333	266	335	350	552	271	5070
14:07	1026	763	341	323	312	266	271	224	4.9	8.6	98	2730	2333	262	346	342	548	269	5029
14:08	1025	760	341	323	312	266	271	171	4.9	8.9	98	2683	2369	269	365	339	554	273	5052
14:09	1026	759	340	323	311	267	271	143	5.0	9.2	98	2692	2355	309	378	340	561	276	5046
14:10	1032	761	341	323	312	266	271	148	5.2	8.9	98	2690	2391	333	364	347	566	277	5024
14:11	1031	762	341	323	312	266	271	142	5.5	8.9	99	2705	2280	336	362	358	573	281	4985
14:12	1031	762	342	324	312	266	271	140	5.6	8.9	98	2685	2367	337	351	364	564	284	5052
14:13	1030	761	342	323	312	266	271	146	5.6	9.2	98	2734	2343	340	364	365	555	281	5076
14:14	1032	761	342	324	312	266	271	150	7.6	9.1	98	2713	2367	340	370	417	630	299	5080
14:15	1036	764	342	323	312	269	272	140	7.9	8.9	98	2762	2330	340	362	370	671	249	5092
14:16	1032	763	342	323	312	269	271	147	7.1	8.9	98	2744	2355	340	365	345	654	200	5098
14:17	1033	763	341	323	312	269	272	142	6.1	8.9	98	2727	2379	328	346	356	706	137	5106
14:18	1029	762	342	323	312	269	272	146	6.0	8.8	98	2737	2253	179	327	366	751	112	4990
14:19	1026	760	343	323	312	269	272	147	5.8	9.2	98	2707	2414	251	366	364	744	130	5120
14:20	1015	755	341	322	312	269	272	141	5.6	9.6	98	2676	2425	306	390	360	721	153	5102
14:21	1010	751	341	322	312	269	271	143	5.6	10.5	98	2695	2304	322	439	362	707	186	4988
14:22	1005	749	343	323	312	269	272	137	6.0	10.7	98	2723	2279	314	337	375	706	209	5002
14:23	977	737	341	321	312	269	271	151	6.6	11.4	98	2708	2304	320	347	396	708	249	5012

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 11, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:24	984	734	342	322	311	269	271	144	7.1	21.2	98	2698	2378	716	0	415	694	279	5076
14:25	1000	741	344	324	312	269	271	142	8.2	12.3	98	2686	2279	297	310	453	701	329	4965
14:26	1002	743	343	322	312	269	272	144	8.7	11.4	98	2727	2402	279	260	461	703	455	5060
14:27	1003	745	341	322	311	269	271	145	8.5	11.2	98	2732	2402	271	251	433	641	439	5134
14:28	1007	747	342	322	312	269	272	148	8.2	11.0	98	2771	2266	275	239	390	596	419	5037
14:29	1013	749	342	323	312	269	272	142	7.9	10.7	90	2676	2353	264	226	350	562	397	5029
14:30	1019	752	343	323	312	269	272	143	7.6	10.5	89	2664	2365	294	217	328	537	390	5030
14:31	1031	757	343	322	312	290	272	146	7.4	10.1	98	2652	2390	282	199	313	521	396	5047
14:32	1019	755	341	321	312	269	272	144	7.1	9.7	98	2737	2414	288	193	296	507	407	5150
14:33	1007	750	341	322	311	269	272	144	6.8	10.4	98	2762	2425	329	278	281	496	414	5187
14:34	1012	752	342	322	312	269	272	143	6.5	10.3	98	2725	2291	338	315	267	491	428	5016
14:35	1019	755	343	322	312	269	272	140	6.7	9.8	99	2745	2279	326	303	262	502	479	5024
14:36	1024	757	342	322	312	269	272	146	6.8	9.2	98	2732	2291	330	280	320	505	480	5023
14:37	1027	759	341	321	312	269	272	151	6.7	9.1	98	2723	2290	326	273	349	505	460	5013
14:38	1027	759	342	322	312	269	272	146	6.3	9.1	98	2713	2277	341	265	378	504	433	5000
14:39	1028	759	342	322	312	269	272	143	6.0	9.1	98	2683	2402	349	270	387	515	411	5085
14:40	1030	761	342	322	312	269	272	143	5.8	9.0	98	2702	2414	349	266	382	523	394	5115
14:41	1032	762	342	322	312	269	272	146	5.6	8.7	98	2668	2376	335	252	377	530	394	5076
14:42	1035	764	342	322	312	269	272	141	5.5	8.2	98	2718	2339	337	228	372	535	395	5058
14:43	1035	764	342	322	312	269	272	146	5.4	7.9	98	2703	2376	358	215	367	538	372	5079
14:44	1031	763	341	321	312	269	272	140	5.1	8.0	98	2708	2424	364	219	355	539	363	5120
14:45	1031	763	341	321	312	269	272	144	4.8	7.9	98	2678	2364	109	205	340	547	350	5042
14:46	1027	762	343	324	313	269	272	146	4.4	8.1	98	2722	2327	164	217	322	554	342	5049
14:47	1036	766	348	324	314	269	273	144	4.4	7.9	98	2733	2364	302	219	315	565	344	5078
14:48	1038	770	344	320	312	269	272	140	4.5	7.2	98	2742	2277	336	182	314	575	345	5019
14:49	1035	768	339	317	310	269	272	147	4.4	7.0	98	2762	2277	352	169	314	575	337	5039
14:50	1034	768	338	318	309	269	271	143	4.2	6.7	98	2760	2388	377	158	310	572	327	5137
14:51	1032	767	336	318	309	268	271	151	4.0	6.7	98	2730	2400	368	154	299	575	315	5130
14:52	1029	761	320	308	304	268	270	145	3.6	7.7	98	2760	2352	372	157	284	581	304	5112
14:53	1024	761	342	325	310	267	271	148	3.3	7.2	98	2661	2376	360	146	267	590	293	5037
14:54	1027	762	347	321	311	267	272	142	2.9	7.1	98	2647	2277	375	167	254	596	284	4924
14:55	1035	766	339	313	308	267	271	141	2.6	7.0	98	2707	2364	366	174	246	618	275	5071
14:56	1039	769	331	307	303	267	269	141	2.8	6.6	98	2741	2264	350	144	246	635	279	4998
14:57	1036	768	330	308	302	266	268	149	3.0	6.0	98	2744	2277	366	123	255	642	287	5021
14:58	1026	764	337	313	304	266	269	138	2.9	6.3	98	2707	2390	395	140	259	633	282	5097
14:59	1021	758	341	315	305	266	269	149	2.7	7.2	97	2712	2403	374	176	252	623	267	5120
15:00	1025	758	341	314	305	265	269	142	2.3	7.9	98	2736	2391	358	209	237	626	245	5127
15:01	1034	761	340	313	305	265	269	0	2.6	7.6	98	2699	2415	608	203	238	642	246	5114
15:02	1033	760	340	314	304	265	268	0	3.2	7.5	98	2717	2427	700	195	256	656	258	5156
15:03	1032	757	341	314	305	265	269	0	3.3	7.7	98	2726	2305	711	206	267	643	251	5031
15:04	1029	756	342	314	305	265	269	0	3.4	7.8	98	2736	2280	726	208	277	622	243	5018
15:05	1028	755	341	313	305	265	268	0	3.6	8.2	98	2756	2280	730	221	285	609	238	5036
15:06	1030	756	341	314	305	265	268	0	3.8	8.1	97	2716	2355	722	222	292	597	233	4992
15:07	1042	760	343	315	305	265	268	0	4.1	7.8	98	2724	2267	741	201	302	590	234	4992
15:08	1040	761	342	314	305	265	268	0	4.2	5.7	98	2700	2282	798	106	308	579	233	4982
15:09	1041	758	341	312	304	265	267	0	4.1	4.7	98	2726	2269	960	57	309	568	226	5007
15:10	1043	757	340	312	303	265	267	0	2.9	4.4	98	2659	2393	1199	55	286	524	207	5052
15:11	1031	754	341	313	304	265	267	0	1.4	4.6	98	2663	2381	1437	63	230	498	195	5044

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 11, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15:12	978	734	339	310	303	284	266	0	0.6	7.8	98	2640	2407	1212	60	181	596	310	5078
15:13	861	683	337	308	301	284	266	0	0.5	12.5	98	2607	2442	1006	102	173	1123	442	5250
15:14	799	641	337	306	300	283	265	0	1.7	16.1	98	2752	2310	1074	86	165	1434	–	5062
15:15	757	609	337	306	299	282	265	0	5.5	18.6	98	2760	2298	1378	93	212	1692	421	5065
15:16	726	582	336	305	298	282	265	0	9.7	19.6	98	2621	2285	1694	110	246	1923	775	4906
15:17	763	586	337	305	298	281	264	0	–	19.8	98	2656	2398	1351	195	–	–	–	5054

DEC. 17, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 17, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
) TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
1 13:48	1031	747	341	313	304	260	263	0	5.3	7.8	45	2733	2402	415	235	275	345	411	5136
2 13:49	1033	747	341	313	303	260	263	0	5.4	7.3	51	2781	2330	413	228	277	344	405	5111
3 13:50	1024	744	341	313	303	260	263	0	5.4	7.6	51	2724	2341	421	236	278	342	411	5065
4 13:51	1031	746	341	313	303	260	263	0	5.2	7.5	44	2701	2328	413	230	275	336	410	5026
5 13:52	1033	747	341	313	303	260	263	0	5.3	7.4	41	2733	2291	412	232	274	340	425	5023
6 13:53	1038	749	342	314	304	260	263	0	5.4	7.3	43	2669	2291	416	228	274	340	410	4959
7 13:54	1036	749	342	314	304	260	263	0	5.2	7.1	42	2736	2390	425	213	272	335	404	5109
8 13:55	1030	747	342	314	303	260	263	179	4.9	6.7	65	2774	2402	336	197	264	332	399	5176
9 13:56	1029	745	342	313	303	260	263	3	4.5	7.3	44	2744	2303	416	220	248	332	398	5048
: 13:57	1031	746	342	314	304	260	263	0	4.6	7.1	51	2697	2474	415	218	242	345	391	5171
13:58	1031	746	342	313	304	260	263	0	4.9	7.6	42	2686	2366	421	234	248	349	397	5051
13:59	1034	747	342	314	304	260	263	0	4.9	6.9	43	2763	2252	416	211	254	346	394	5015
14:00	1033	748	341	313	304	260	263	0	4.9	6.8	41	2721	2316	423	207	260	342	387	5037
14:01	1033	747	342	313	304	260	263	0	4.5	7.0	41	2691	2402	428	202	253	335	382	5050
14:02	1031	746	342	314	304	260	263	0	4.5	6.9	40	2726	2146	424	203	250	341	393	4874
14:03	1032	747	343	314	304	260	263	0	4.6	6.9	56	2726	2212	398	211	247	346	398	4938
14:04	1034	748	342	314	304	260	263	0	4.3	6.8	44	2687	2376	421	201	242	343	396	5107
14:05	1032	746	342	313	304	261	263	0	3.8	6.9	49	2724	2530	382	202	239	340	380	5254
14:06	1033	747	342	314	304	261	263	0	3.7	6.7	44	2716	2564	376	202	240	354	367	5260
14:07	1027	745	342	314	304	261	263	0	4.1	6.6	46	2631	2289	382	194	246	361	373	4920
14:08	1030	745	342	314	304	260	263	0	4.2	7.7	45	2684	2368	378	239	247	359	378	5072
14:09	1035	748	343	314	304	260	264	0	4.6	7.0	45	2726	2212	372	216	245	365	378	4937
14:10	1032	747	341	313	304	261	264	0	4.6	6.7	46	2701	2437	374	203	246	357	376	5137
14:11	1035	748	342	313	304	260	263	0	4.3	6.5	53	2739	2090	382	196	248	346	370	4839
14:12	1029	745	342	313	304	260	263	0	4.2	6.7	46	2741	2388	386	202	241	347	366	5129
14:13	1033	746	342	314	304	261	263	0	4.2	6.8	54	2682	2276	377	206	237	354	364	4958
14:14	1033	746	342	314	304	261	264	0	4.3	6.6	46	2660	2376	382	198	236	359	370	5056
14:15	1034	746	342	313	304	261	263	0	4.2	6.6	44	2672	2446	388	192	236	358	374	5120
14:16	1031	745	342	314	304	260	263	0	4.1	6.9	45	2699	2437	385	197	233	358	369	5136
14:17	1028	744	343	315	304	260	263	0	4.2	6.7	43	2743	2314	383	195	234	360	367	5057
14:18	1031	746	342	314	304	260	264	0	4.3	6.7	42	2731	2300	407	197	235	359	370	5031
14:19	1036	747	341	314	304	260	264	0	4.4	6.6	53	2690	2505	424	199	239	357	366	5196
14:20	1033	747	342	314	304	260	264	0	4.3	6.5	45	2752	2375	426	190	239	355	357	5127
14:21	1037	748	343	314	304	260	264	0	4.0	6.6	50	2751	2399	429	197	234	350	346	5150
14:22	1034	748	343	314	305	260	264	0	4.0	6.3	56	2739	2275	403	184	230	355	346	5014
14:23	1032	752	342	315	305	260	264	0	3.9	6.4	62	2670	2470	215	181	226	356	338	5140
14:24	1029	754	343	316	305	260	264	0	3.9	6.4	62	2684	2267	169	184	223	358	344	4971
14:25	1030	757	342	315	305	260	264	0	4.0	6.4	69	2697	2435	162	190	220	361	343	5132
14:26	1032	760	343	315	305	260	263	0	4.0	6.6	98	2691	2262	160	193	219	362	344	4953
14:27	1031	761	342	315	305	260	263	0	4.0	6.6	98	2741	2313	160	195	219	361	338	5054
14:28	1034	762	342	315	305	260	263	0	4.1	6.6	99	2663	2505	158	190	224	363	336	5190
14:29	1034	763	342	315	305	260	263	0	4.2	6.6	99	2751	2300	156	189	226	364	335	5051
14:30	1036	765	342	315	305	279	263	0	4.1	6.6	99	2691	2267	155	194	227	362	336	4978
14:31	1034	765	341	315	305	279	263	0	4.0	6.3	99	2686	2607	154	175	222	359	336	5186
14:32	1031	764	342	316	305	279	264	0	3.9	6.6	99	2699	2411	158	188	222	357	333	5110
14:33	1029	762	342	316	305	279	263	0	3.9	6.7	99	2718	2116	155	195	221	359	337	4834
14:34	1032	763	343	316	306	279	263	0	4.1	6.5	99	2670	2480	153	183	222	361	348	5145
14:35	1032	760	341	314	305	279	263	0	4.2	6.5	99	2699	2275	282	186	226	359	343	4974

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

)TE:
All data on this sheet were taken on DEC. 17, 1991.
Calcium injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
) TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
14:36	1032	757	340	314	304	278	263	0	4.1	6.4	99	2708	2350	370	183	229	354	329	5058
14:37	1034	757	343	317	306	278	263	0	4.0	6.5	99	2680	2503	394	186	227	353	327	5151
14:38	1035	757	343	316	306	278	263	0	3.9	6.3	99	2721	2348	405	179	224	353	329	5069
14:39	1036	757	341	314	305	279	263	0	3.6	6.2	99	2734	2235	409	178	217	350	316	4969
14:40	1036	757	341	315	305	278	263	0	3.4	6.3	99	2694	2365	402	180	212	353	312	5079
14:41	1037	757	342	316	305	278	263	0	3.3	6.4	99	2704	2469	412	183	208	360	309	5173
14:42	1037	757	343	316	306	279	263	0	3.4	6.3	99	2675	2492	412	177	210	366	318	5167
14:43	1036	756	342	315	305	279	263	0	3.3	6.4	99	2718	2324	414	184	210	366	313	5041
14:44	1036	756	341	315	305	278	263	0	3.3	6.5	99	2739	2101	418	184	206	367	316	4840
14:45	1039	757	342	315	305	279	263	0	3.4	6.4	99	2677	2365	418	181	209	370	321	5062
14:46	1036	756	342	315	305	279	263	0	3.4	6.5	99	2719	2361	436	191	208	368	324	5080
14:47	1038	756	342	315	305	278	263	0	3.3	6.5	99	2691	2409	423	189	204	367	323	5107
14:48	1039	756	342	315	305	279	263	0	3.4	6.3	99	2711	2373	422	185	208	371	322	5084
14:49	1038	756	342	315	305	278	263	0	3.4	6.3	99	2708	2324	359	181	212	373	320	5031
14:50	1041	758	343	316	306	279	263	0	3.3	6.3	99	2658	2480	238	186	211	371	309	5142
14:51	1035	757	342	315	306	279	263	0	3.4	6.3	99	2724	2397	194	184	209	370	307	5121
14:52	1033	756	341	315	305	278	263	0	3.4	7.0	99	2696	2311	187	210	209	368	309	5007
14:53	1036	757	342	315	305	279	263	0	3.8	6.7	99	2697	2469	182	200	215	374	308	5166
14:54	1036	758	342	315	305	278	263	0	4.1	6.4	99	2713	2433	185	189	225	373	309	5146
14:55	1035	758	342	315	305	278	263	0	4.0	6.4	99	2731	2397	189	189	231	361	311	5128
14:56	1034	756	341	315	305	278	263	0	3.8	6.5	99	2734	2433	188	190	229	353	307	5167
14:57	1029	753	342	316	305	278	263	0	3.9	7.1	99	2729	2361	185	217	225	352	297	5137
14:58	1031	753	342	316	306	278	263	0	4.1	6.8	99	2662	2260	182	211	227	356	311	4922
14:59	1033	752	341	315	306	278	263	0	4.4	6.6	99	2726	2067	183	199	241	356	307	4815
15:00	1035	753	342	315	306	278	263	0	4.3	6.6	99	2684	2469	193	197	249	347	306	5100
15:01	1034	753	342	315	306	278	263	0	4.0	6.5	99	2713	2266	191	193	245	340	300	4998
15:02	1033	752	342	316	306	279	263	0	3.9	6.7	99	2706	2397	190	195	236	343	294	5103
15:03	1035	753	342	316	306	279	264	0	3.9	6.7	99	2696	2536	187	202	233	350	299	5234
15:04	1035	753	342	315	306	279	263	0	4.2	6.6	99	2756	2266	189	193	235	357	303	5042
15:05	1040	755	342	315	305	279	263	0	4.1	6.4	99	2699	2492	190	189	237	353	305	5191
15:06	1038	756	341	314	305	279	263	0	4.0	6.5	99	2697	2373	189	190	232	350	301	5070
15:07	1034	755	341	314	305	278	263	0	3.9	6.6	99	2696	2433	184	197	225	349	304	5164
15:08	1036	755	342	315	305	278	263	0	3.9	6.7	99	2703	2365	185	198	224	349	294	5068
15:09	1039	756	342	315	305	278	263	0	4.0	6.4	99	2741	2324	190	186	229	348	297	5065
15:10	1041	758	342	315	305	278	263	0	4.1	6.3	99	2716	2503	189	177	231	351	294	5219
15:11	1041	758	341	314	305	278	263	0	3.9	6.3	99	2697	2445	192	177	228	349	295	5142
15:12	1041	757	341	314	305	278	263	0	3.8	6.3	99	2709	2397	192	179	222	350	295	5106
15:13	1038	756	342	315	305	278	263	0	3.8	6.4	99	2682	2527	194	179	218	353	295	5209
15:14	1040	757	342	315	305	278	263	0	3.7	6.4	99	2723	2409	185	185	215	354	296	5134
15:15	1040	759	342	314	305	278	263	0	3.8	6.6	99	2704	2409	202	190	218	356	293	5113
15:16	1044	760	341	314	305	278	263	0	3.8	6.4	99	2723	2361	279	180	221	354	286	5083
15:17	1043	761	342	315	305	278	263	0	3.9	6.4	99	2677	2445	225	183	225	353	292	5139
15:18	1042	761	341	314	305	278	263	0	3.8	6.4	99	2708	2503	226	180	226	350	289	5211
15:19	1042	761	342	314	305	278	263	0	3.8	6.4	99	2691	2503	226	180	226	353	292	5194
15:20	1042	762	342	315	305	278	263	0	3.8	6.4	99	2736	2336	223	185	226	355	297	5072
15:21	1038	760	341	314	304	278	263	0	3.9	6.5	99	2767	2169	214	178	226	356	292	4936
15:22	1040	760	342	315	305	278	262	0	3.9	6.6	99	2714	2445	210	194	227	354	285	5159
15:23	1042	761	341	314	305	278	263	0	3.9	6.4	99	2744	2336	218	184	228	350	281	5080

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 17, 1991.
Calcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
15:24	1043	761	341	314	305	278	263	0	3.9	6.2	99	2696	2361	224	178	231	346	263	5070
15:25	1041	761	341	314	305	278	262	0	3.9	6.3	99	2716	2235	222	181	231	344	277	4951
15:26	1042	761	342	315	305	278	263	0	3.7	6.3	99	2713	2169	223	179	226	347	272	4881
15:27	1043	761	342	315	305	278	263	0	3.6	6.3	99	2679	2324	224	178	222	345	270	5033
15:28	1042	762	341	314	305	278	263	0	3.6	6.3	99	2708	2373	223	180	218	345	272	5080
15:29	1038	760	341	314	304	278	262	0	3.6	6.6	99	2769	2260	215	188	217	348	272	5029
15:30	1033	758	342	314	305	278	263	0	3.8	6.8	99	2734	2286	221	202	218	350	274	5020
15:31	1037	759	341	313	304	278	263	0	4.1	6.9	99	2703	2492	219	210	226	352	276	5194
15:32	1041	761	341	314	304	278	262	0	4.4	6.4	99	2714	2348	217	193	235	350	278	5063
15:33	1041	762	342	315	305	278	263	0	4.3	6.3	99	2713	2445	217	184	238	343	278	5158
15:34	1044	763	342	315	305	278	263	0	4.0	6.3	99	2697	2385	321	179	237	336	278	5109
15:35	1039	761	341	314	304	278	262	0	3.7	6.4	99	2774	2324	347	181	226	335	273	5098
15:36	1038	761	341	314	304	278	262	0	3.7	6.5	99	2684	2409	348	186	222	341	277	5093
15:37	1036	758	341	314	304	277	262	0	3.8	6.5	99	2709	2266	351	189	222	344	275	4995
15:38	1040	758	342	314	304	277	262	0	3.9	6.6	99	2648	2311	354	195	225	345	277	4959
15:39	1040	758	342	314	304	277	262	0	3.9	6.4	99	2699	2324	360	181	227	343	272	5023
15:40	1040	758	342	314	304	277	262	0	3.9	6.7	99	2709	2286	364	193	230	342	277	4995
15:41	1038	758	342	314	304	277	262	0	3.9	6.1	99	2706	2346	359	177	230	343	270	5058
15:42	1041	759	341	314	304	277	262	4	3.9	6.3	99	2713	2373	362	186	227	343	272	5086
15:43	1042	759	342	314	304	277	262	0	3.9	6.3	99	2714	2397	360	185	227	343	267	5112
15:44	1041	759	342	314	304	277	262	0	3.9	6.2	99	2721	2273	364	173	224	342	270	4981
15:45	1041	759	341	313	304	277	262	0	3.7	6.7	99	2720	2273	368	180	221	339	266	4993
15:46	1043	759	341	314	304	277	262	0	3.7	6.4	99	2704	2361	359	183	216	342	274	5065
15:47	1040	758	342	314	304	277	262	0	3.8	6.5	99	2714	2527	378	181	217	343	269	5253
15:48	1038	757	342	314	304	277	262	0	3.8	6.6	99	2730	2361	344	194	220	341	269	5090
15:49	1043	759	341	313	304	277	262	0	3.9	6.5	99	2736	2373	334	201	220	343	265	5111
15:50	1046	761	341	313	304	277	262	0	4.1	6.5	99	2714	2397	262	198	225	344	264	5112
15:51	1039	759	342	314	304	277	262	0	3.9	6.4	99	2674	2247	249	190	230	341	264	4987
15:52	1038	757	341	313	304	277	262	0	3.8	7.0	99	2704	2311	261	218	231	337	263	5015
15:53	1042	759	341	313	304	277	262	0	4.0	6.8	99	2670	2421	275	218	232	340	264	5092
15:54	1039	758	342	313	304	277	262	0	4.2	6.7	99	2709	2397	253	209	240	343	274	5107
15:55	1039	758	341	313	303	277	262	0	4.3	6.7	99	2726	2324	272	209	249	338	277	5051
15:56	1041	762	342	313	304	277	262	0	4.3	6.6	99	2745	2298	263	202	253	335	277	5043
15:57	1041	761	342	313	304	277	262	0	4.2	6.9	99	2693	2397	187	215	250	334	271	5090
15:58	1041	760	341	313	303	277	262	0	4.2	6.7	99	2726	2409	324	205	248	335	268	5135
15:59	1038	758	341	313	303	277	262	0	4.2	6.5	99	2769	2311	372	203	250	334	272	5080
16:00	1042	758	342	313	304	277	262	0	4.1	6.8	99	2718	2365	382	218	248	331	272	5103
16:01	1041	758	342	313	304	277	262	0	4.2	6.7	99	2706	2397	396	218	248	332	264	5103
16:02	1038	757	341	313	303	277	262	0	4.2	6.7	99	2703	2445	400	214	248	332	269	5148
16:03	1035	756	341	312	303	277	262	0	4.2	7.0	99	2699	2445	395	229	251	331	265	5144
16:04	1048	759	341	312	303	277	262	0	4.4	7.3	99	2691	2222	395	203	255	335	271	4816
16:05	1013	747	342	312	303	276	261	0	4.4	8.5	99	2699	2421	368	178	260	333	267	5121
16:06	955	717	339	310	302	276	261	0	4.4	11.3	99	2761	2324	313	211	257	329	261	5085
16:07	915	692	339	310	301	276	260	0	4.4	13.9	99	2698	2421	253	197	207	311	265	5119
16:08	882	668	341	312	302	275	260	0	4.5	16.4	99	2733	2157	215	183	23	55	267	4890
16:09	846	657	341	311	302	275	260	0	4.5	17.4	92	2703	2263	189	148	2	56	265	4967
16:10	781	625	340	309	301	274	260	0	4.5	18.1	99	2804	2437	173	115	1	67	266	5241
16:11	732	593	337	307	299	274	259	0	4.5	19.2	99	2775	2327	168	74	1	74	267	5102

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 17, 1991.
alcium Injector Type is II—Staggered

3) Calcium Sorbent Type is Wultrasorp
4) Delta SO2 Vs Ca/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PI	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
16:12	692	563	335	305	296	273	259	0	1.8	19.6	92	2715	2413	179	41	0	68	231	5128
16:13	659	536	332	303	296	273	258	0	1.8	19.8	86	2737	2472	146	33	0	72	228	5209
16:14	631	515	328	300	294	272	258	0	1.9	19.8	82	2756	2226	163	16	0	76	230	4982
16:15	607	495	325	296	292	271	256	0	1.9	19.9	78	2717	2462	143	18	0	80	230	5179
16:16	584	477	320	292	289	270	255	0	1.9	19.9	73	2726	2440	143	18	0	83	229	5166
16:17	564	459	315	289	286	268	254	0	1.9	19.9	79	2733	2279	125	18	0	87	230	5005
16:18	545	444	310	285	283	267	252	0	1.9	19.9	73	2740	2306	125	18	0	89	231	5047
16:19	527	429	306	281	279	265	250	0	1.9	19.9	78	2751	2381	107	18	0	91	232	5132
16:20	510	416	301	277	276	264	249	0	2.0	19.9	76	2765	2321	90	18	0	95	232	5100
16:21	495	403	295	272	273	262	247	0	2.0	19.9	66	2760	2397	90	18	0	97	233	5157
16:22	480	391	291	268	269	260	245	0	2.0	19.9	62	2738	2435	90	18	0	98	231	5173
16:23	466	379	286	264	266	258	243	0	2.0	19.9	65	2742	2412	90	18	0	98	232	5155
16:24	453	368	281	260	262	255	241	0	2.0	19.9	60	2739	2327	90	18	0	99	231	5067
16:25	441	358	276	256	258	253	239	0	2.0	19.9	57	2750	2454	90	18	0	101	233	5204
16:26	429	347	269	252	255	251	237	0	2.1	19.9	53	1835	1754	90	18	0	103	232	3590
16:27	440	333	246	243	251	248	234	0	2.1	19.9	34	–	645	107	0	0	104	232	–
16:28	457	321	231	239	250	245	230	0	2.1	20.0	31	–	244	119	20	0	105	233	–
16:29	453	321	223	240	250	241	227	0	2.1	20.0	28	–	245	139	0	0	105	233	–
16:30	446	320	218	240	250	239	225	0	2.1	20.0	27	–	246	139	0	0	106	234	–
16:31	444	319	214	240	250	235	222	0	2.2	20.0	27	–	246	139	0	0	108	235	–
16:32	439	318	212	239	249	232	220	0	2.2	20.0	26	–	247	139	0	0	109	235	–
16:33	432	315	217	238	248	229	215	0	2.2	20.0	26	–	247	159	0	0	108	235	–
16:34	427	312	221	237	246	227	209	0	2.2	19.9	28	–	248	179	18	0	109	235	–
16:35	422	308	223	236	245	225	204	0	2.2	19.9	27	–	249	197	36	0	109	235	–
16:36	418	305	225	234	243	223	200	0	2.3	19.9	28	–	249	197	18	0	111	237	–
16:37	415	303	225	232	241	221	196	0	2.3	19.9	28	–	249	215	36	0	111	237	–
16:38	412	301	225	231	240	219	193	0	2.3	19.7	26	–	250	179	0	0	112	236	–
16:39	409	299	225	229	239	217	190	0	2.3	19.7	27	–	250	179	0	0	112	237	–

DEC. 18, 1991

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
All data on this sheet were taken on DEC. 16, 1991.
Calcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.Pt	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
10:32	1039	744	342	305	295	267	254	4	5.5	7.7	98	2714	2414	433	193	236	336	395	5128
10:33	1035	743	341	304	294	267	253	0	5.4	7.4	98	2708	2375	427	180	238	334	403	5083
10:34	1031	740	341	304	293	267	253	0	5.0	8.2	96	2701	2375	431	195	231	328	393	5076
10:35	1029	739	342	305	294	267	253	0	4.8	8.3	99	2740	2337	432	205	222	332	384	5077
10:36	1032	740	343	305	294	267	253	0	5.0	7.8	98	2772	2350	428	194	222	336	379	5122
10:37	1032	740	341	304	294	267	253	0	5.2	7.8	97	2740	2348	429	187	227	340	380	5088
10:38	1028	739	341	304	294	267	253	0	5.1	7.6	94	2759	2323	427	187	228	335	372	5081
10:39	1029	738	342	304	294	267	253	0	5.0	8.1	98	2728	2310	434	196	225	331	373	5038
10:40	1029	738	342	304	293	267	253	0	5.1	7.8	99	2682	2361	381	187	227	332	360	5043
10:41	1028	738	342	304	293	267	253	0	5.3	7.6	99	2775	2271	341	186	232	333	363	5008
10:42	1030	739	342	304	294	267	253	0	5.3	7.9	99	2745	2542	333	202	233	328	365	5267
10:43	1032	741	342	304	294	267	253	0	5.4	7.8	99	2735	2372	321	183	234	327	373	5106
10:44	1032	741	342	305	294	267	253	0	5.4	7.7	99	2726	2384	264	184	236	323	375	5155
10:45	1023	736	342	305	294	267	253	0	5.4	8.1	99	2772	2421	215	196	234	321	375	5193
10:46	1030	741	342	305	294	267	253	0	5.4	8.1	99	2760	2409	218	211	233	321	370	5169
10:47	1031	742	341	304	294	267	253	0	5.7	8.4	99	2665	2421	219	216	236	324	370	5086
10:48	1026	740	341	304	293	267	253	0	5.8	8.2	99	2639	1838	228	203	243	320	369	4677
10:49	1029	741	342	305	294	267	254	0	5.8	8.2	99	2675	2396	228	202	247	315	375	5071
10:50	1034	744	343	305	294	267	254	0	5.9	8.3	99	2740	2346	217	209	246	315	382	5086
10:51	1036	747	341	304	294	267	254	0	6.0	7.8	99	2733	2372	212	195	249	315	389	5113
10:52	1032	745	341	304	294	268	254	0	6.0	7.7	99	2780	2407	220	187	247	312	395	5187
10:53	1032	745	342	304	294	268	254	0	5.6	7.9	99	2696	2443	233	197	242	305	388	5139
10:54	1025	742	341	304	294	267	253	0	5.4	8.6	99	2666	2467	173	208	237	309	382	5151
10:55	1022	740	341	304	293	267	253	0	5.5	9.2	99	2732	2407	148	203	236	317	373	5136
10:56	1030	744	342	305	294	267	253	0	5.9	9.4	99	2762	2281	142	215	243	326	382	5043
10:57	1036	748	342	305	294	267	253	0	6.5	8.9	99	2748	2419	133	203	249	333	416	5168
10:58	1033	748	341	304	294	267	253	0	6.7	8.5	99	2782	2395	144	186	252	328	432	5129
10:59	1027	746	341	304	294	267	253	0	6.6	9.0	99	2737	2417	135	206	253	317	443	5154
11:00	1031	746	342	304	294	267	253	0	6.4	8.7	99	2759	2318	129	202	248	306	448	5076
11:01	1033	748	342	305	294	268	253	0	6.6	8.5	98	2640	2393	133	199	252	308	436	5054
11:02	1023	744	341	304	294	268	254	0	6.5	9.0	98	2763	2391	131	208	255	302	415	5155
11:03	1032	749	342	305	294	268	254	0	6.3	8.2	98	2757	2404	127	206	253	300	403	5160
11:04	1037	752	342	305	294	268	254	0	6.5	8.1	99	2757	2428	122	210	255	306	406	5201
11:05	1031	749	342	304	294	268	254	0	6.4	8.5	99	2709	2291	124	209	256	305	399	5000
11:06	1025	746	340	304	293	268	254	0	6.2	8.0	99	2718	2316	136	201	256	304	393	5034
11:07	1024	745	341	305	294	268	254	0	6.1	8.8	99	2696	2316	143	228	255	305	391	5012
11:08	1034	749	343	306	295	268	254	0	6.2	8.1	99	2767	2302	140	215	258	308	392	5031
11:09	1037	751	342	306	295	268	254	0	6.4	7.8	99	2767	2402	150	197	263	311	395	5168
11:10	1036	752	341	305	294	268	254	0	6.2	8.0	99	2706	2340	146	194	264	304	388	5046
11:11	1027	748	340	304	294	268	254	0	5.9	8.4	99	2770	2414	150	205	258	300	383	5182
11:12	1034	750	342	306	295	268	254	0	5.8	8.1	99	2689	2414	154	215	251	303	376	5103
11:13	1033	749	343	306	295	268	254	0	6.0	8.1	99	2696	2340	155	204	252	309	384	5035
11:14	1035	750	342	306	295	269	255	0	6.0	7.8	99	2696	2300	157	195	258	309	375	4996
11:15	1030	748	341	305	295	269	254	0	5.9	7.8	99	2714	2388	157	184	260	307	364	5152
11:16	1028	746	341	305	294	269	254	0	5.7	8.4	99	2677	2424	162	198	256	304	364	5101
11:17	1033	748	343	307	295	269	254	0	5.7	8.6	99	2763	2424	163	208	250	306	366	5187
11:18	1034	749	343	306	295	269	255	0	5.9	8.0	99	2750	2326	133	193	246	310	369	5091
11:19	1027	746	341	304	294	269	254	0	6.0	7.9	99	2787	2326	124	185	250	312	371	5112

RILEY R&D PROJECT #: 89801
RCEST SORBENT INJECTION TESTS
TEST LOOP DATA AT SELECTED CHANNELS

TE:
ll data on this sheet were taken on DEC. 18, 1991.
alcium Injector Type is II–Staggered

3) Calcium Sorbent Type is Wulfrasorp
4) Sodium Sorbent Type is Bicarbonate
5) Delta SO2 Vs Na2/S

#: -->	02	04	06	09	12	13	14	17	22	26	29	32	34	35	36	39	40	41	42
	TEMPERATURE @, F							Ca(OH)2	CBTF	KVB	OPA-	ESP	BH	KVB		CBTF			TOTAL
TIME	SORB	ECO	AH	HUM.	ESP	ESP	ESP	RATE	O2	O2	CITY	FLOW	FLOW	SO2	NOX	NOX	SO2	CO	FLOW
H:M	INJ.PT	OUT	MID	CHM IN	IN	MID	OUT	PPH	%	%	%	SCFM	SCFM	CORRECTED @ 3% O2, PPM					SCFM
11:20	1032	748	341	305	294	269	254	0	5.8	7.9	99	2745	2338	124	191	249	307	369	5083
11:21	1029	747	342	306	295	269	255	0	5.8	8.1	99	2733	2412	116	194	245	307	356	5145
11:22	1030	747	342	306	295	269	255	0	5.7	8.0	99	2750	2349	115	196	244	309	347	5099
11:23	1032	747	342	305	295	269	255	0	5.7	8.1	99	2680	2299	113	193	244	307	339	4979
11:24	1024	743	340	304	295	269	254	0	5.7	8.2	99	2745	2299	118	190	243	305	336	5031
11:25	1010	737	341	304	294	268	254	0	5.7	9.0	99	2709	2411	122	214	244	305	332	5120
11:26	1027	742	342	306	295	269	254	0	5.9	9.2	99	2645	2324	107	245	247	309	335	4969
11:27	1032	745	342	306	295	269	254	0	6.6	9.0	99	2760	2324	104	205	262	320	347	5064
11:28	1033	745	341	305	295	269	254	0	6.8	9.3	99	2736	2362	103	207	272	314	366	5098
11:29	1032	745	341	305	295	269	254	0	6.9	9.1	99	2684	2374	106	208	272	308	403	5057
11:30	1028	744	342	305	295	268	254	3	7.0	9.3	99	2663	2423	103	213	270	304	428	5095
11:31	1031	745	342	305	295	268	255	0	7.0	9.4	99	2670	2423	68	225	269	299	455	5123
11:32	1024	742	341	305	295	269	255	0	7.1	9.4	99	2745	2324	68	218	270	297	466	5069
11:33	1034	746	342	305	295	268	255	0	7.0	9.2	99	2659	2447	78	222	269	292	462	5106
11:34	1028	744	341	305	295	268	255	0	7.1	8.9	99	2745	2208	84	214	274	292	451	4959
11:35	1028	745	341	305	294	268	254	0	7.0	9.3	99	2745	2366	83	224	273	288	434	5131
11:36	1029	745	342	306	295	268	255	0	6.9	8.9	99	2728	2374	88	215	272	285	431	5102
11:37	1026	745	342	305	295	269	255	0	7.0	9.0	99	2761	2423	85	213	274	287	437	5184
11:38	1034	748	342	305	295	269	255	0	7.0	9.3	99	2793	2337	90	228	276	288	442	5129
11:39	1028	746	341	305	295	269	255	0	7.1	8.7	99	2745	2541	90	211	278	292	448	5265
11:40	1035	747	341	305	295	269	255	0	7.0	9.3	99	2678	2423	104	232	278	290	449	5101
11:41	1035	747	342	305	295	269	255	0	6.9	8.8	99	2661	2435	75	212	277	289	459	5115
11:42	1031	747	342	305	295	269	255	0	6.9	8.5	99	2701	2423	66	206	277	289	458	5123
11:43	1023	743	341	305	295	269	255	0	6.8	9.0	99	2743	2365	66	214	277	289	458	5127
11:44	1025	744	341	305	295	269	255	0	6.5	9.2	99	2758	2397	76	228	271	287	446	5119
11:45	1028	745	341	305	295	269	255	0	6.7	9.2	99	2761	2421	64	237	274	292	458	5182
11:46	1035	749	342	305	295	269	255	0	6.9	9.0	99	2682	2421	62	220	279	298	449	5103
11:47	1030	747	341	305	295	269	255	0	7.1	9.3	98	2761	2322	64	232	285	301	446	5074
11:48	1028	746	341	305	295	269	255	0	7.0	8.8	98	2758	2310	80	215	286	301	451	5068
11:49	1032	748	341	305	295	269	255	0	7.1	8.9	98	2642	2284	75	213	288	304	454	4926
11:50	1038	750	342	306	295	269	255	0	7.1	8.7	98	2726	2284	81	208	285	301	457	5010
11:51	1030	748	342	306	295	269	255	0	7.0	8.7	98	2723	2297	81	213	281	297	451	5028
11:52	1034	748	341	305	295	269	255	0	6.8	8.5	99	2704	2433	82	208	277	293	451	5137
11:53	1030	745	340	304	294	269	255	0	6.7	8.5	99	2372	2443	82	198	275	294	453	4815
11:54	1026	739	337	301	292	269	254	0	6.5	9.0	80	2008	2455	74	209	270	292	444	4389
11:55	1033	738	340	304	293	269	253	120	6.4	8.6	79	1933	2383	61	199	265	294	451	4316
11:56	1036	739	345	306	293	269	252	0	6.5	8.2	54	1667	3426	51	180	265	298	446	5093
11:57	1027	732	338	305	293	267	247	0	6.2	8.4	31	–	3916	37	178	261	295	430	–
11:58	1015	710	323	296	287	264	239	0	5.9	9.5	29	–	3683	22	173	254	296	408	–
11:59	1015	696	314	286	282	259	236	0	5.7	10.8	33	–	3123	12	170	246	299	396	–
12:00	1029	697	315	285	279	257	234	0	5.6	9.1	33	–	3846	15	168	242	301	389	–

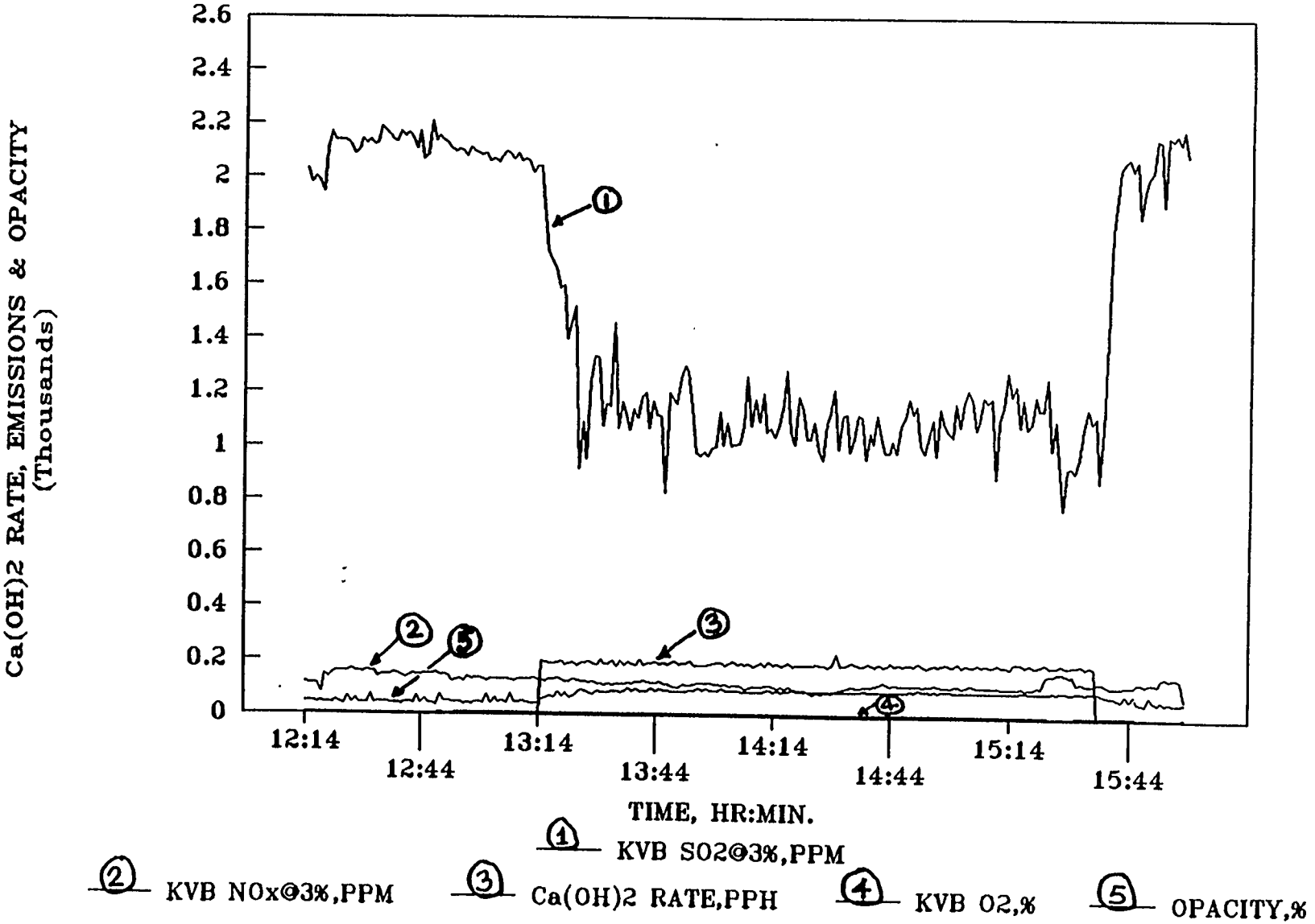
APPENDIX III

PROOF OF CONCEPT TESTING

CONDENSED GRAPHICAL DATA

KCES1 SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 02, 91

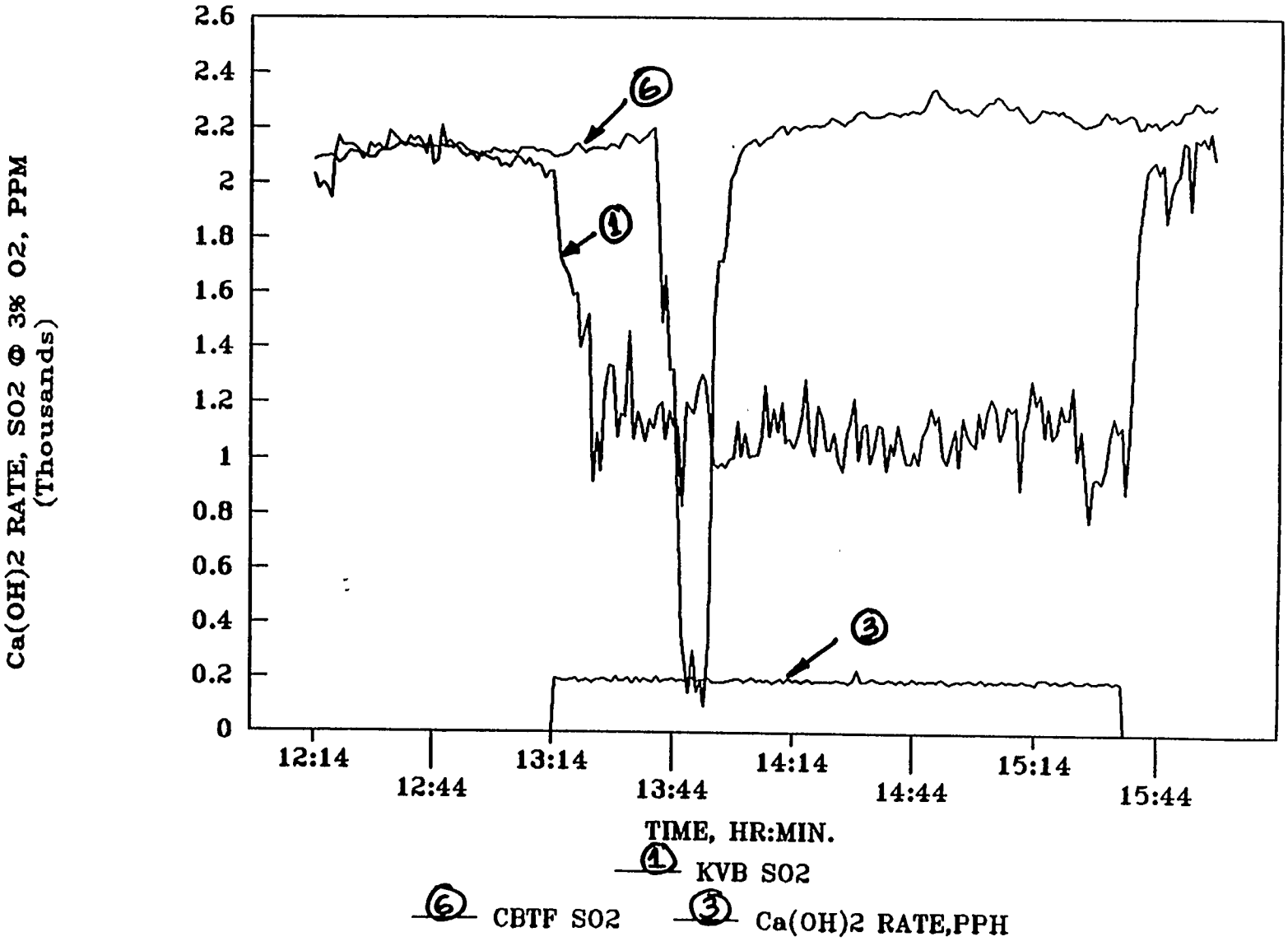


① KVB SO2@3%,PPM

② KVB NOx@3%,PPM ③ Ca(OH)2 RATE,PPH ④ KVB O2,% ⑤ OPACITY,%

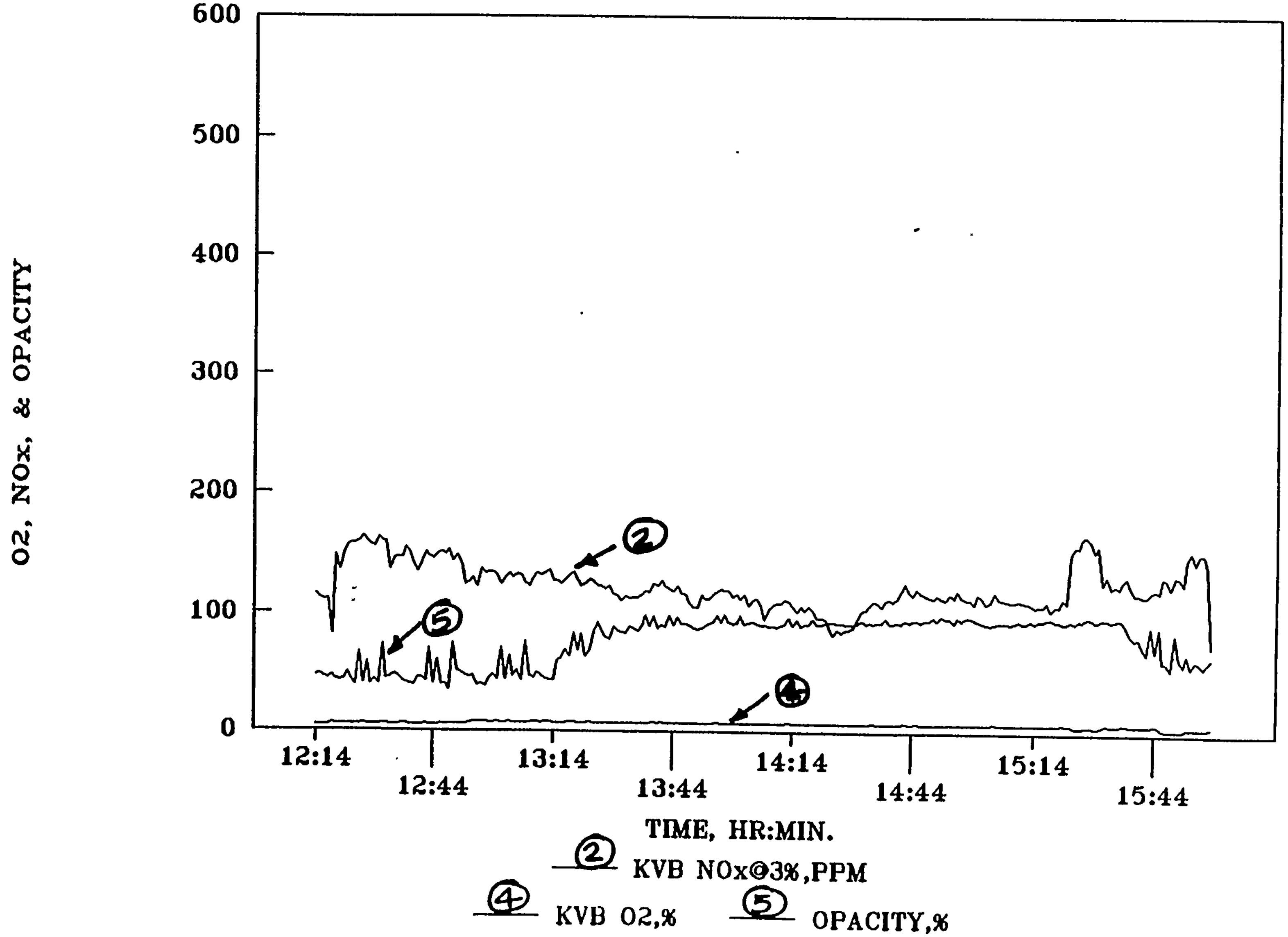
RCRA SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 02, 91



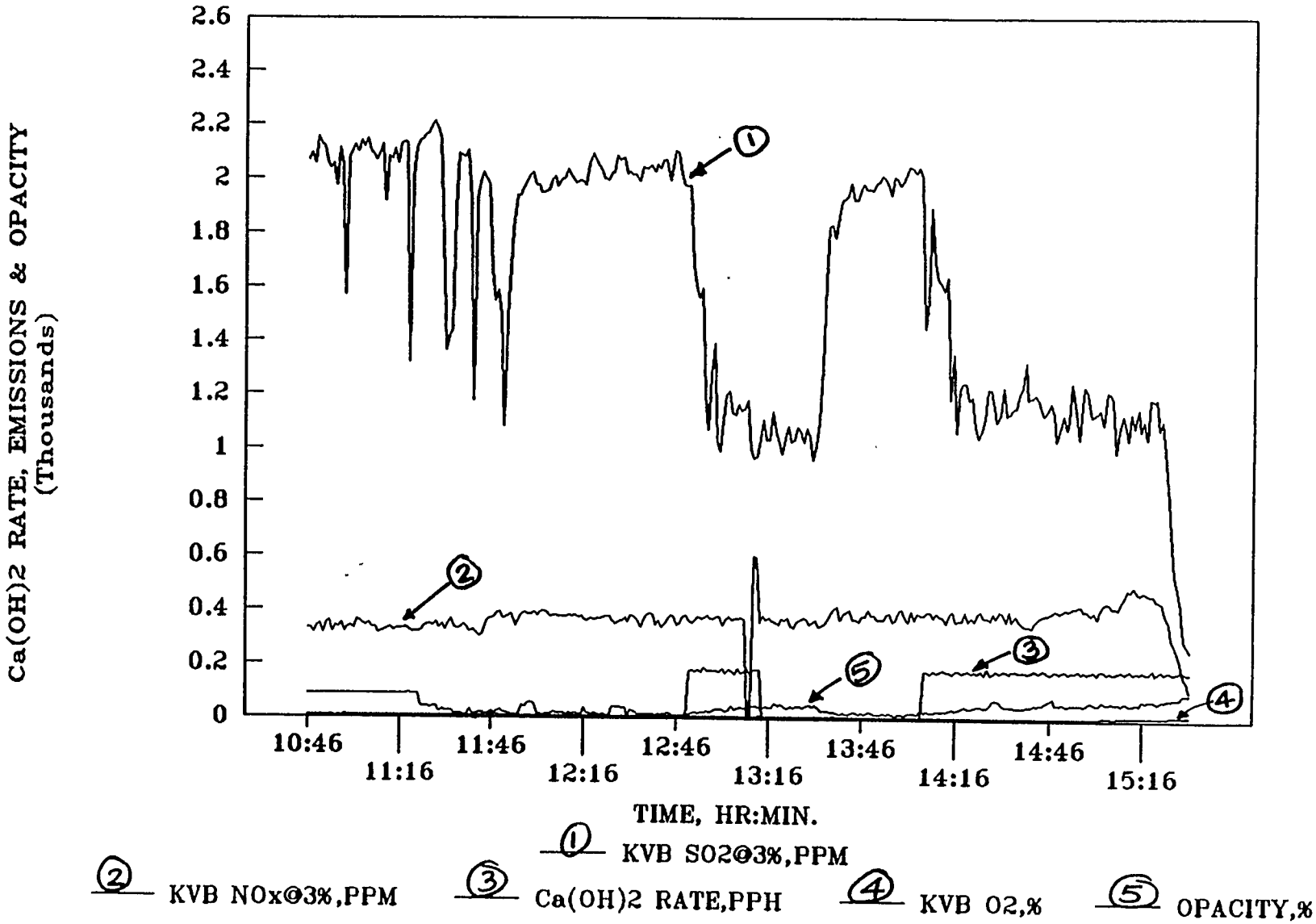
[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 02, 91



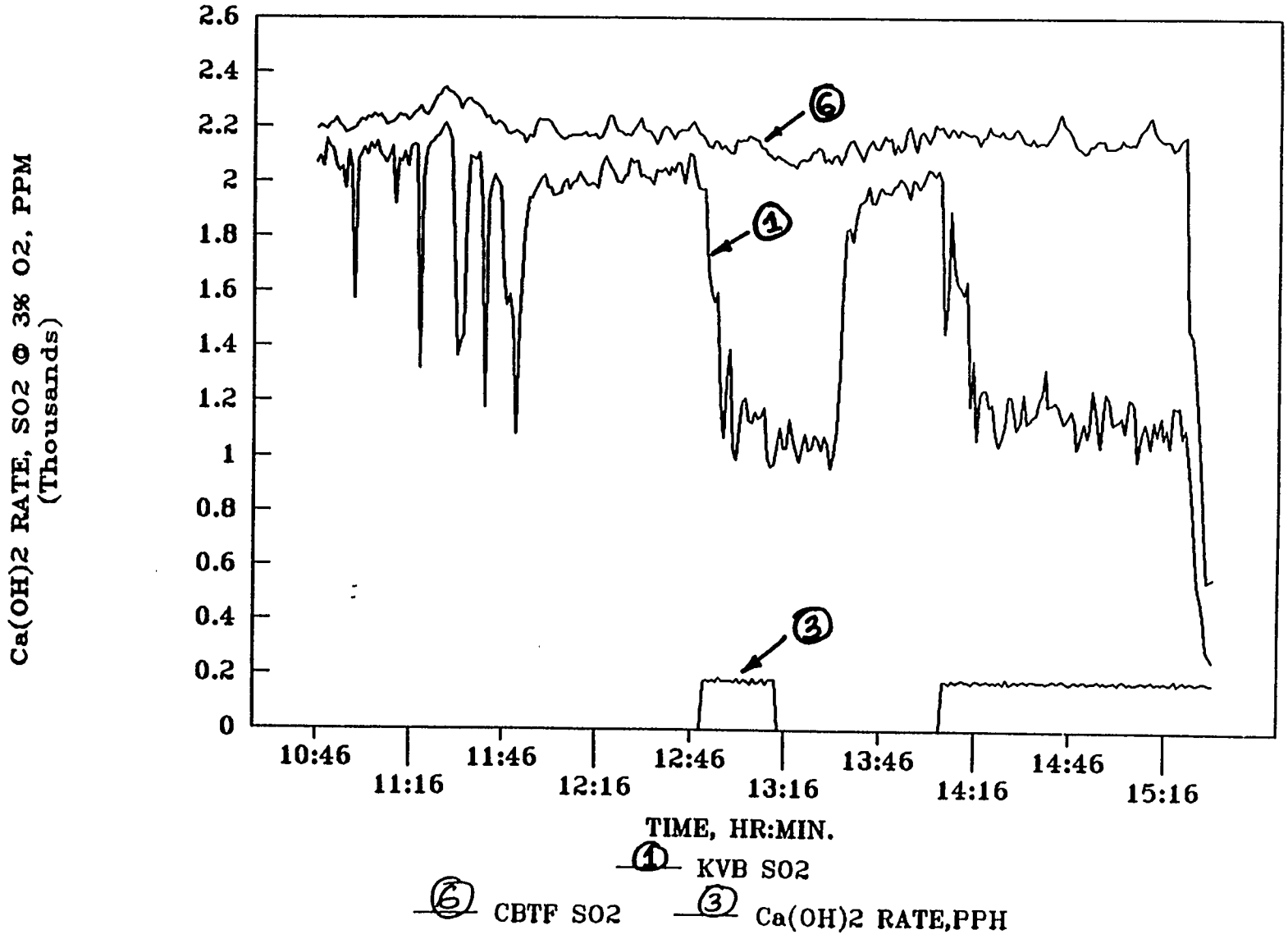
KCEST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 04, 91



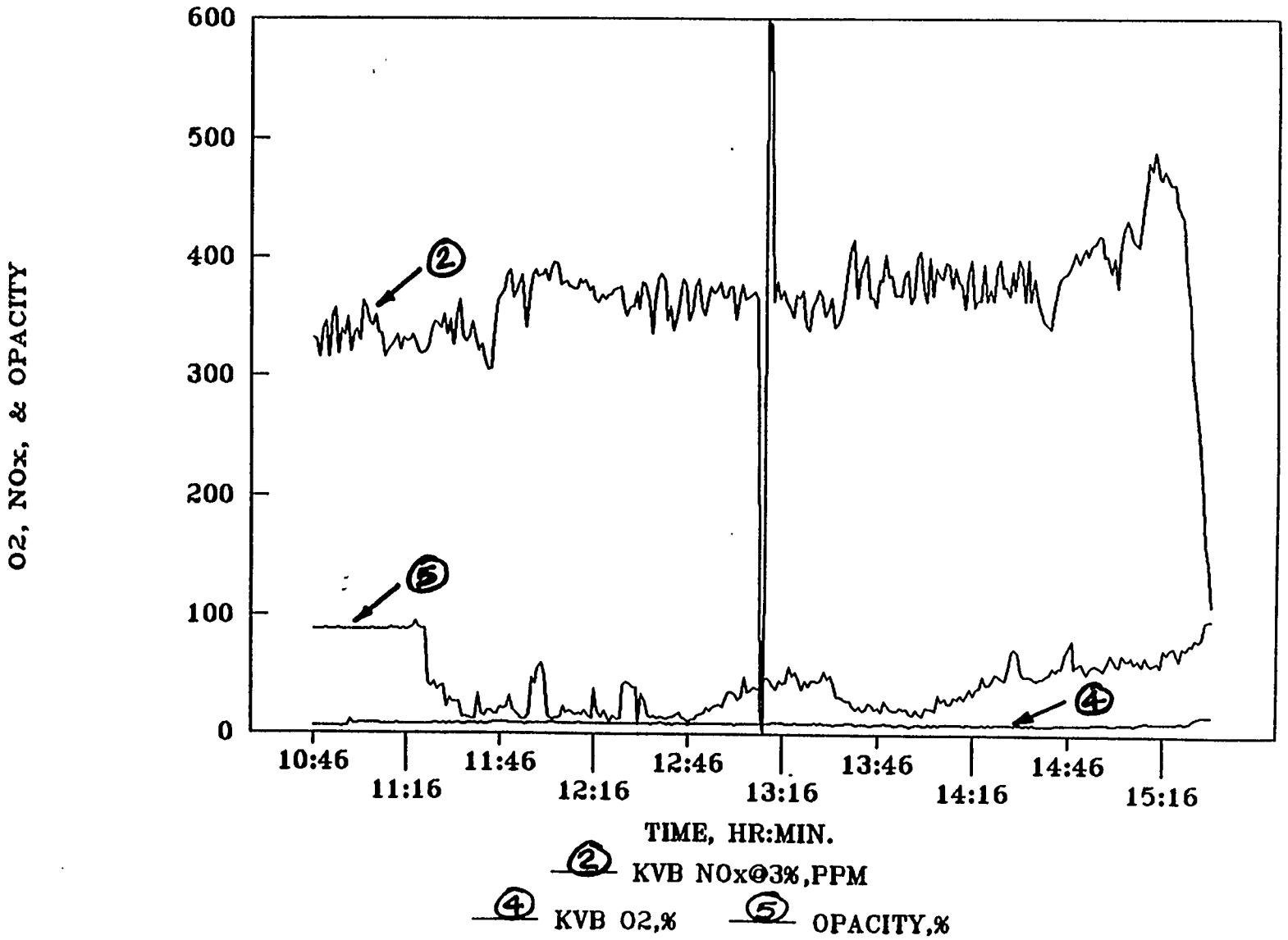
ROLST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 04, 91



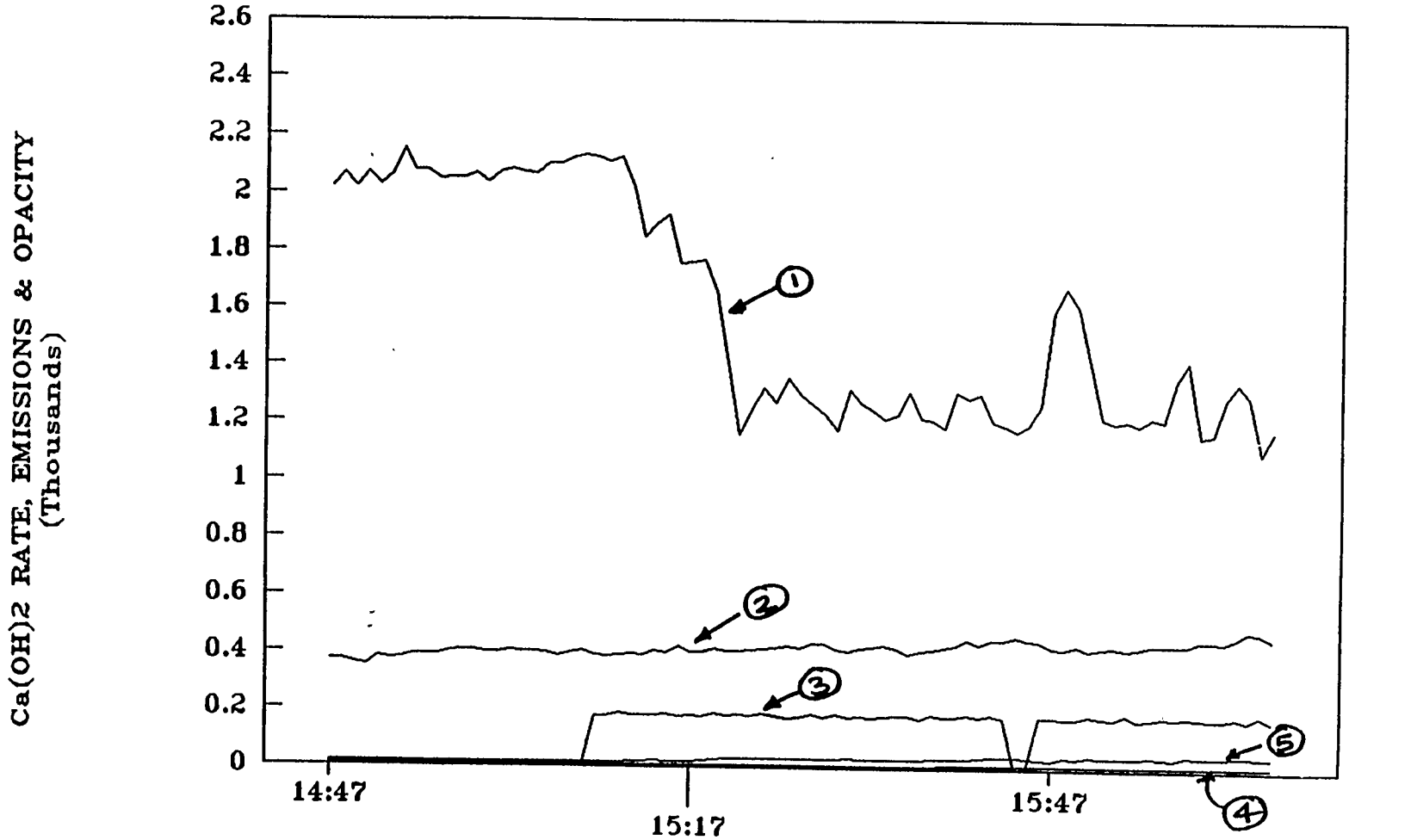
KCEST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 04, 91



KOLST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 17, 91



1 KVB SO2@3%,PPM

2 KVB NOx@3%,PPM

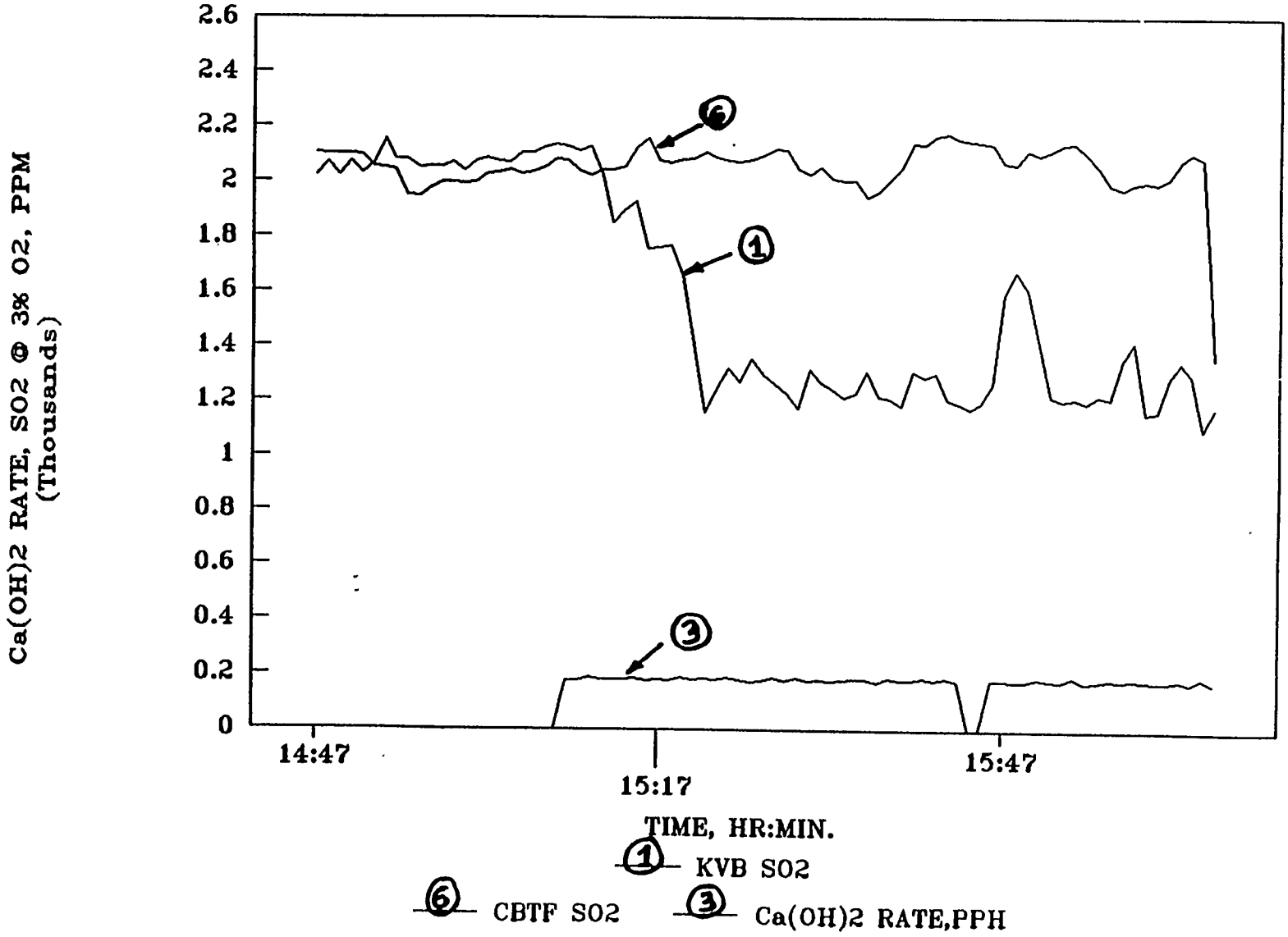
3 Ca(OH)2 RATE,PPH

4 KVB O2,%

5 OPACITY,%

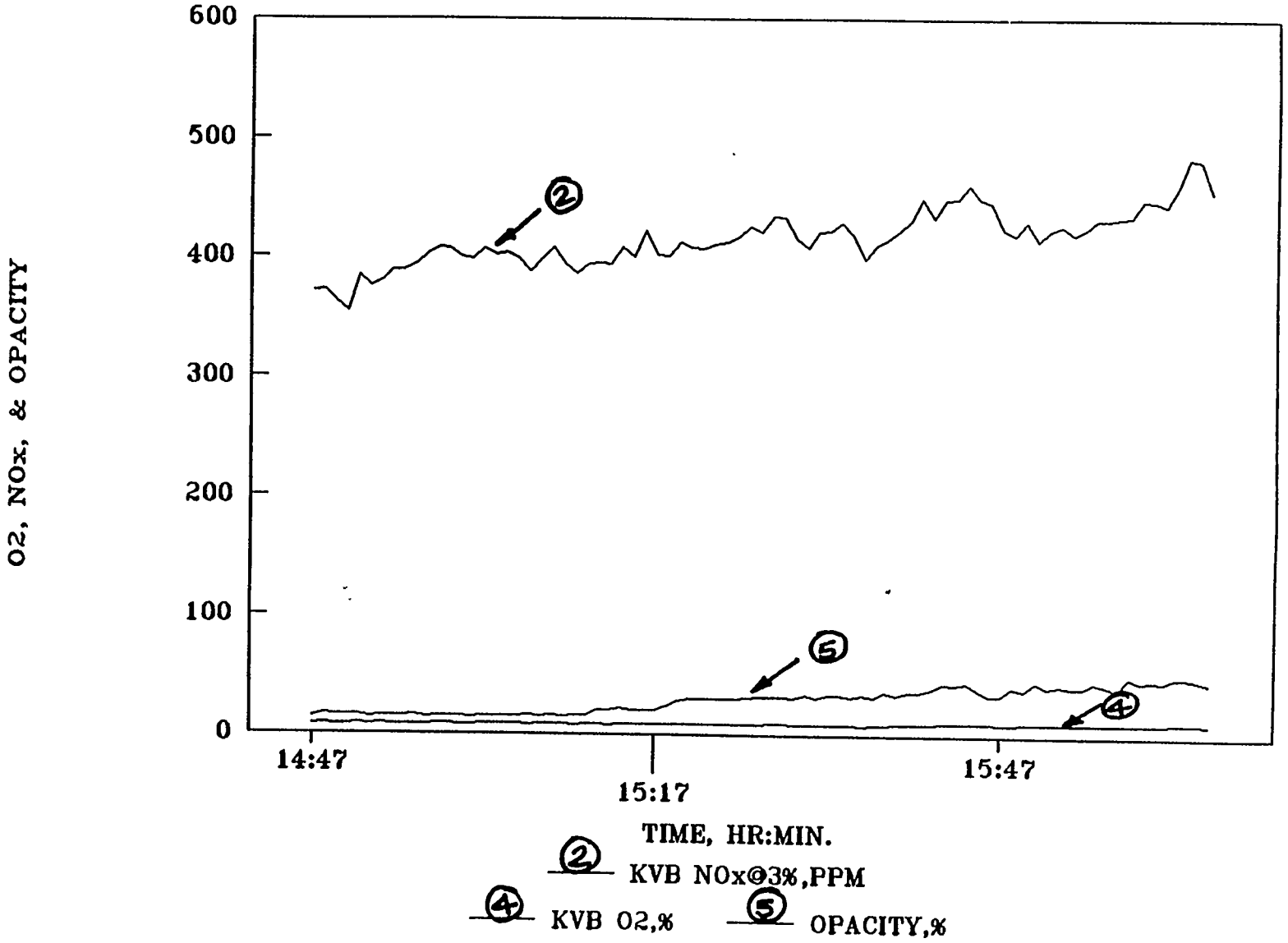
ROSE SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 17, 91



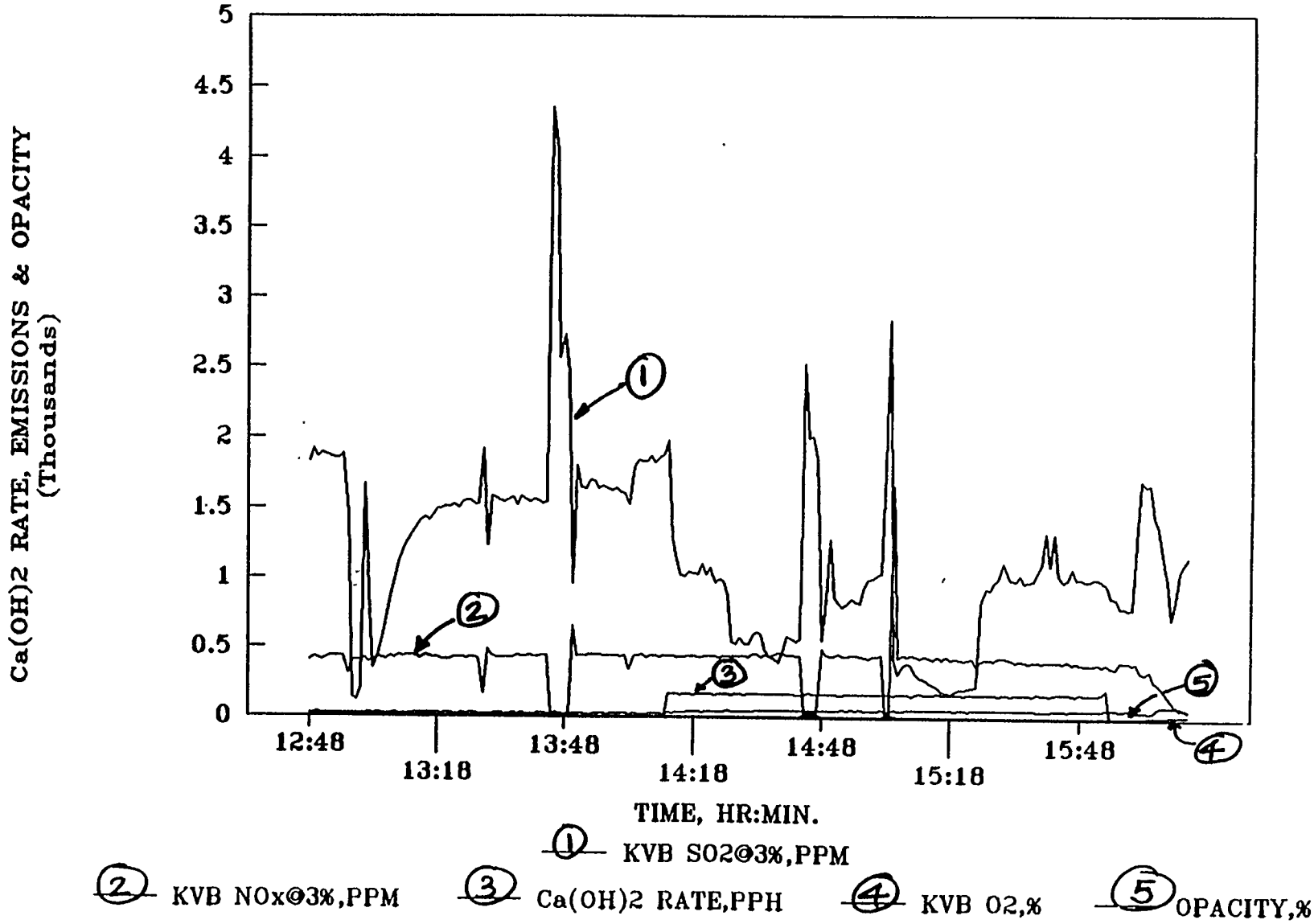
KOLST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 17, 91



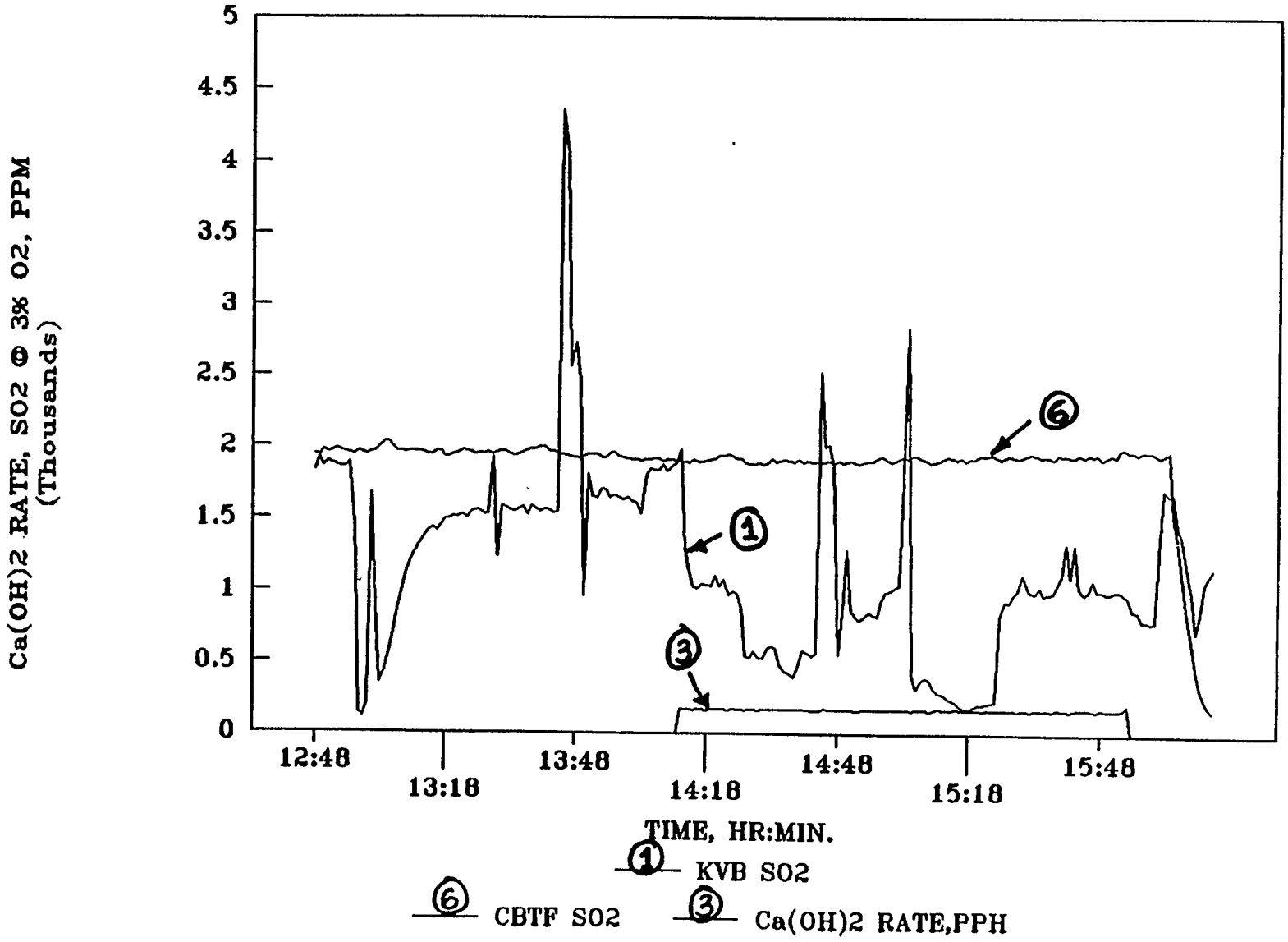
DRY SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 23, 91



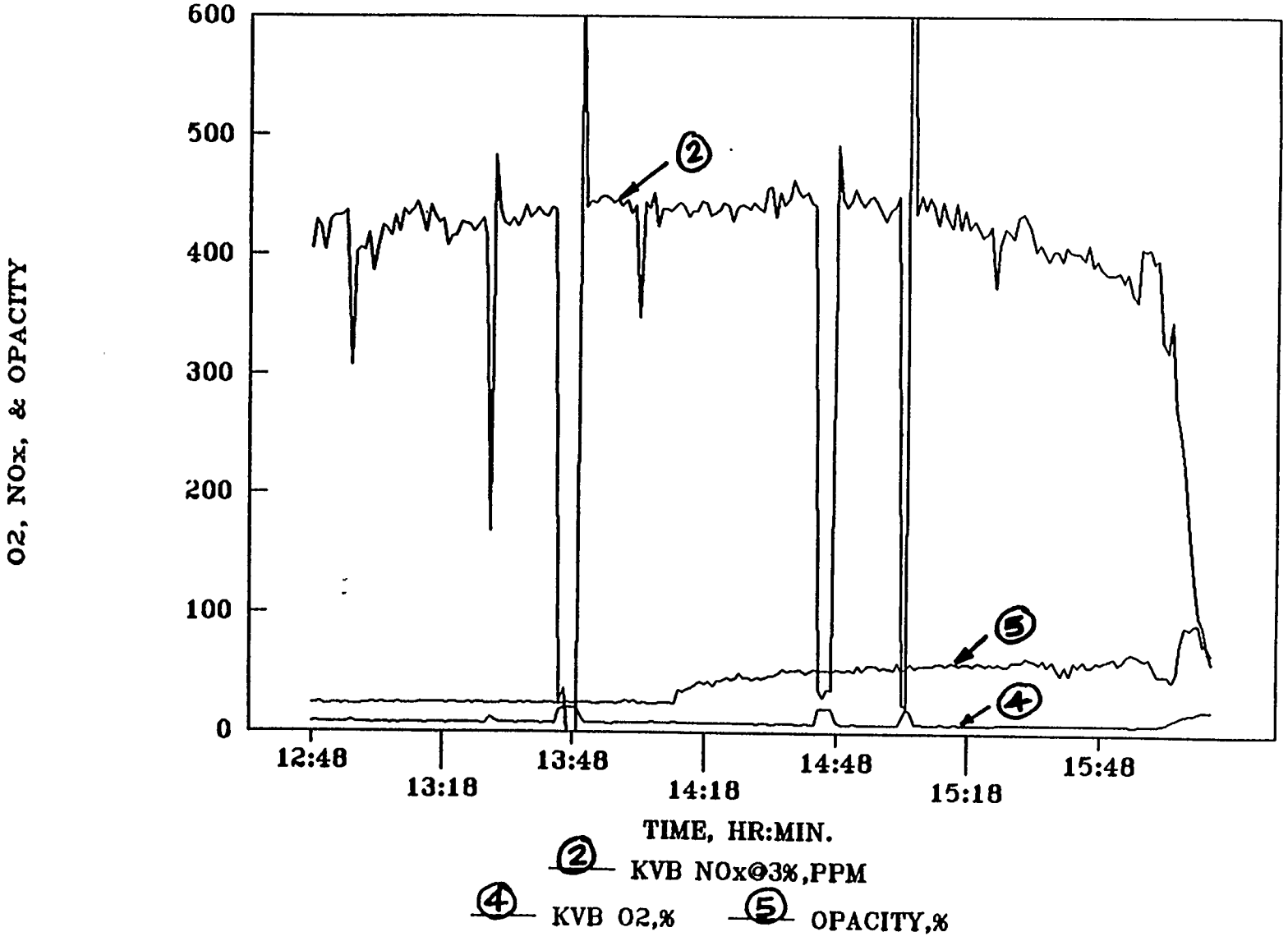
ROEST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 23, 91



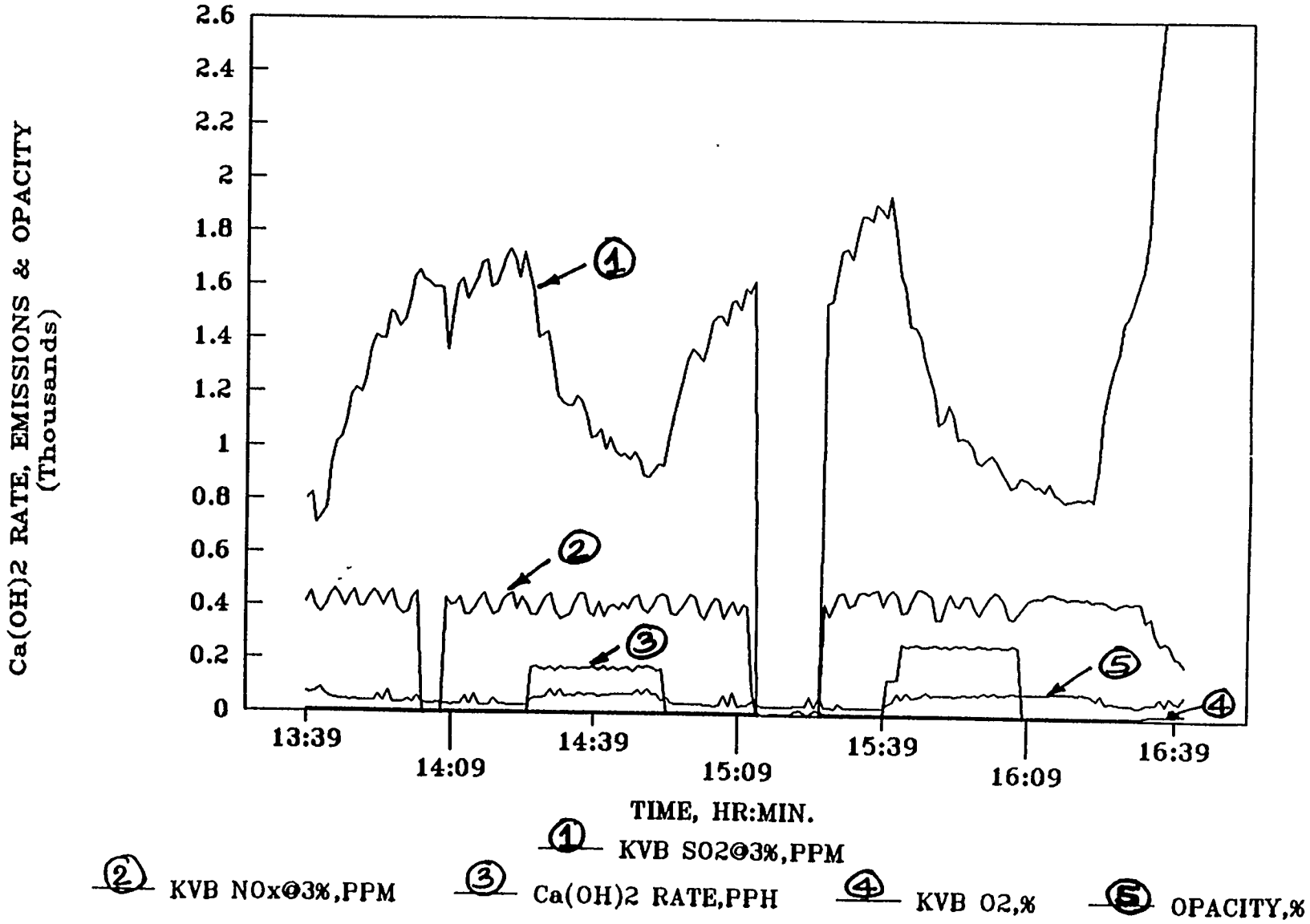
ROEST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 23, 91



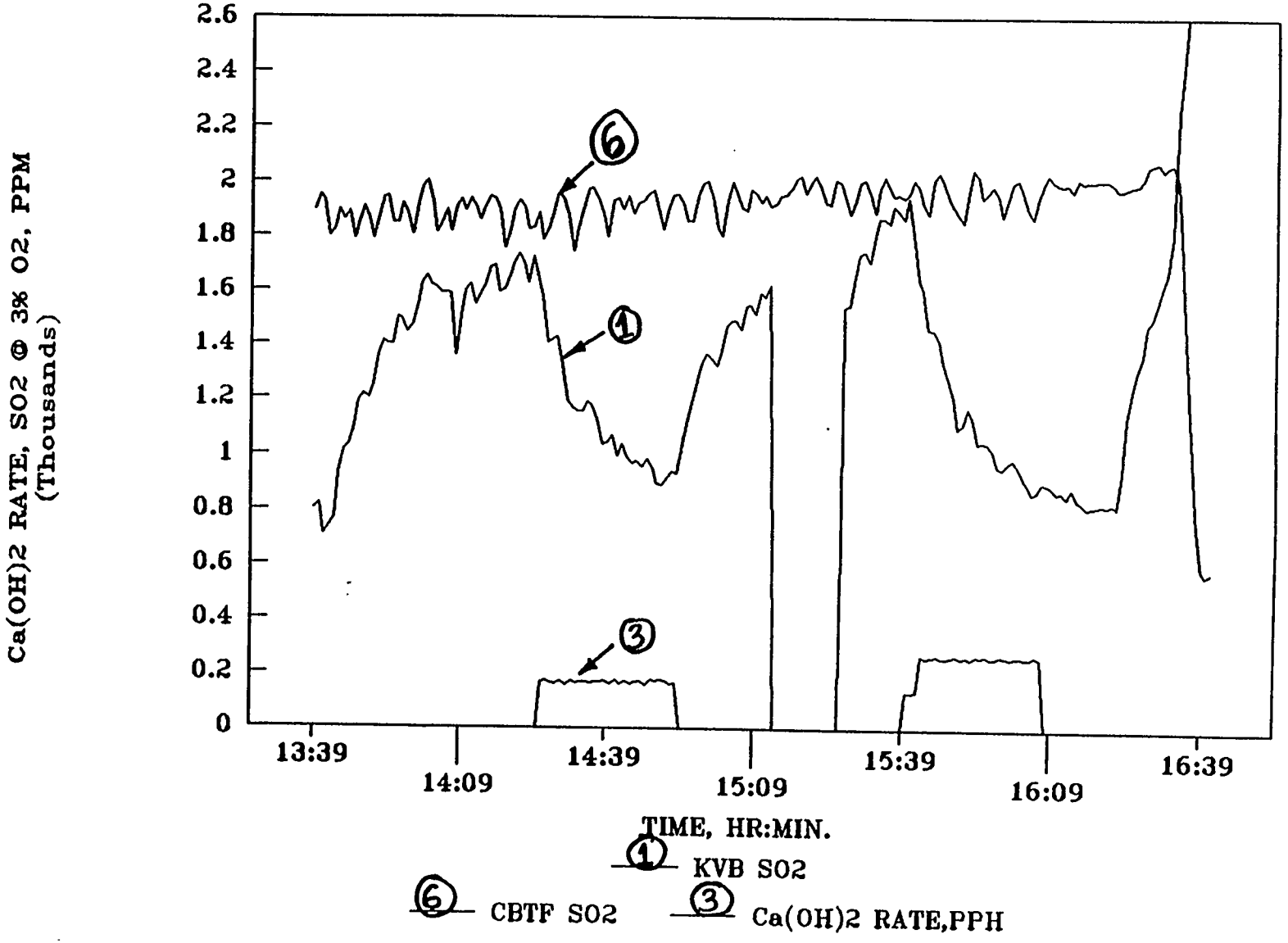
KOLST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 24, 91



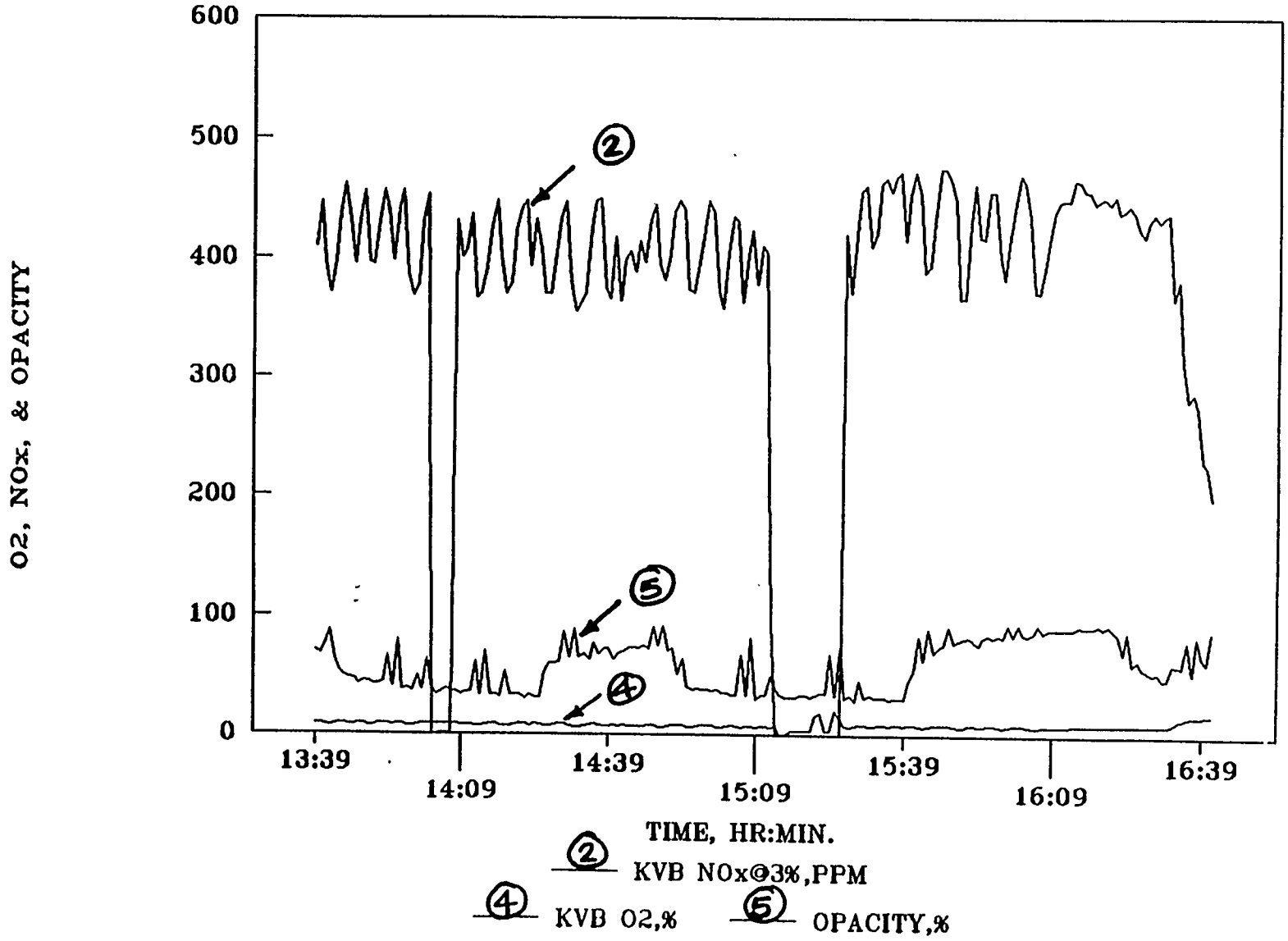
[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 24, 91



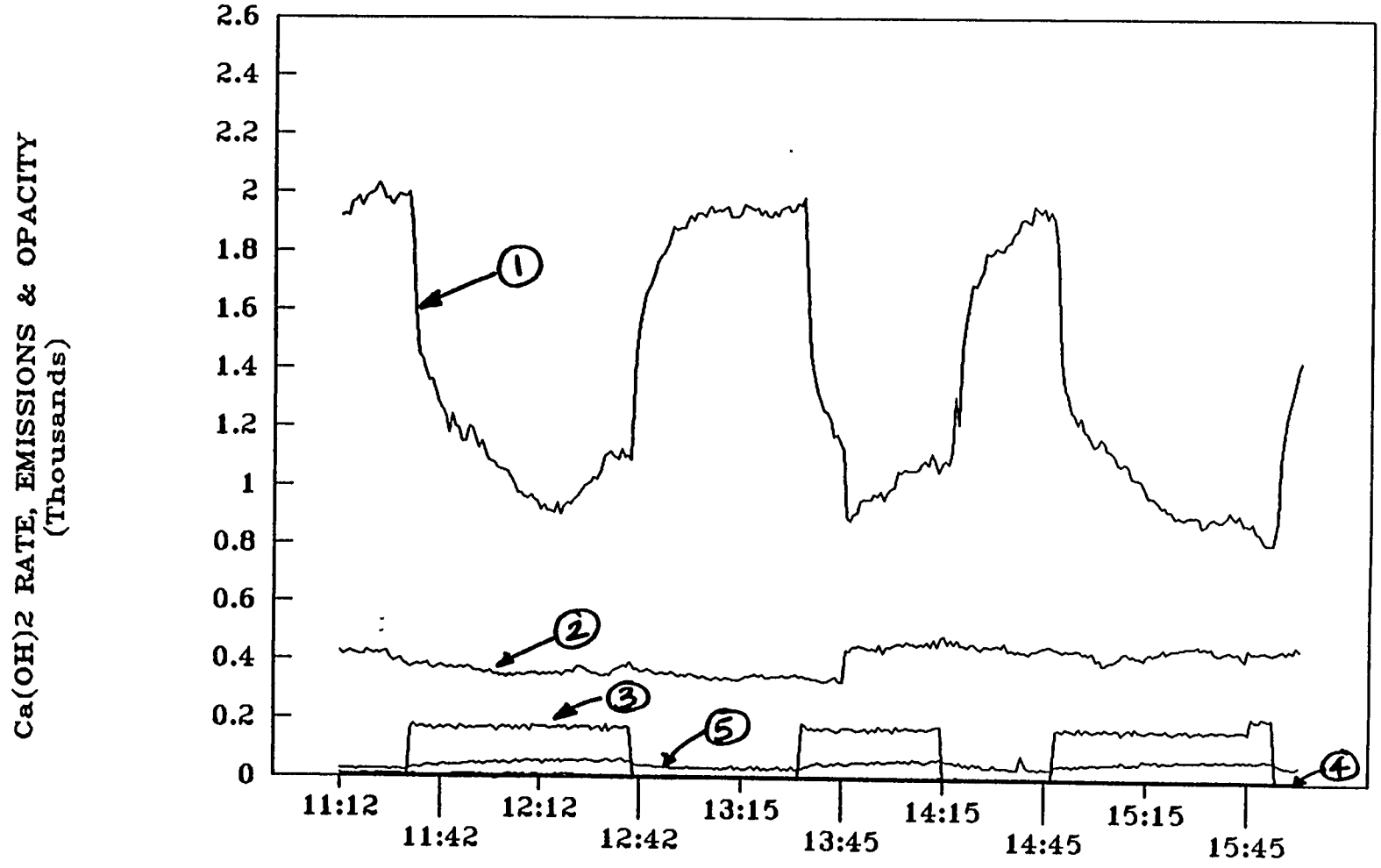
[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 24, 91



ACEC I SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 28, 91

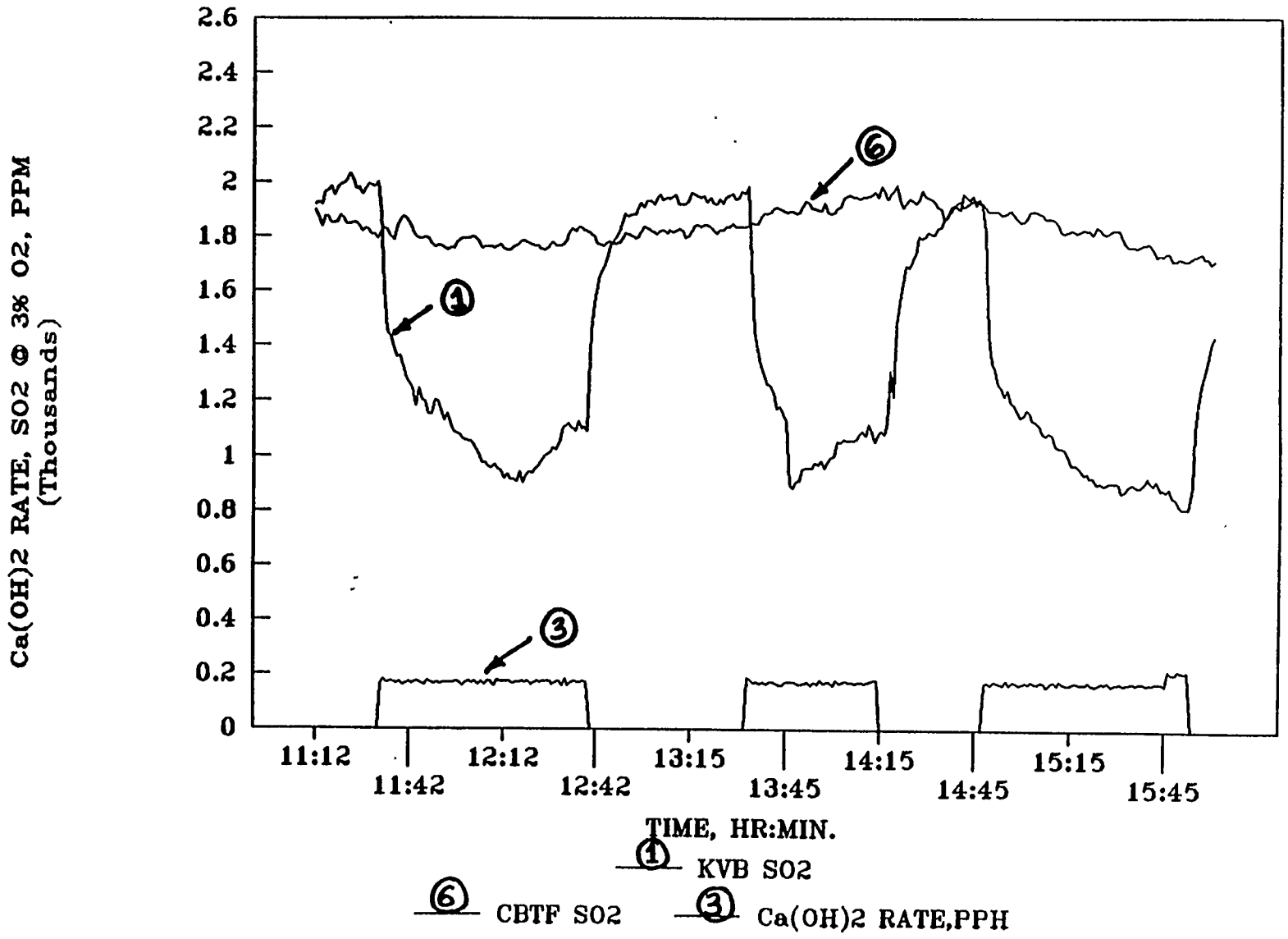


(1) KVB SO2@3%,PPM

(2) KVB NOx@3%,PPM (3) Ca(OH)2 RATE,PPH (4) KVB O2,% (5) OPACITY,%

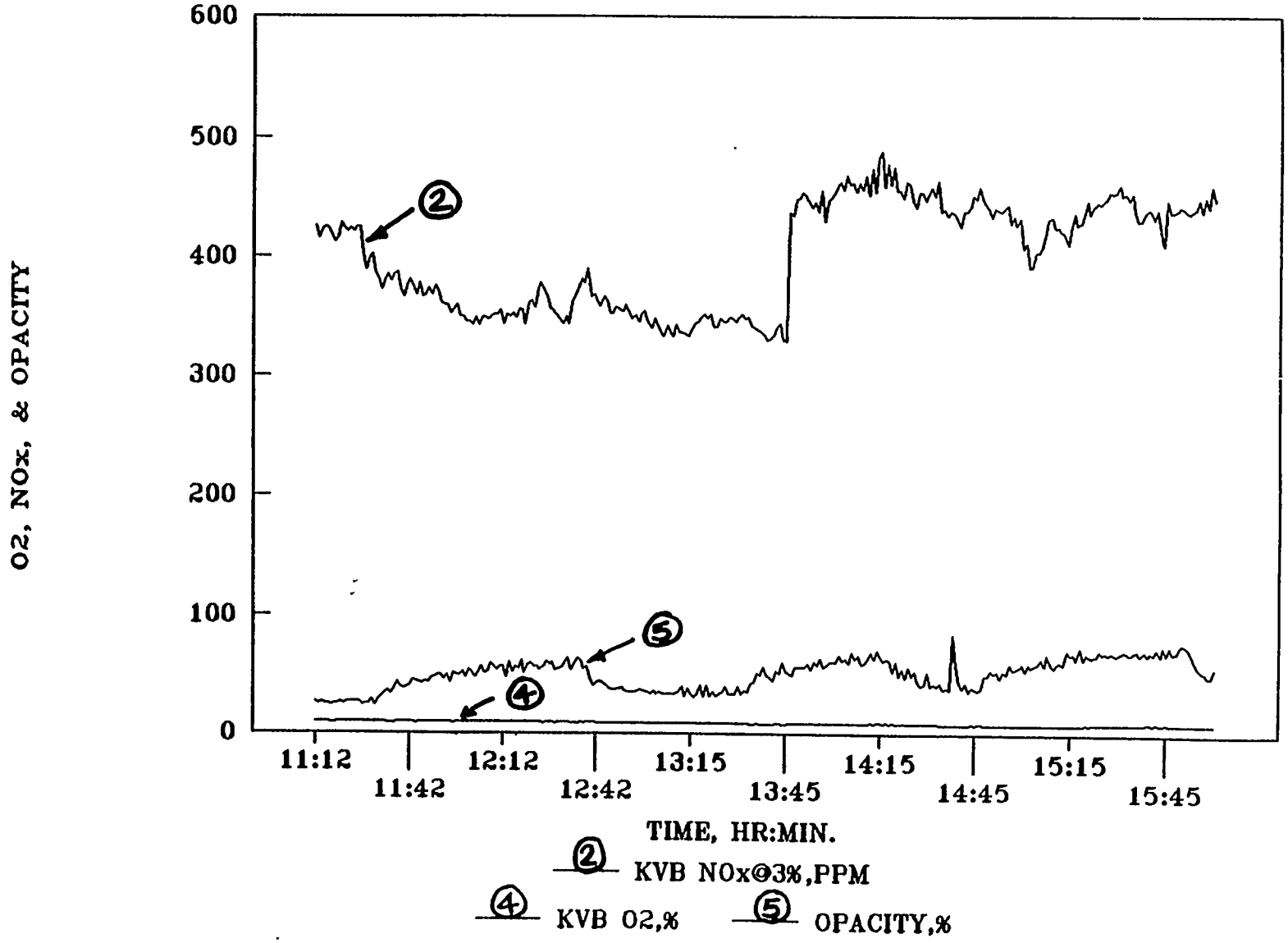
REST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 28, 91



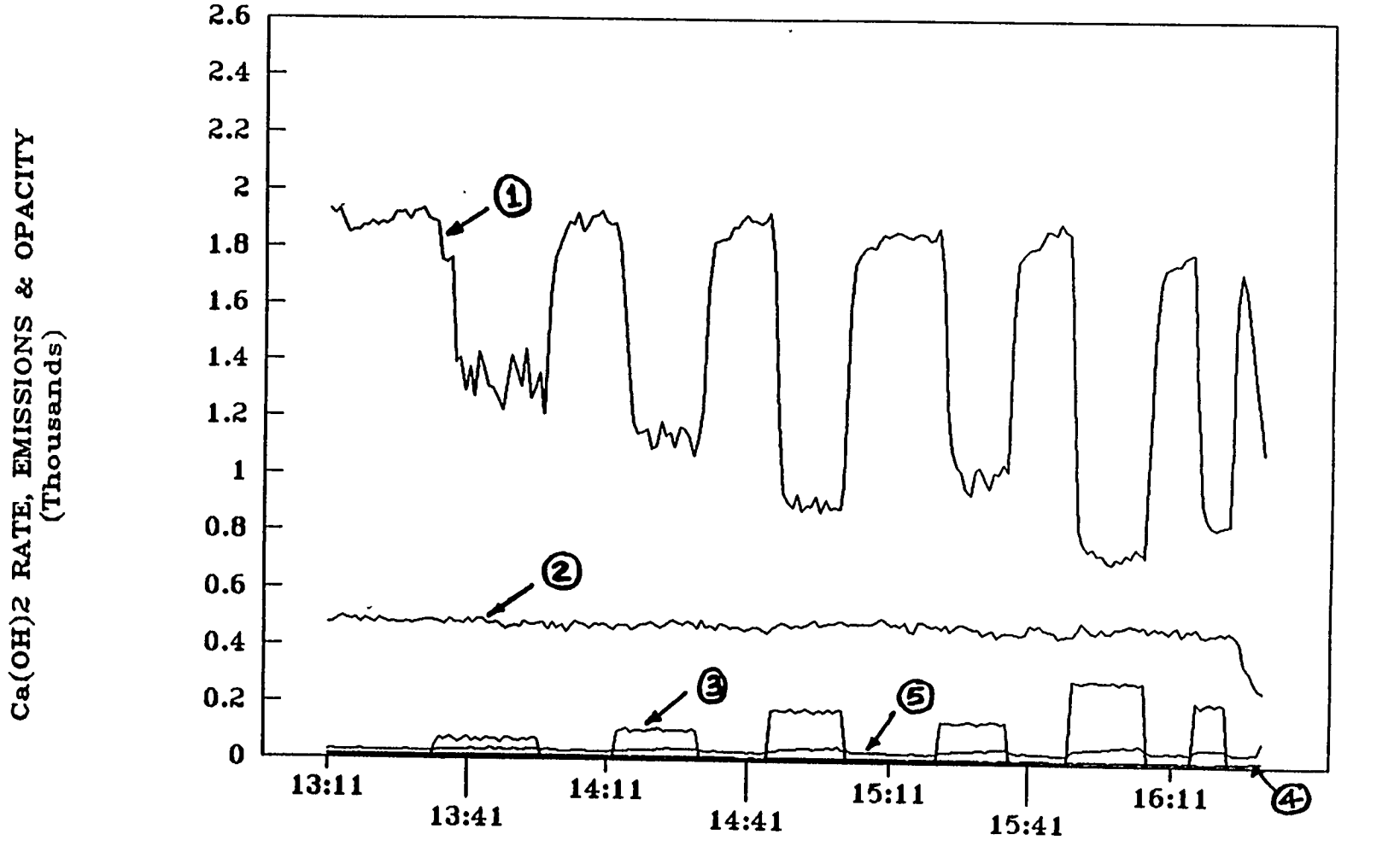
KCLS I SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 28, 91



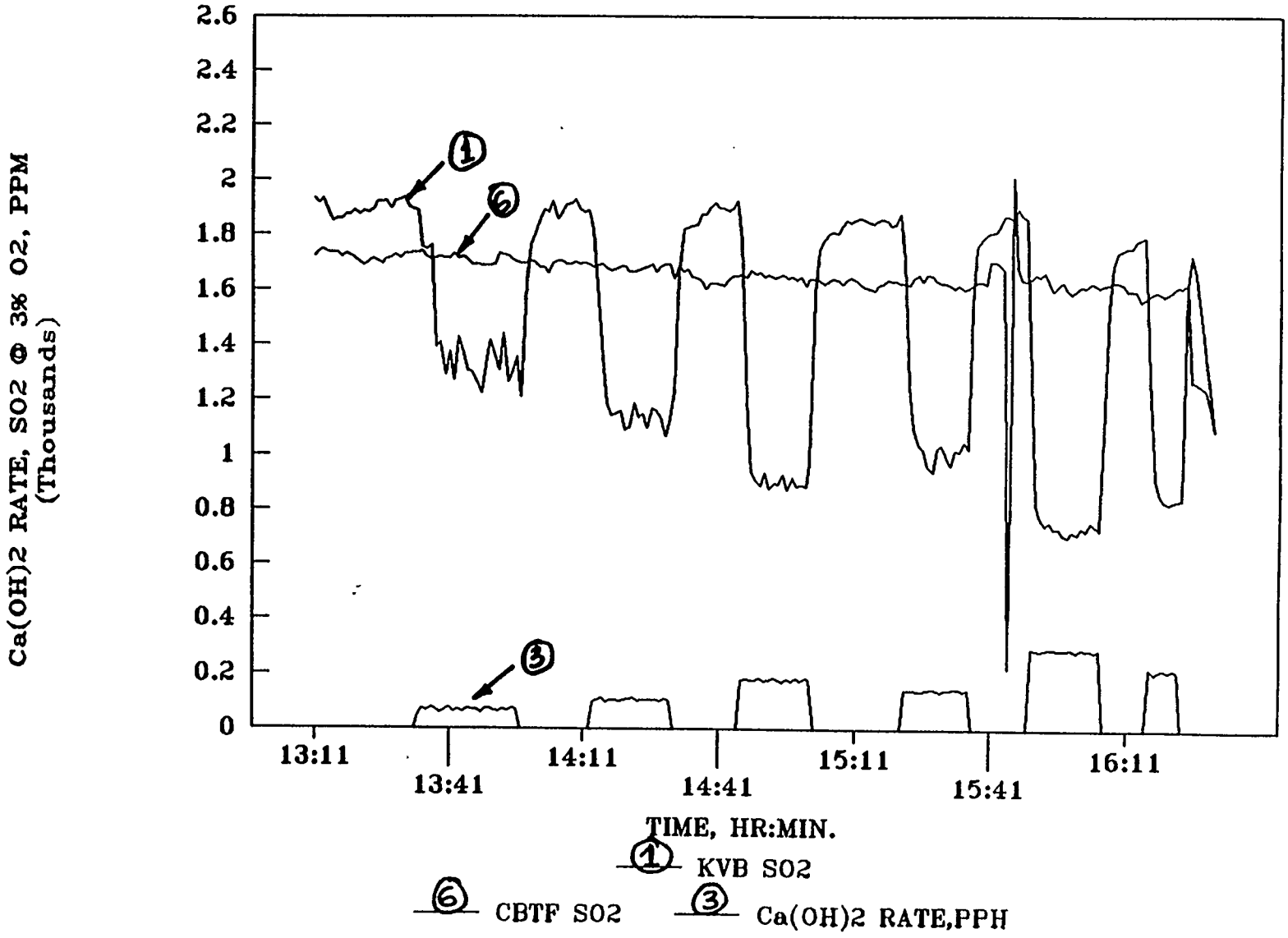
ROEBT SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 30, 91

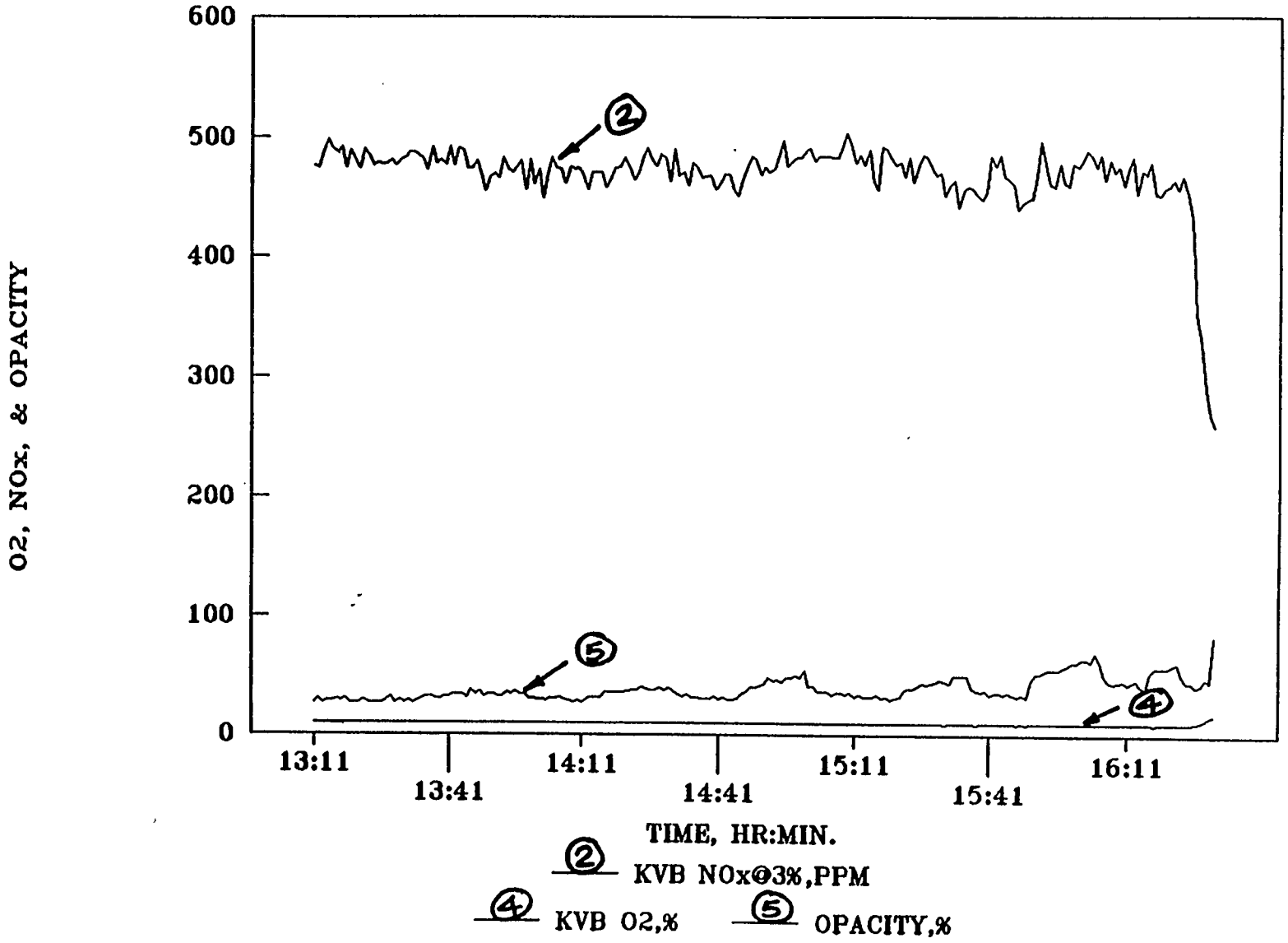


ROLST SORBENT INJECTION TESTS

DATA TAKEN ON OCT. 30, 91

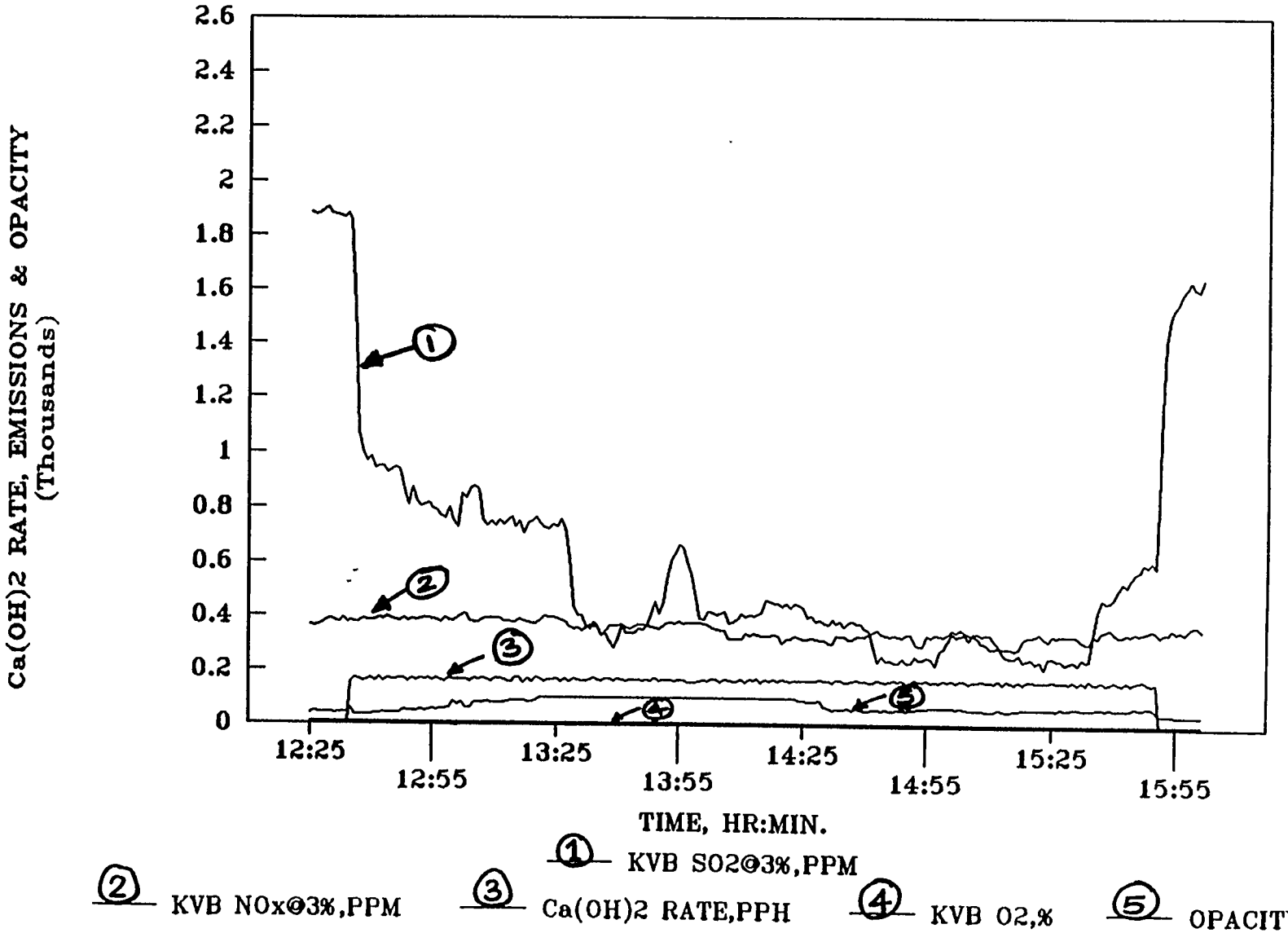


DATA TAKEN ON OCT. 30, 91



RCLST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 12, 91



1 KVB SO2@3%,PPM

2 KVB NOx@3%,PPM

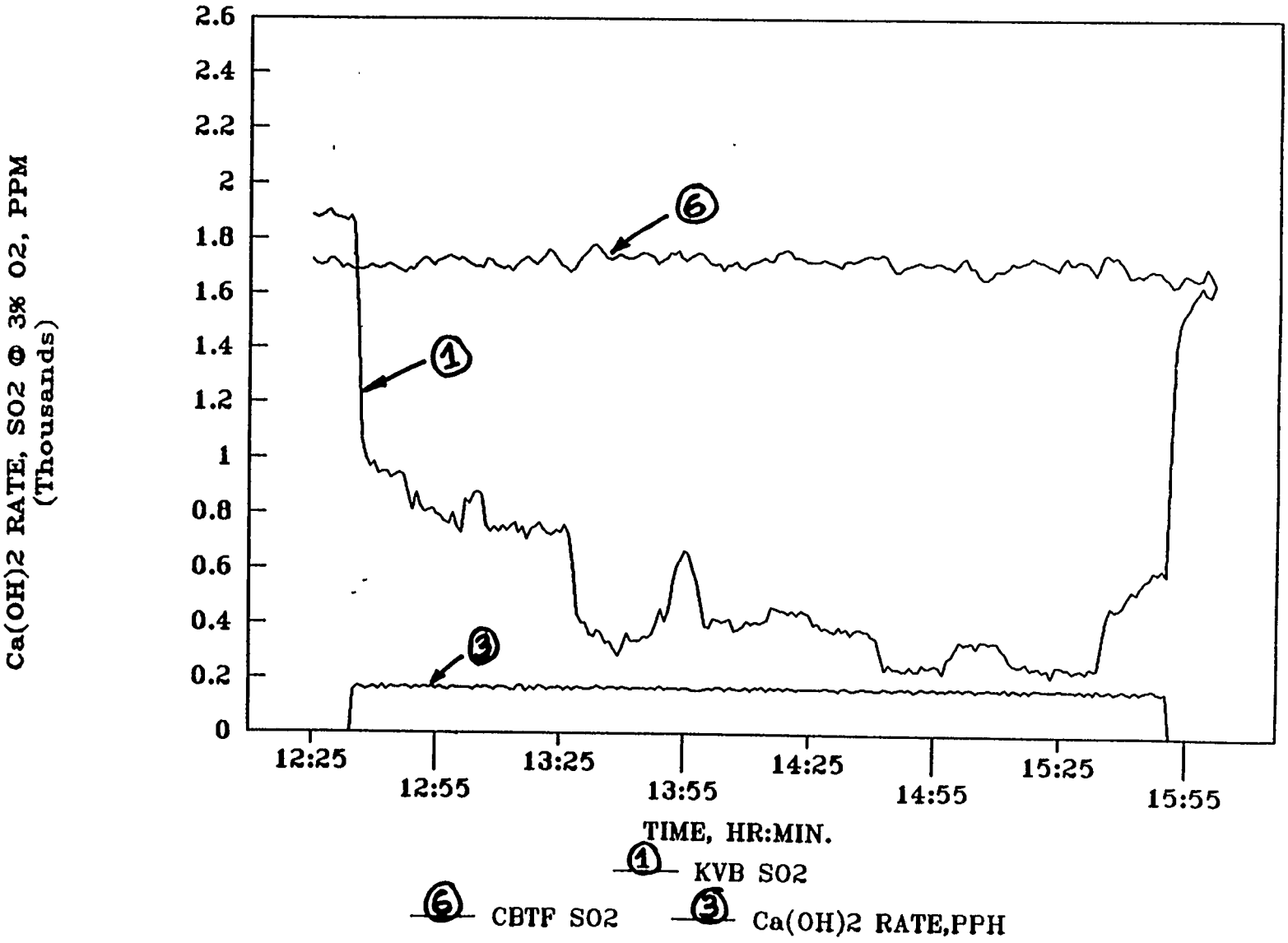
3 Ca(OH)2 RATE,PPH

4 KVB O2,%

5 OPACITY,%

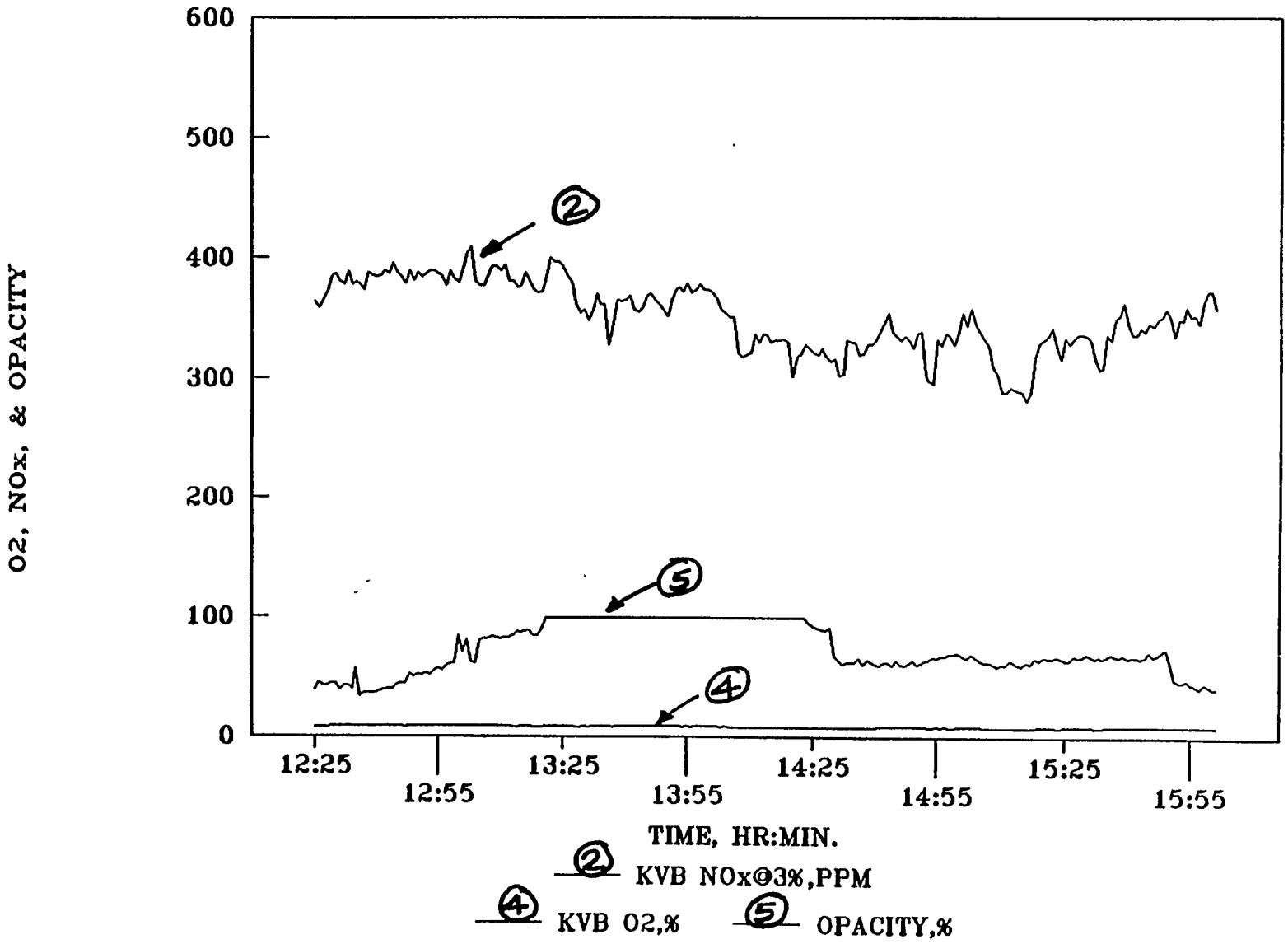
ROEST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 12, 91

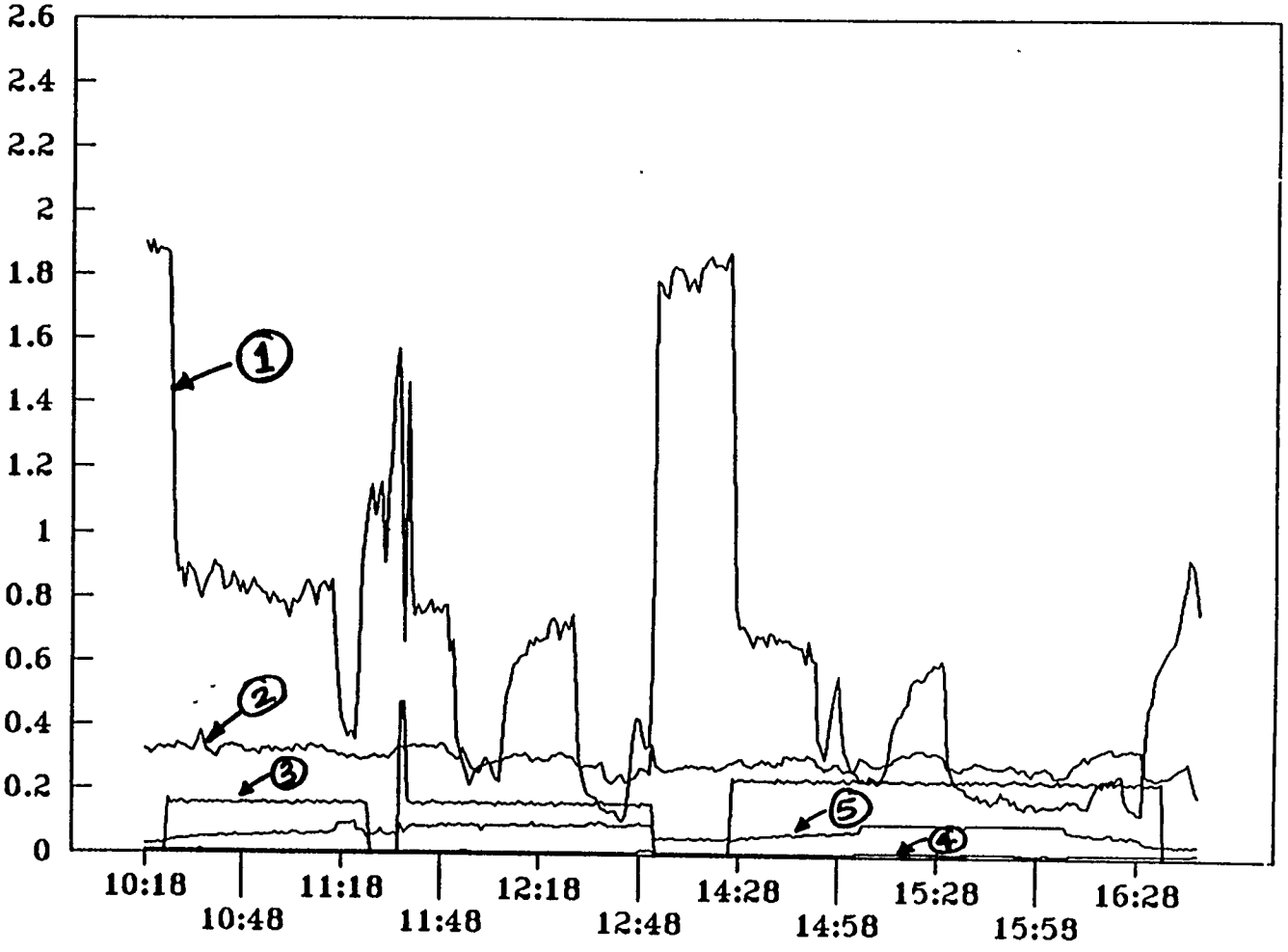


RCEST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 12, 91



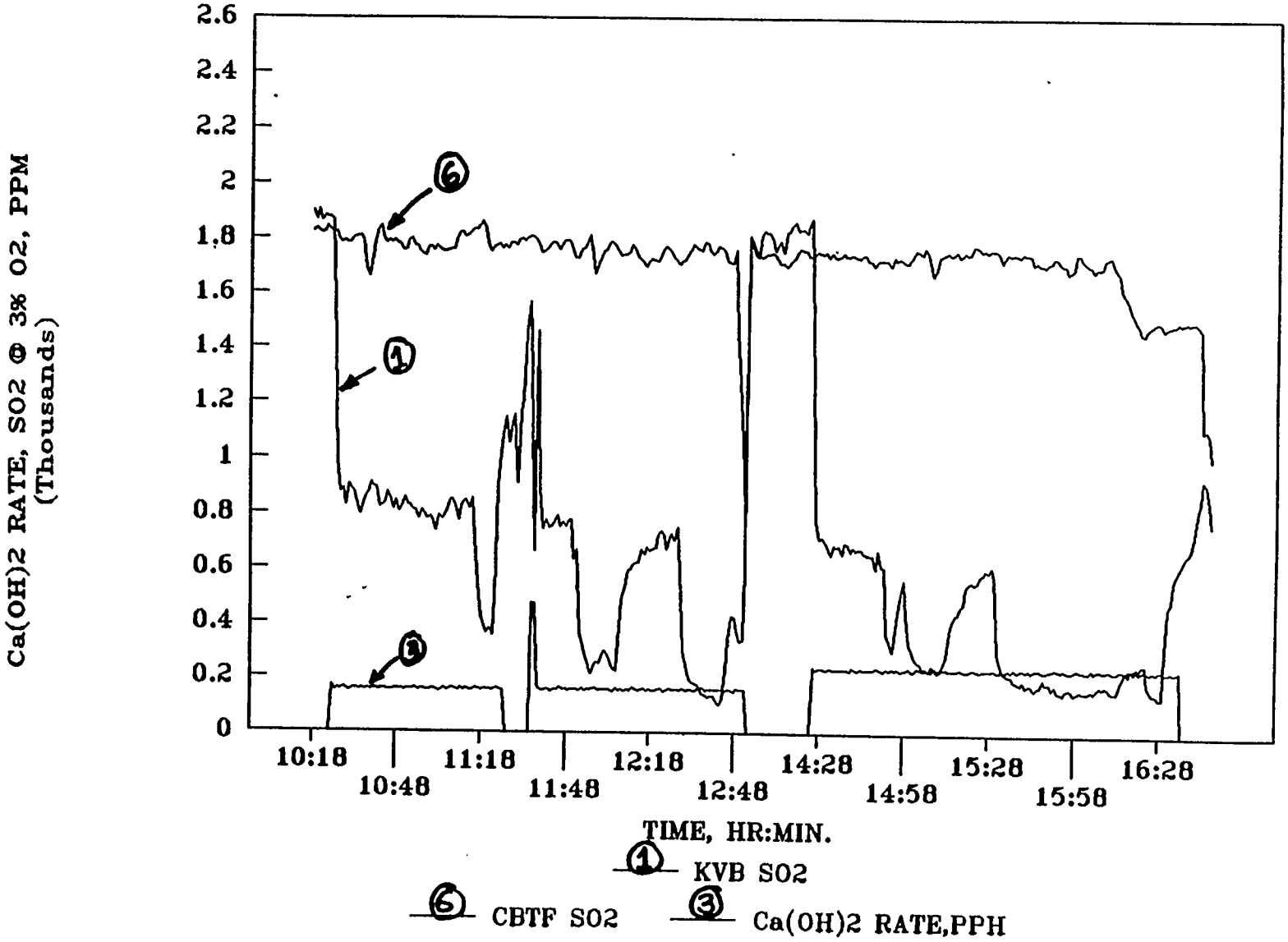
DATA TAKEN ON NOV. 13, 91



1 KVB SO2@3%,PPM

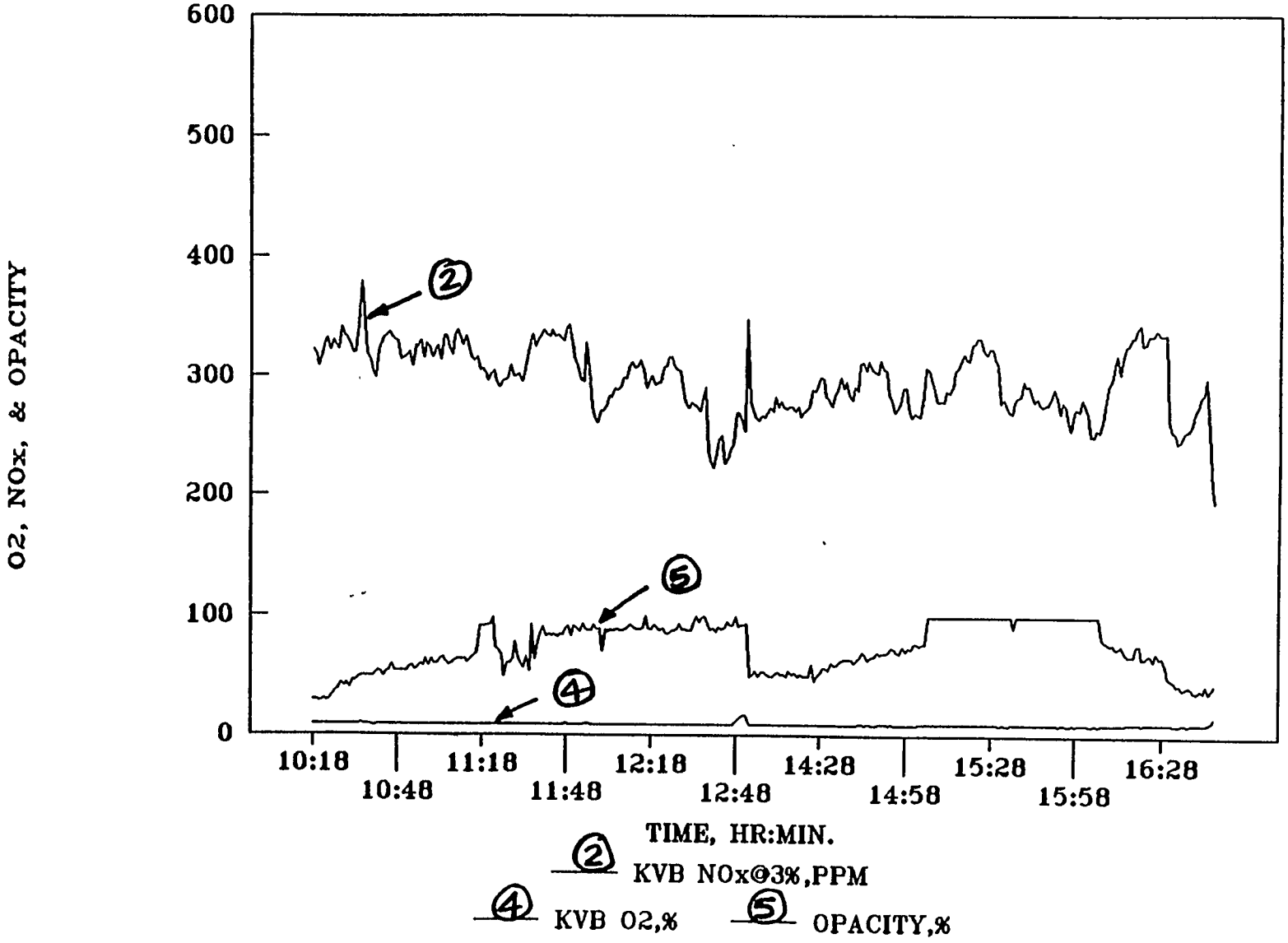
2 KVB NOx@3%,PPM 3 Ca(OH)2 RATE,PPH 4 KVB O2,% 5 OPACITY,%

DATA TAKEN ON NOV. 13, 91



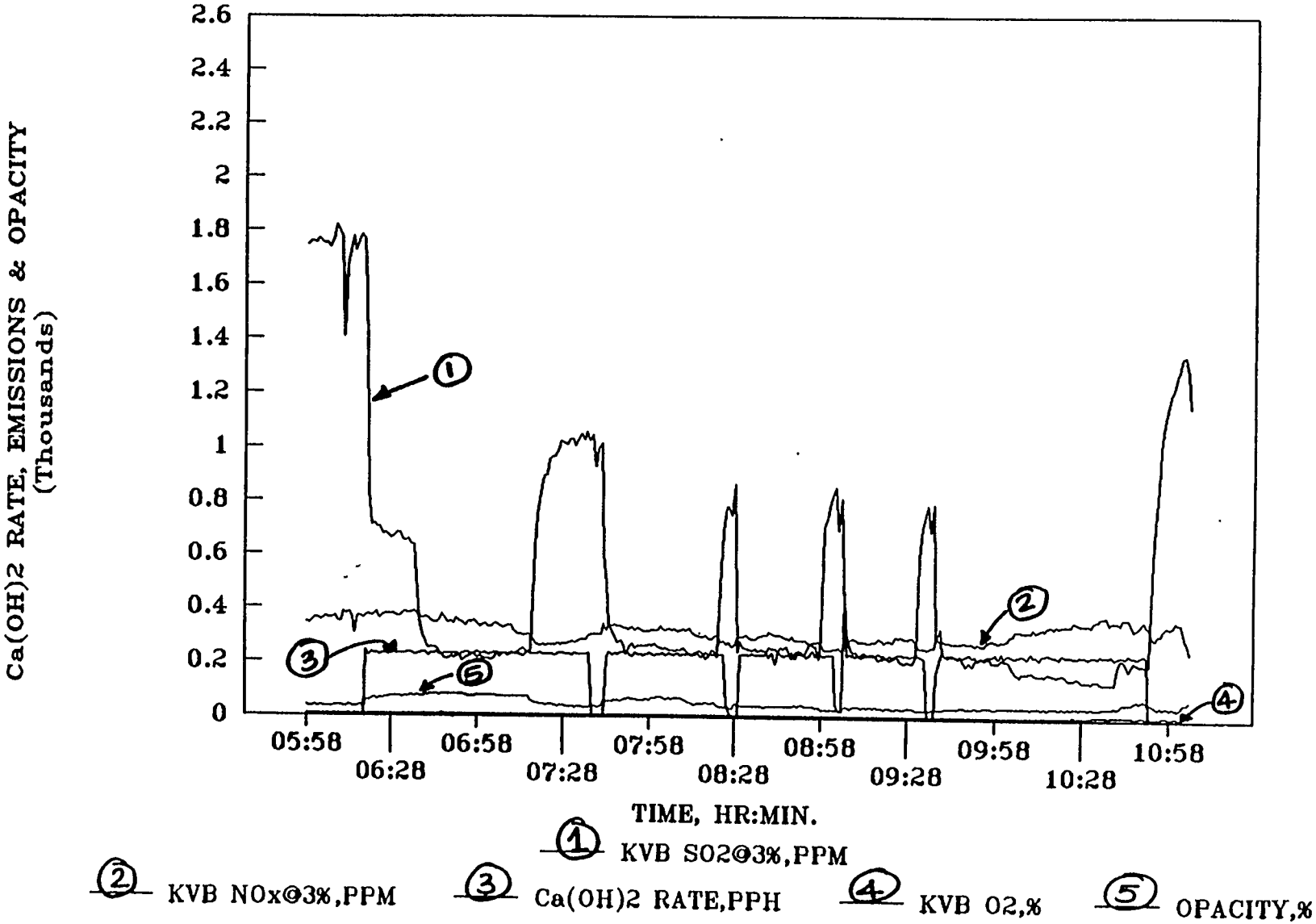
[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 13, 91



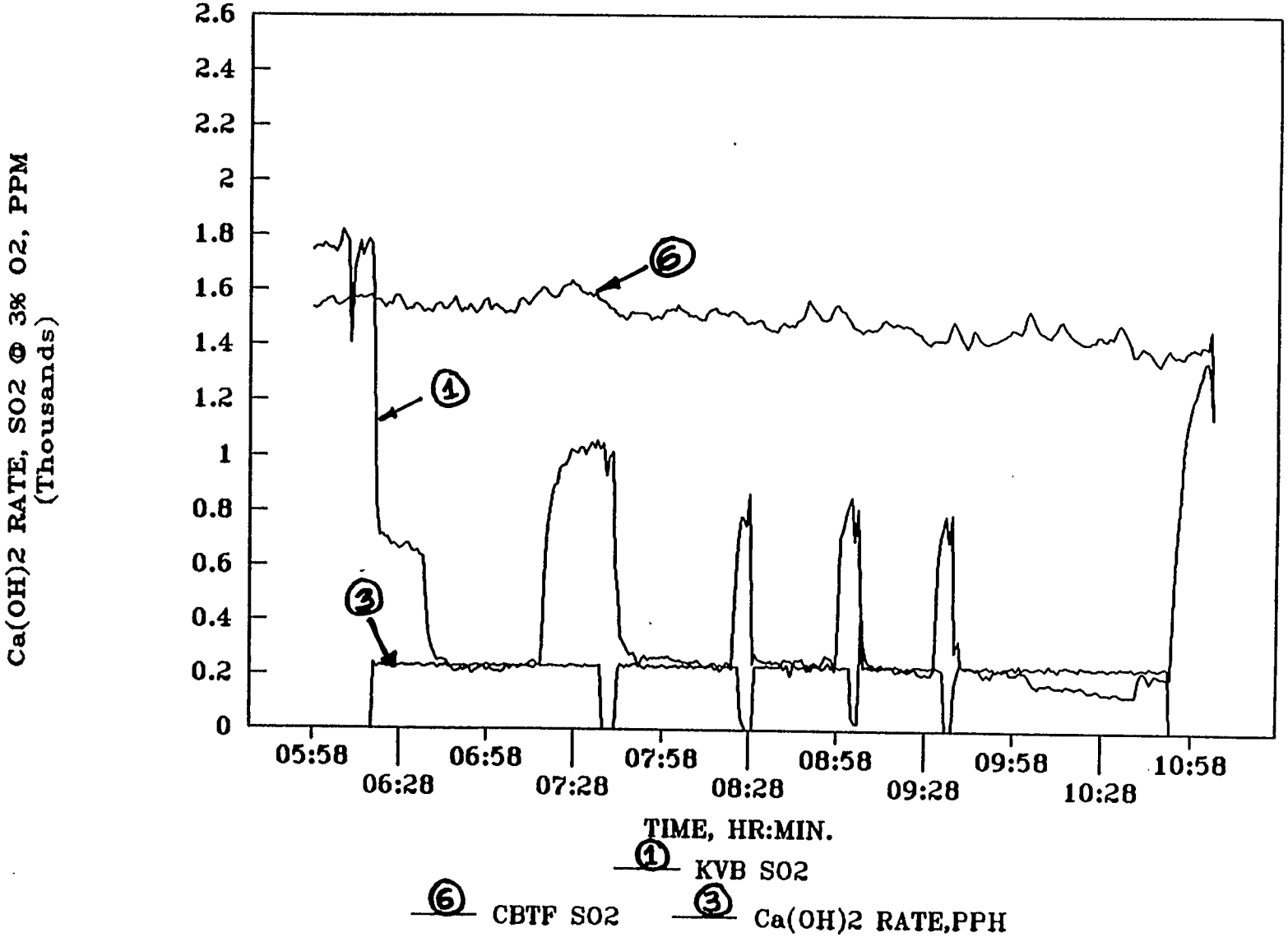
ROEST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 14, 91



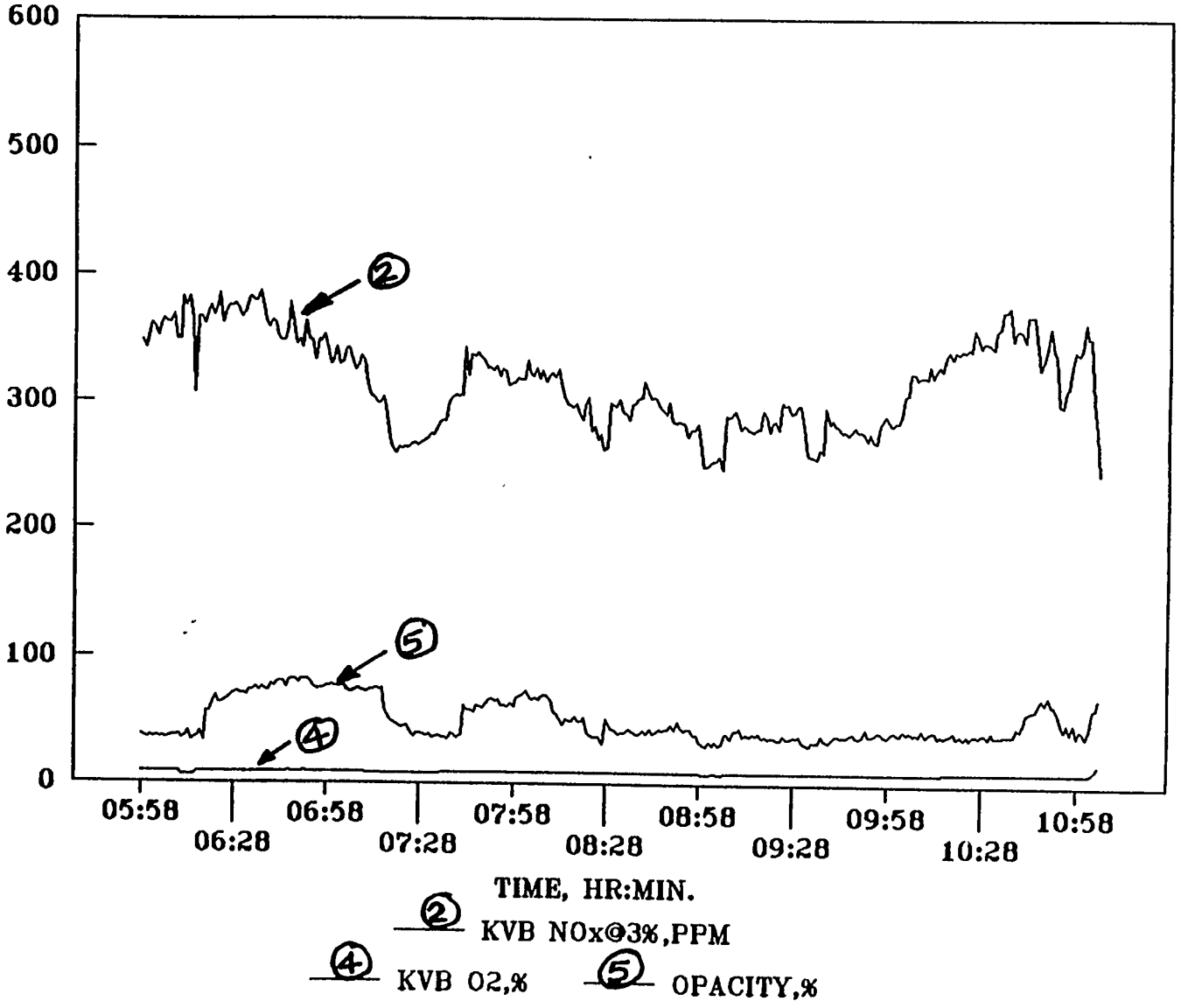
DRY SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 14, 91

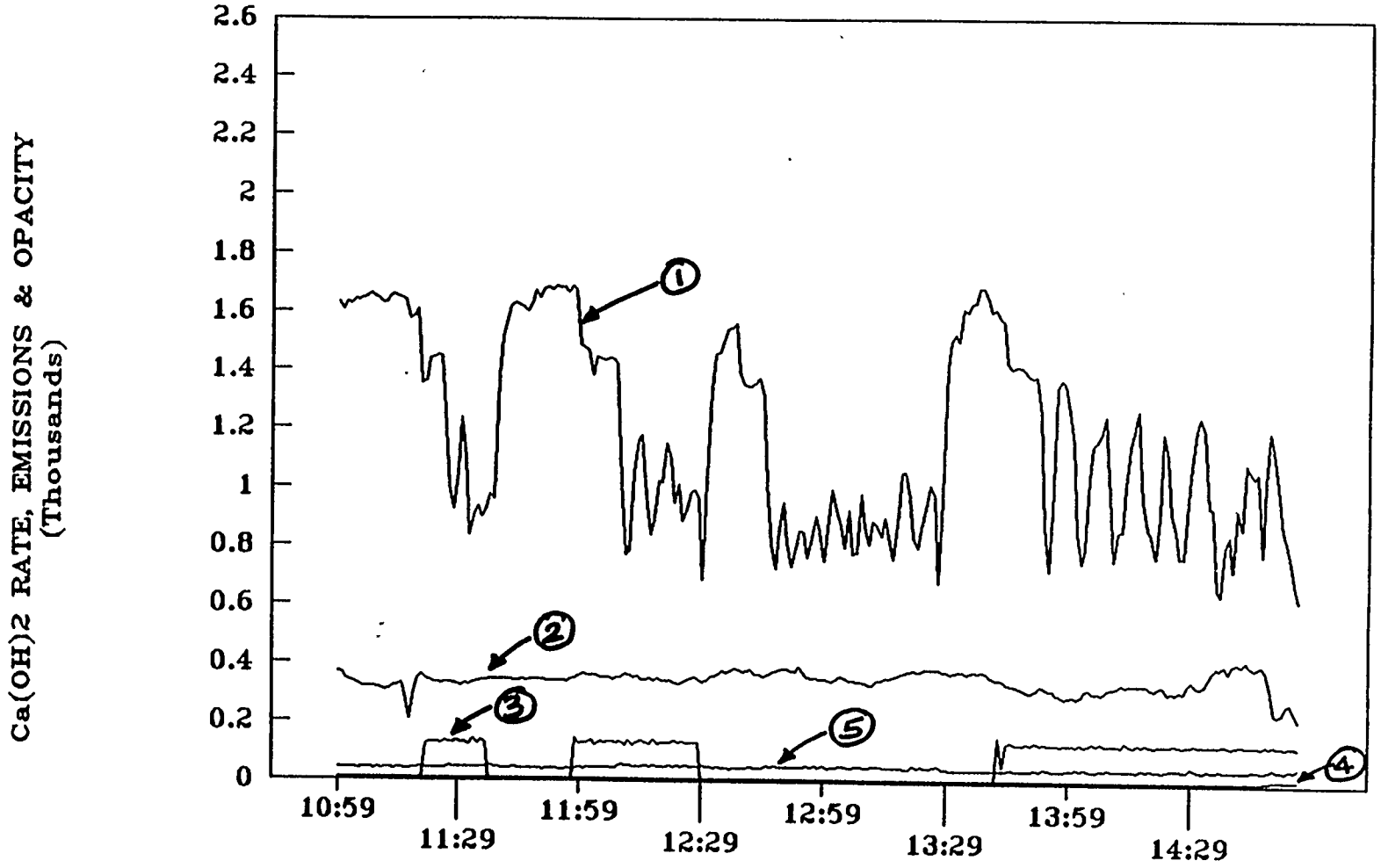


[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 14, 91



DATA TAKEN ON NOV. 19, 91

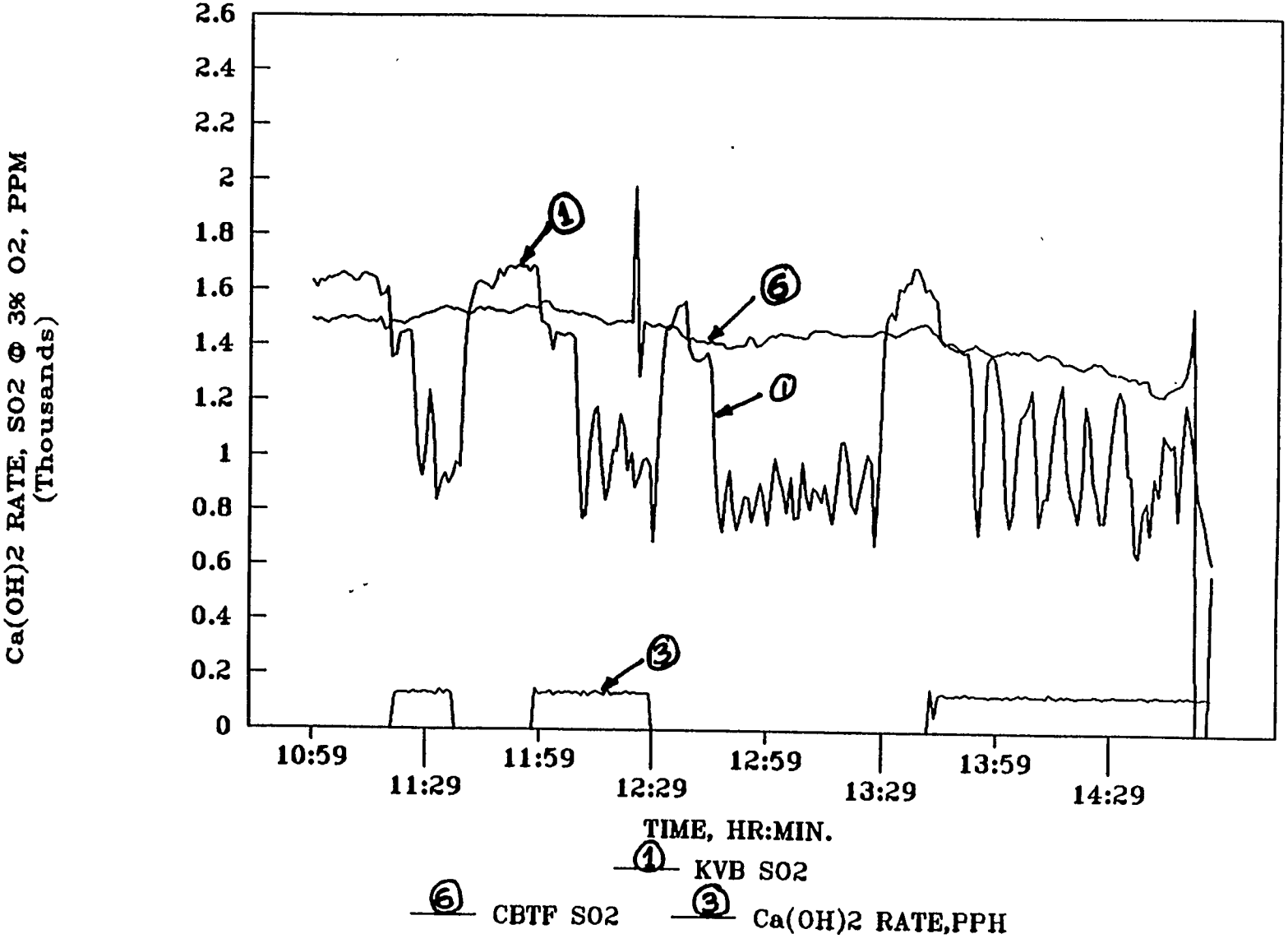


(1) KVB SO2@3%,PPM

(2) KVB NOx@3%,PPM (3) Ca(OH)2 RATE,PPH (4) KVB O2,% (5) OPACITY,%

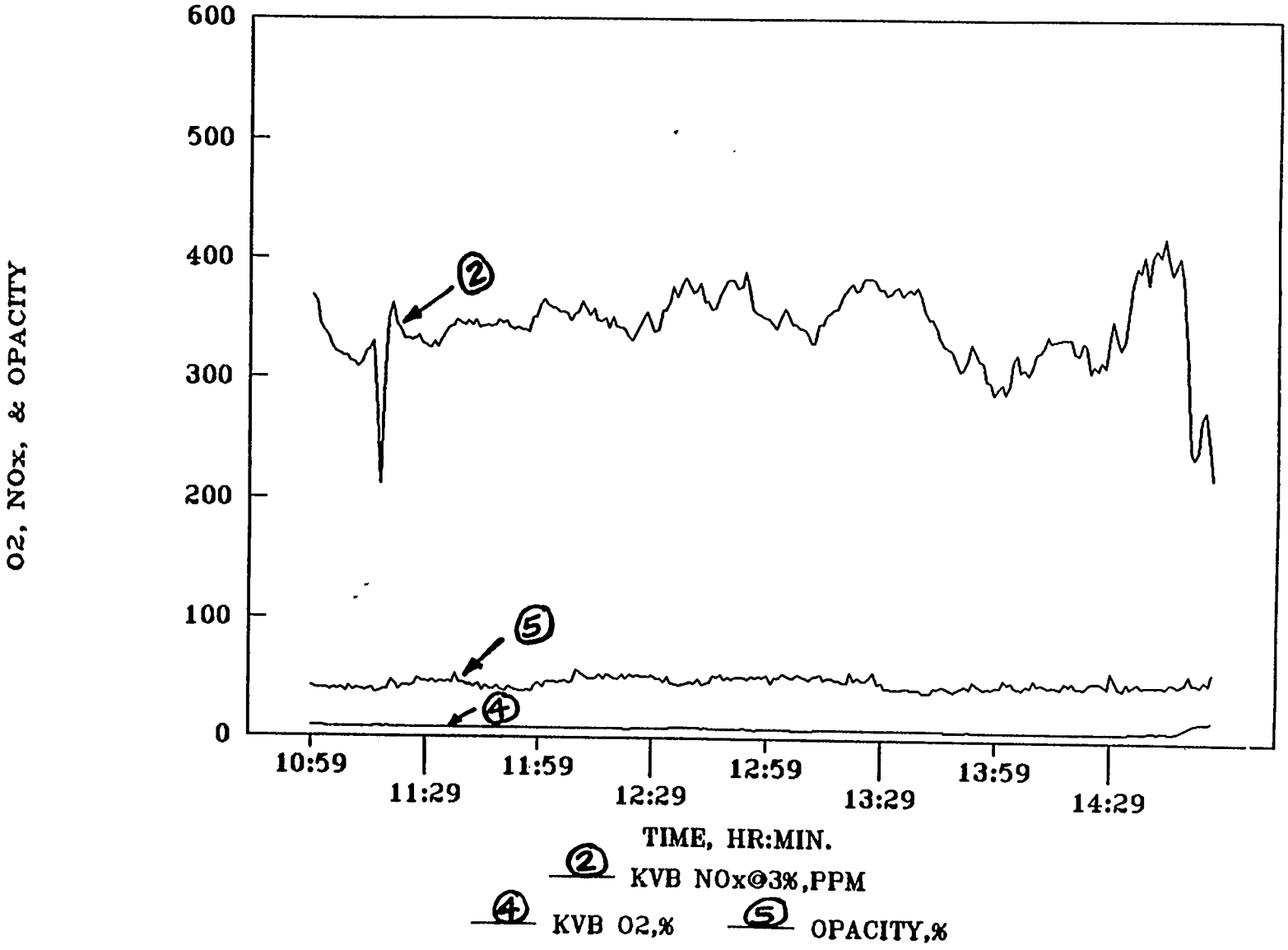
DRY SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 19, 91



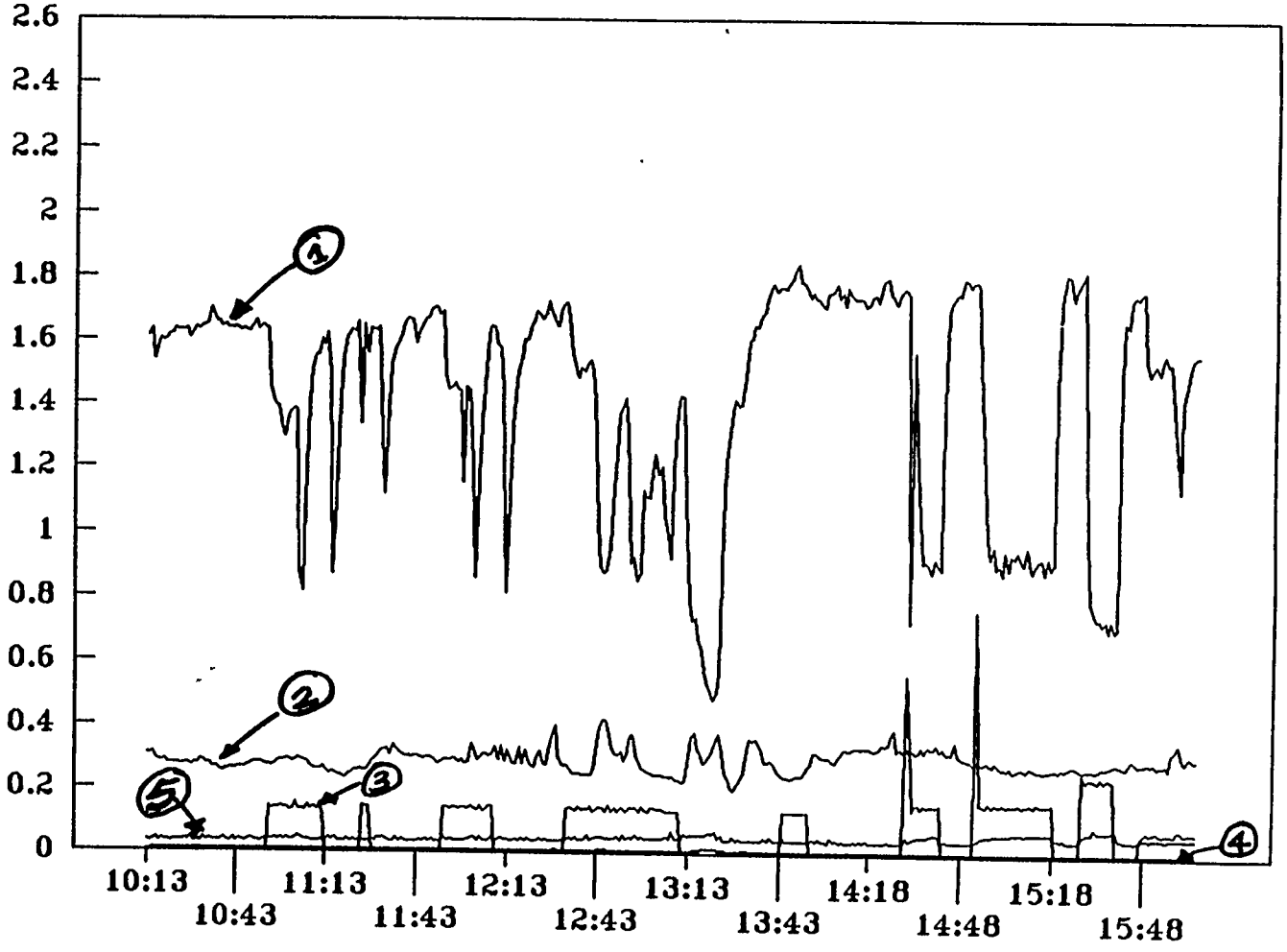
ROLST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 19, 91



ROEST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 21, 91

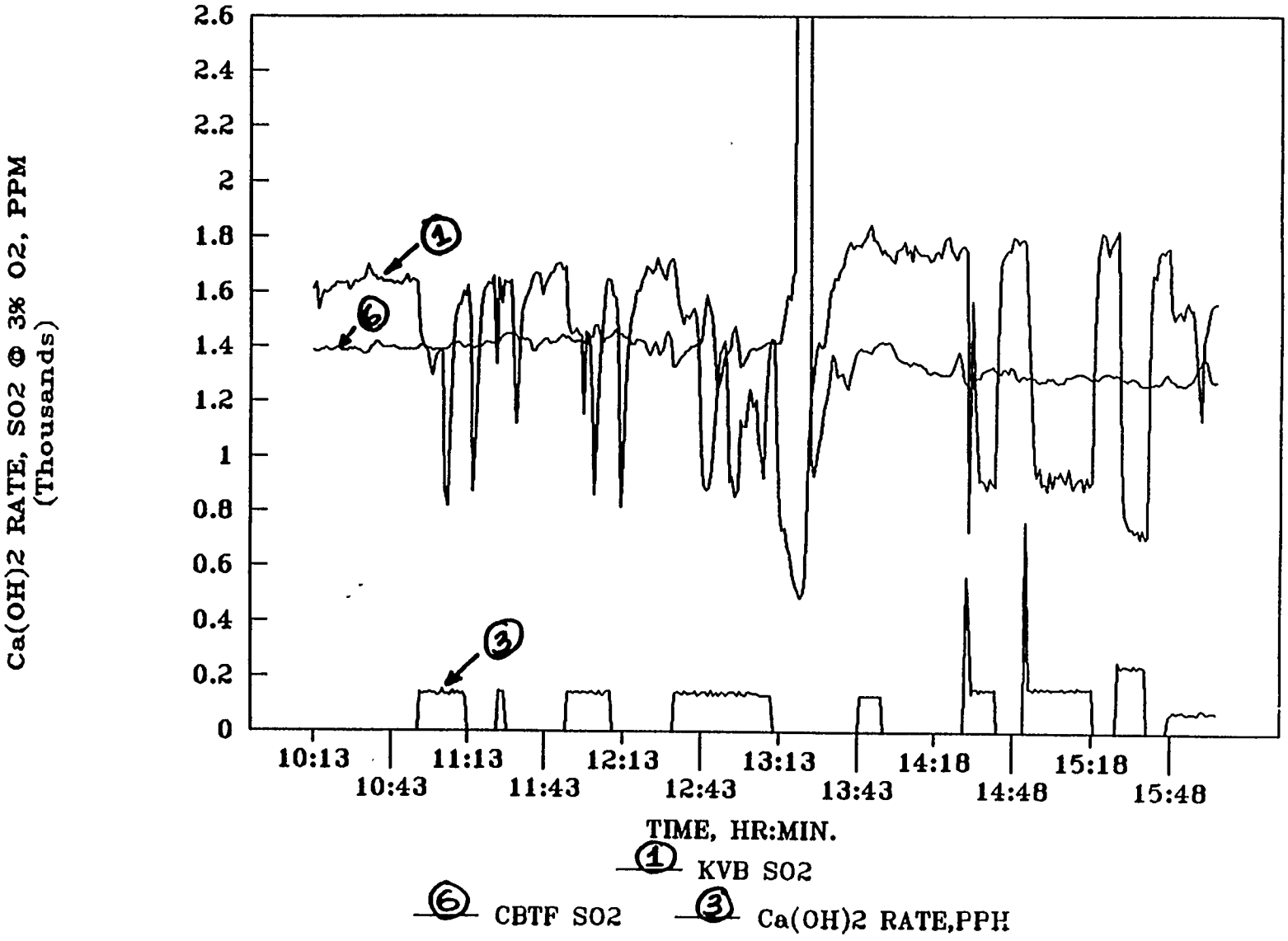


(1) KVB SO2@3%,PPM

(2) KVB NOx@3%,PPM (3) Ca(OH)2 RATE,PPH (4) KVB O2,% (5) OPACITY,%

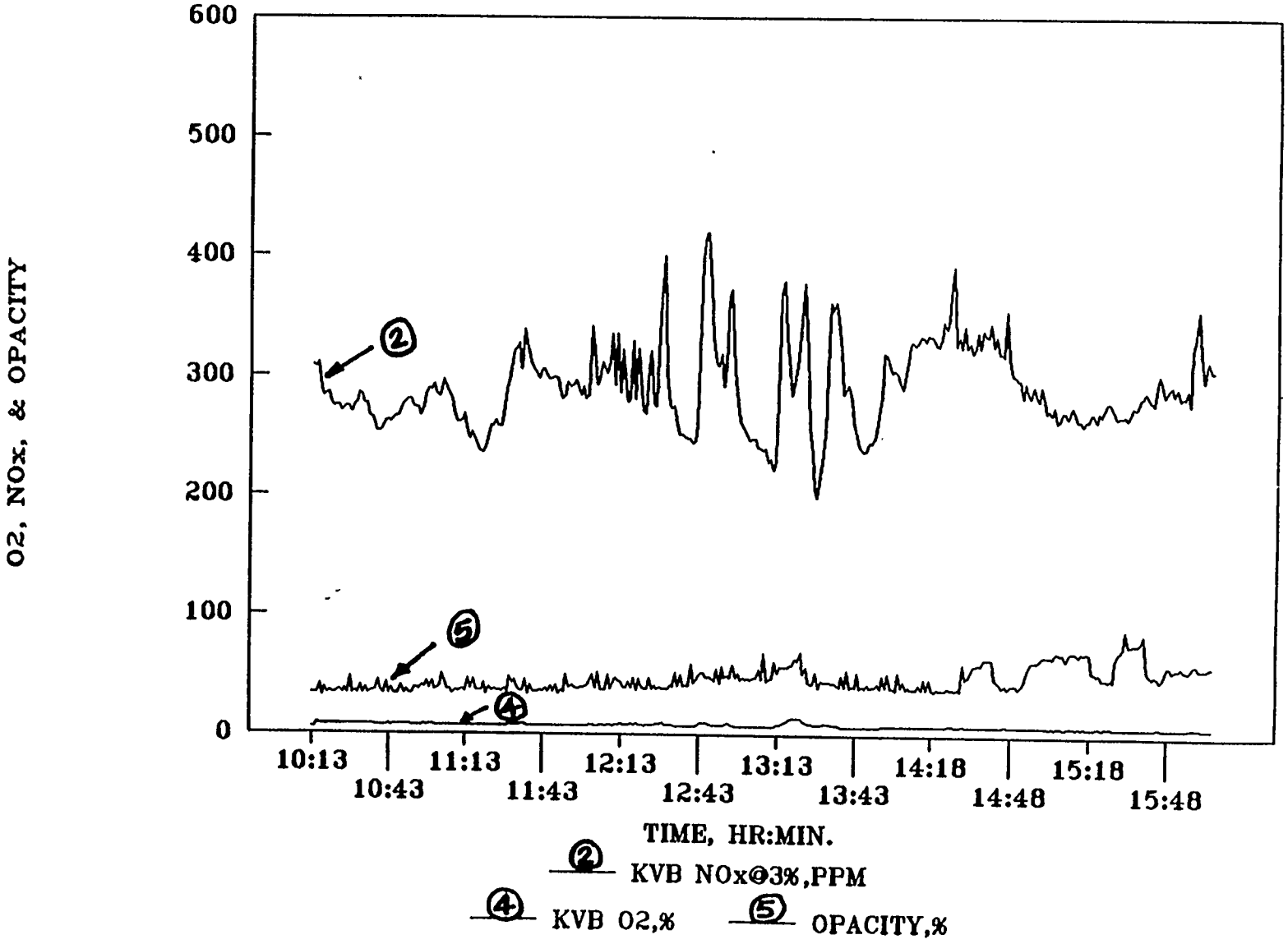
[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 21, 91



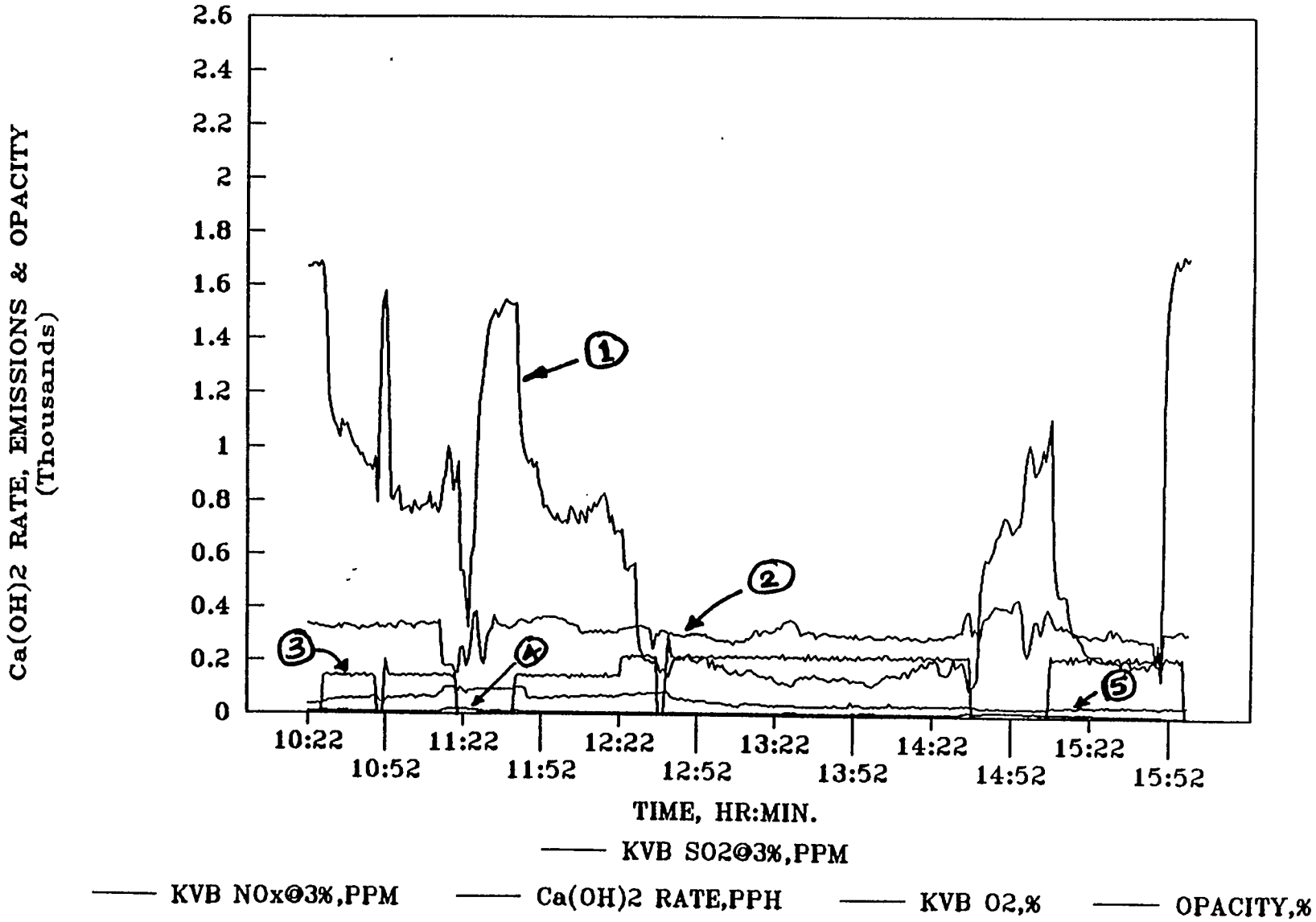
[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 21, 91

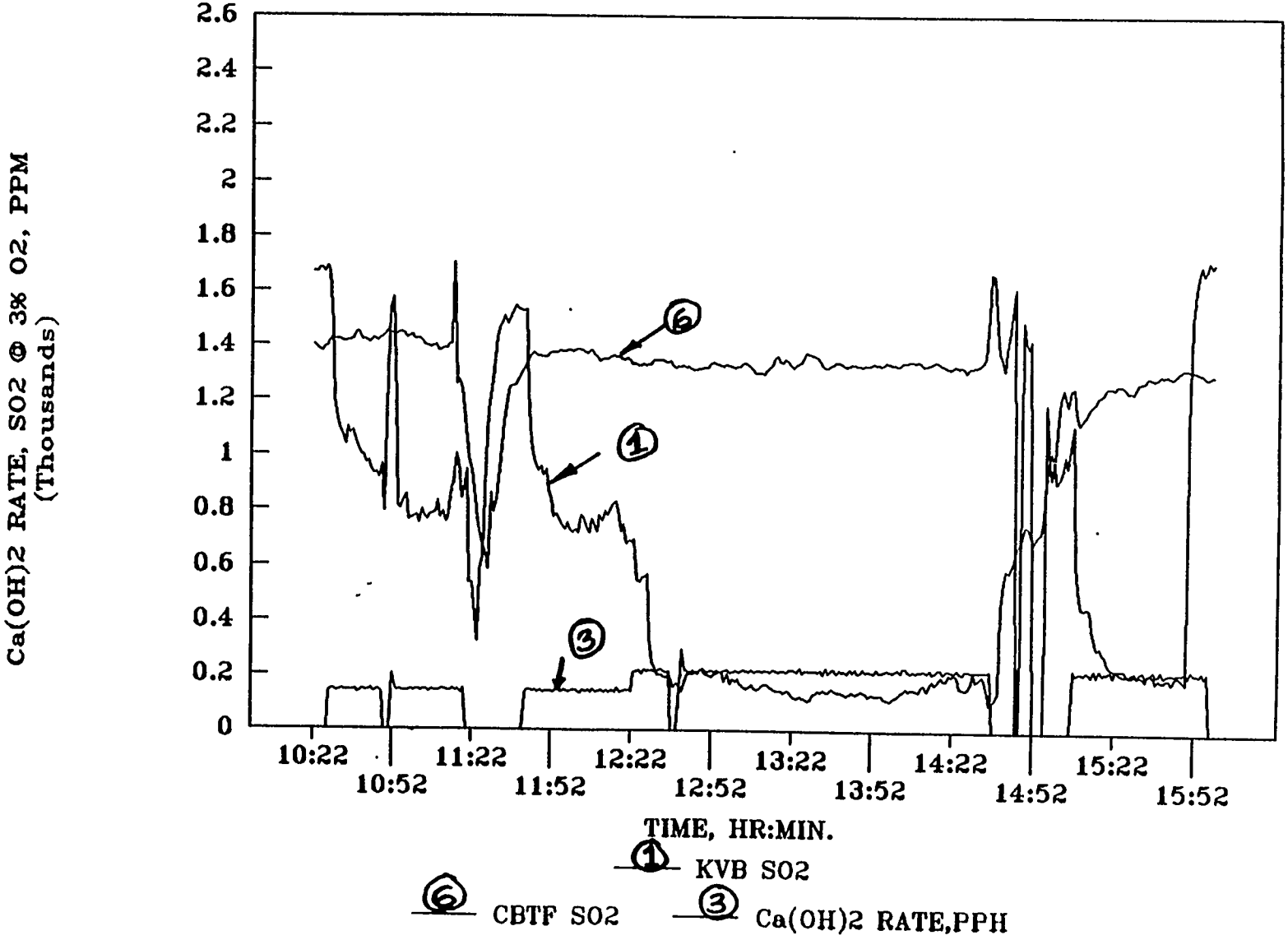


[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 25, 91

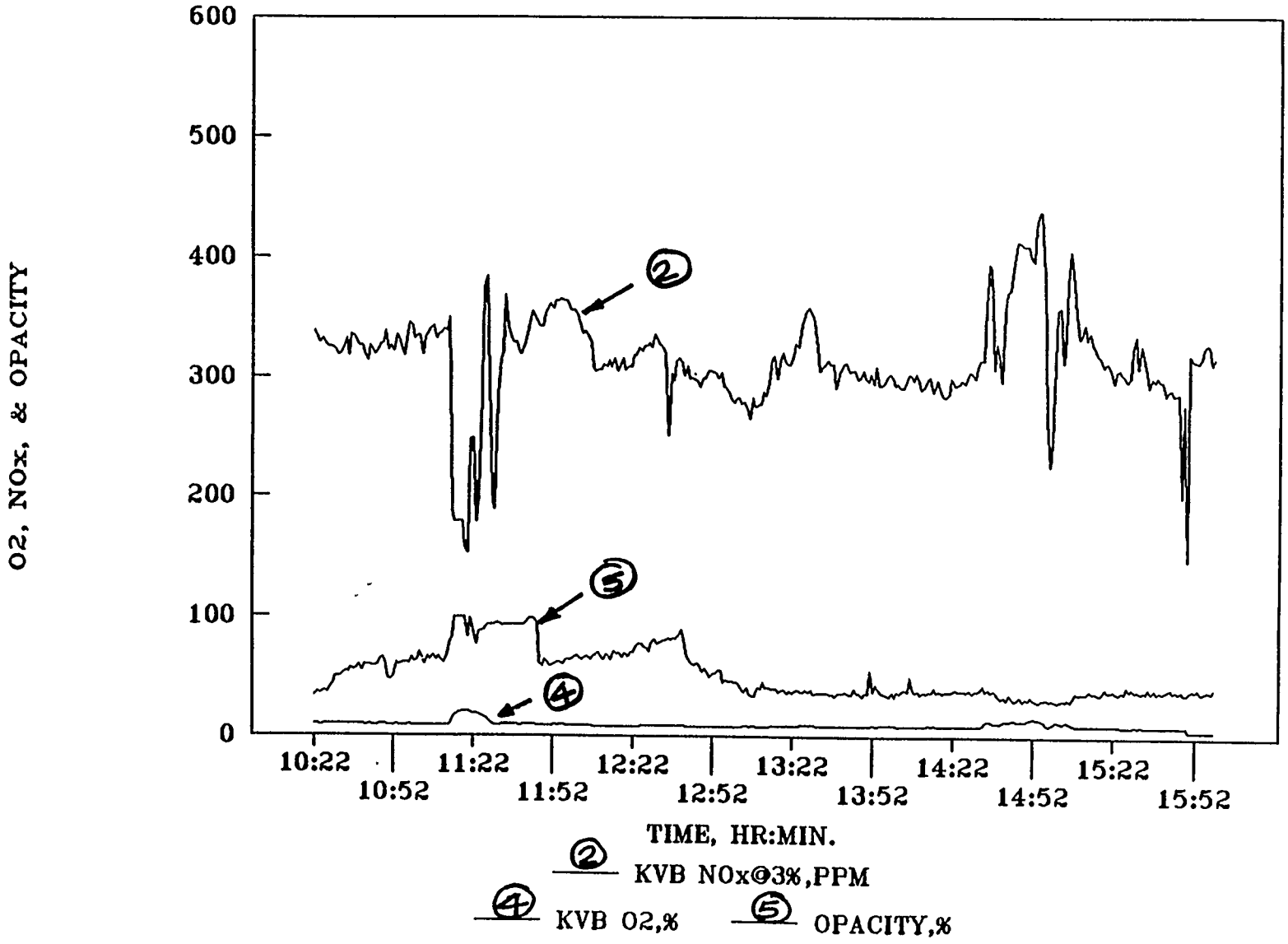


DATA TAKEN ON NOV. 25, 91

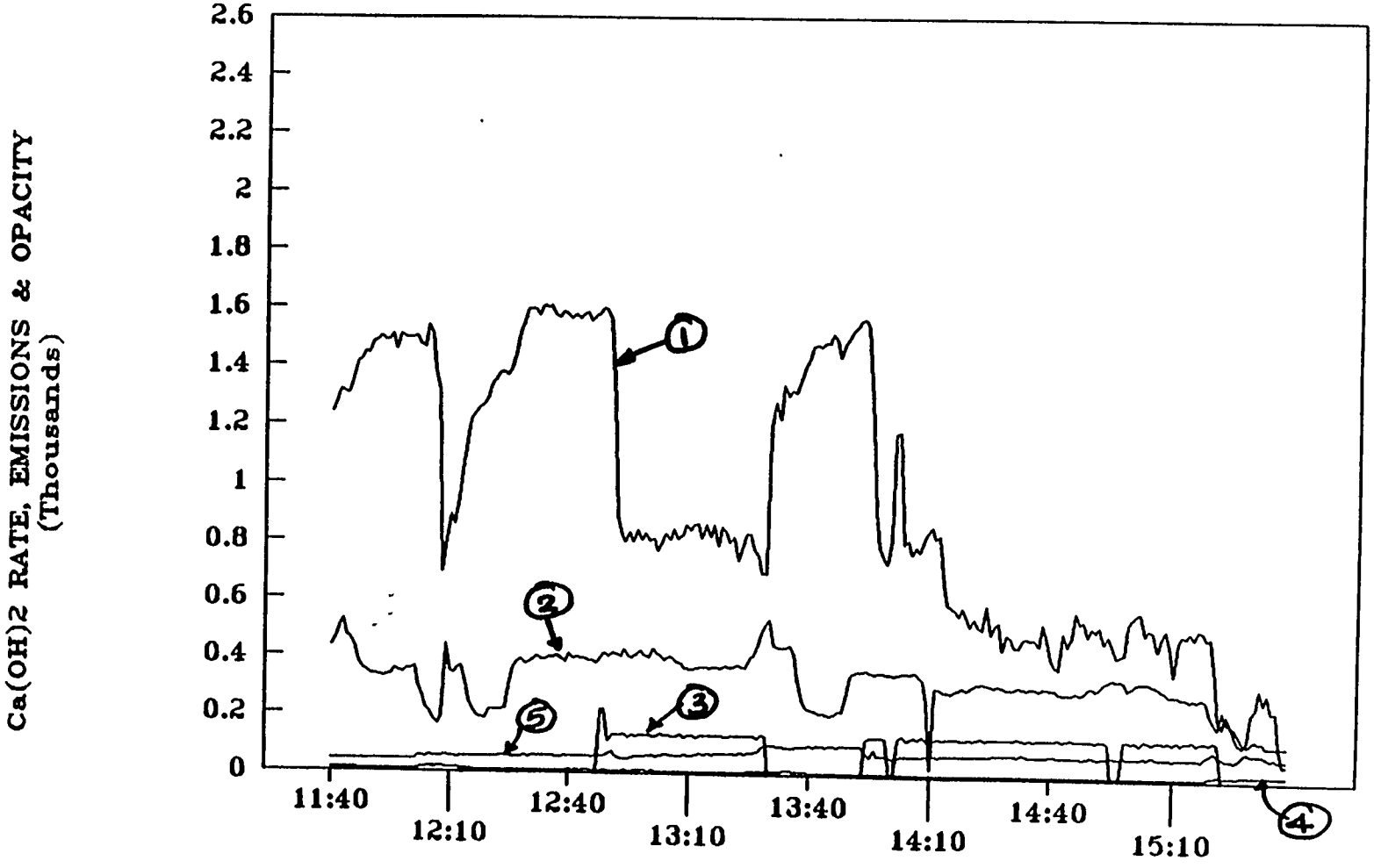


ROEST SORBENT INJECTION TESTS

DATA TAKEN ON NOV. 25, 91



DATA TAKEN ON DEC. 02, 91



1 KVB SO2@3%,PPM

2 KVB NOx@3%,PPM

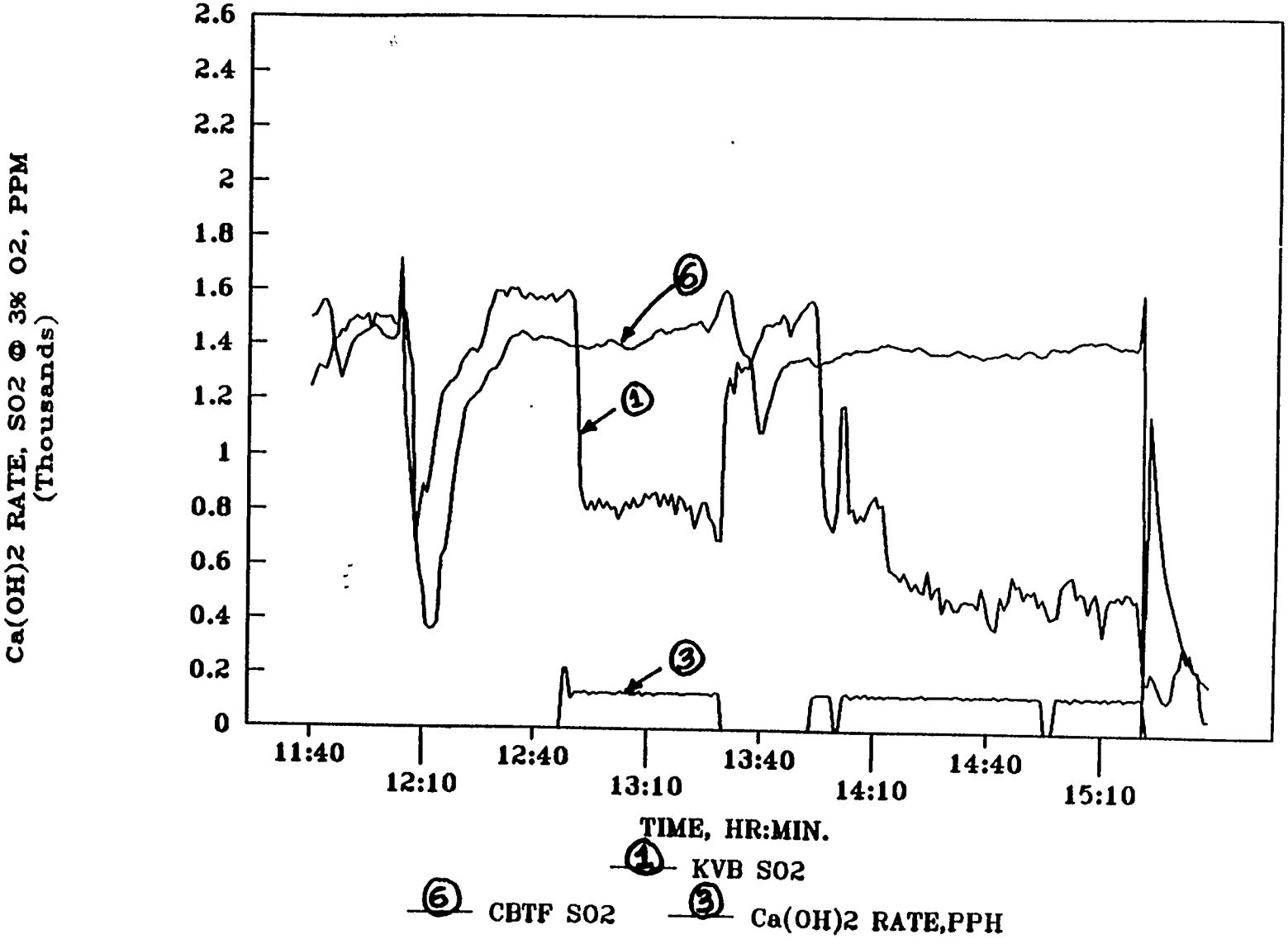
3 Ca(OH)2 RATE,PPH

4 KVB O2,%

5 OPACITY,%

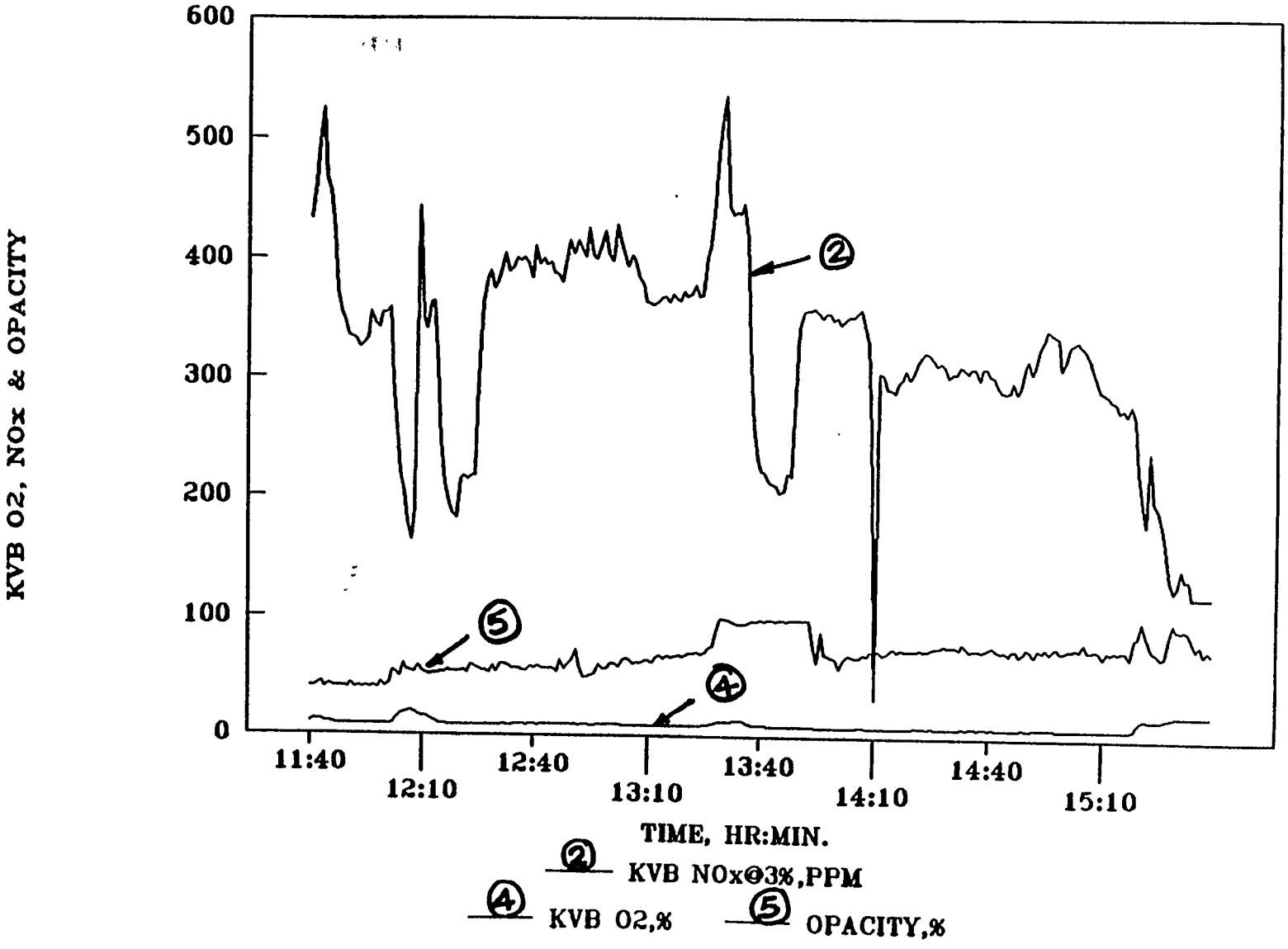
ACES SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 02, 91



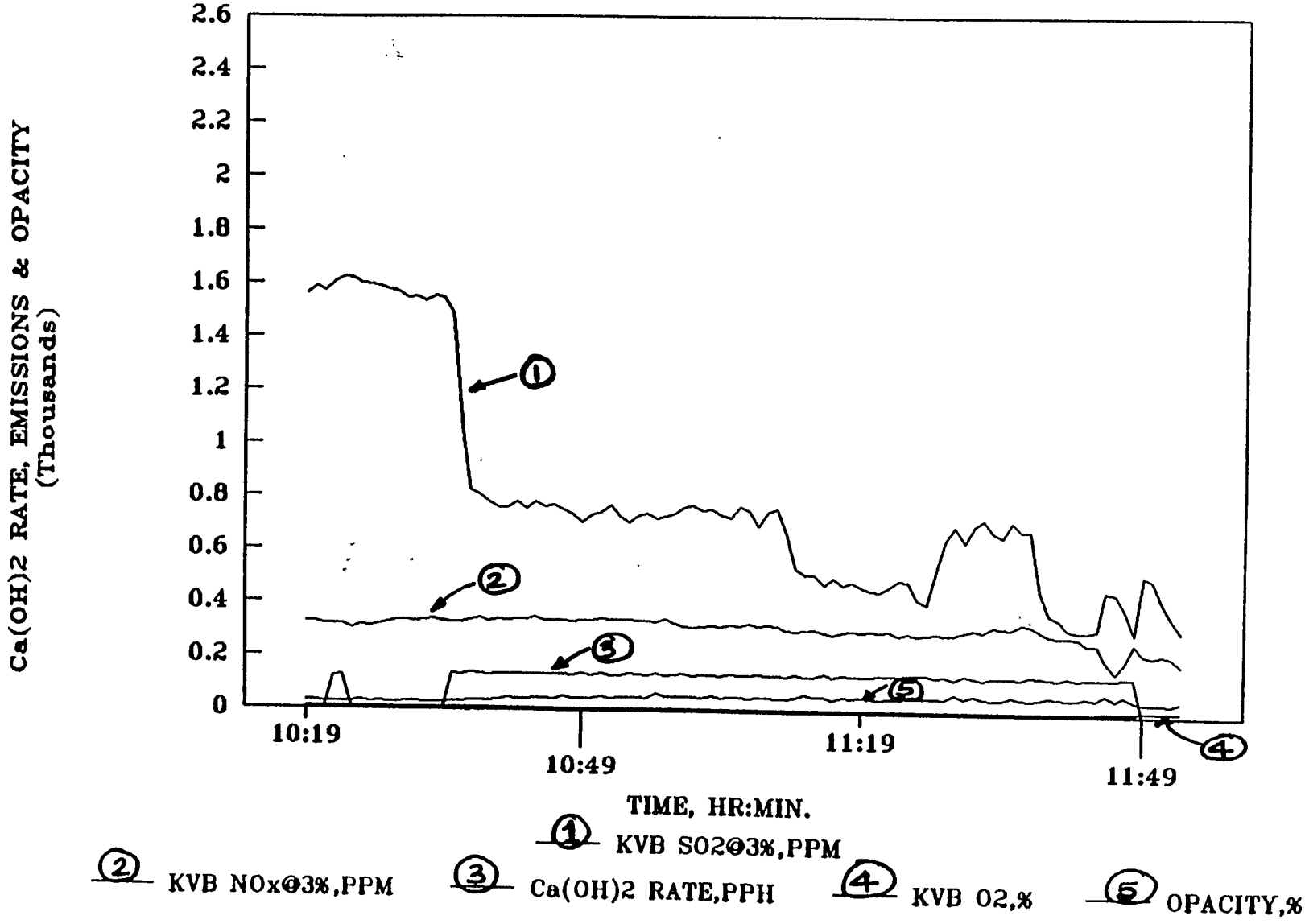
KOLST SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 02, 91



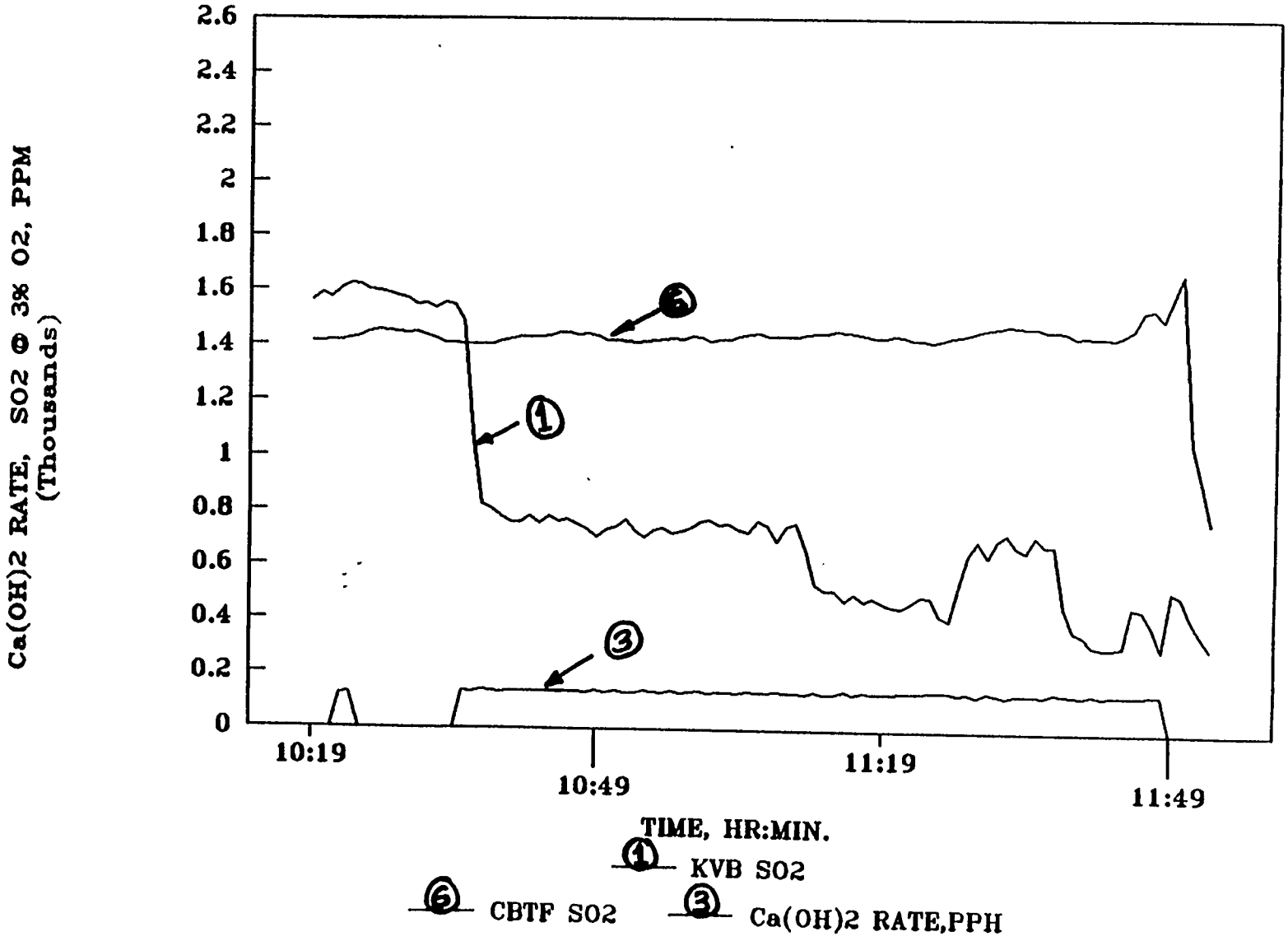
ROLST SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 04, 91

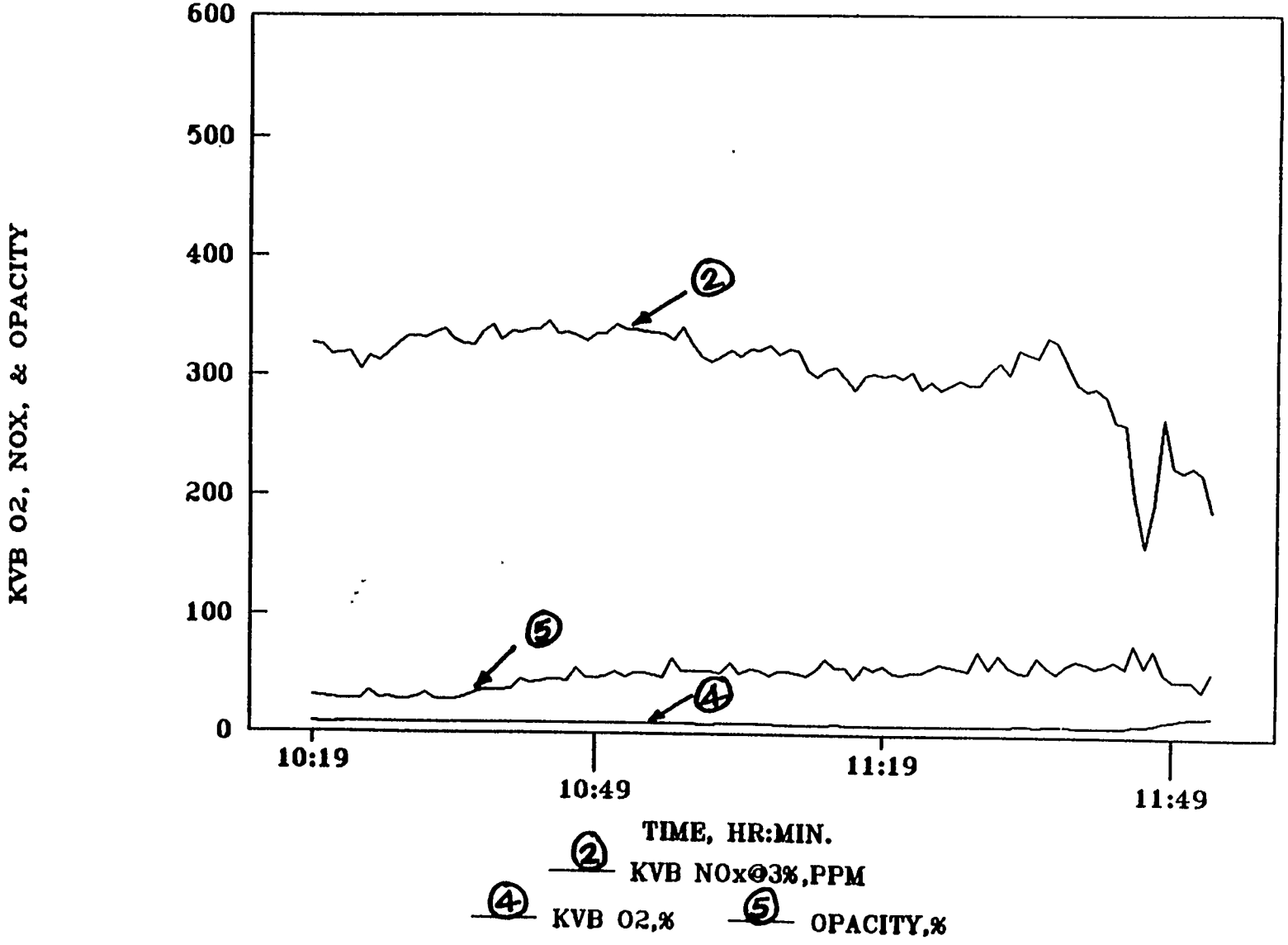


[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 04, 91

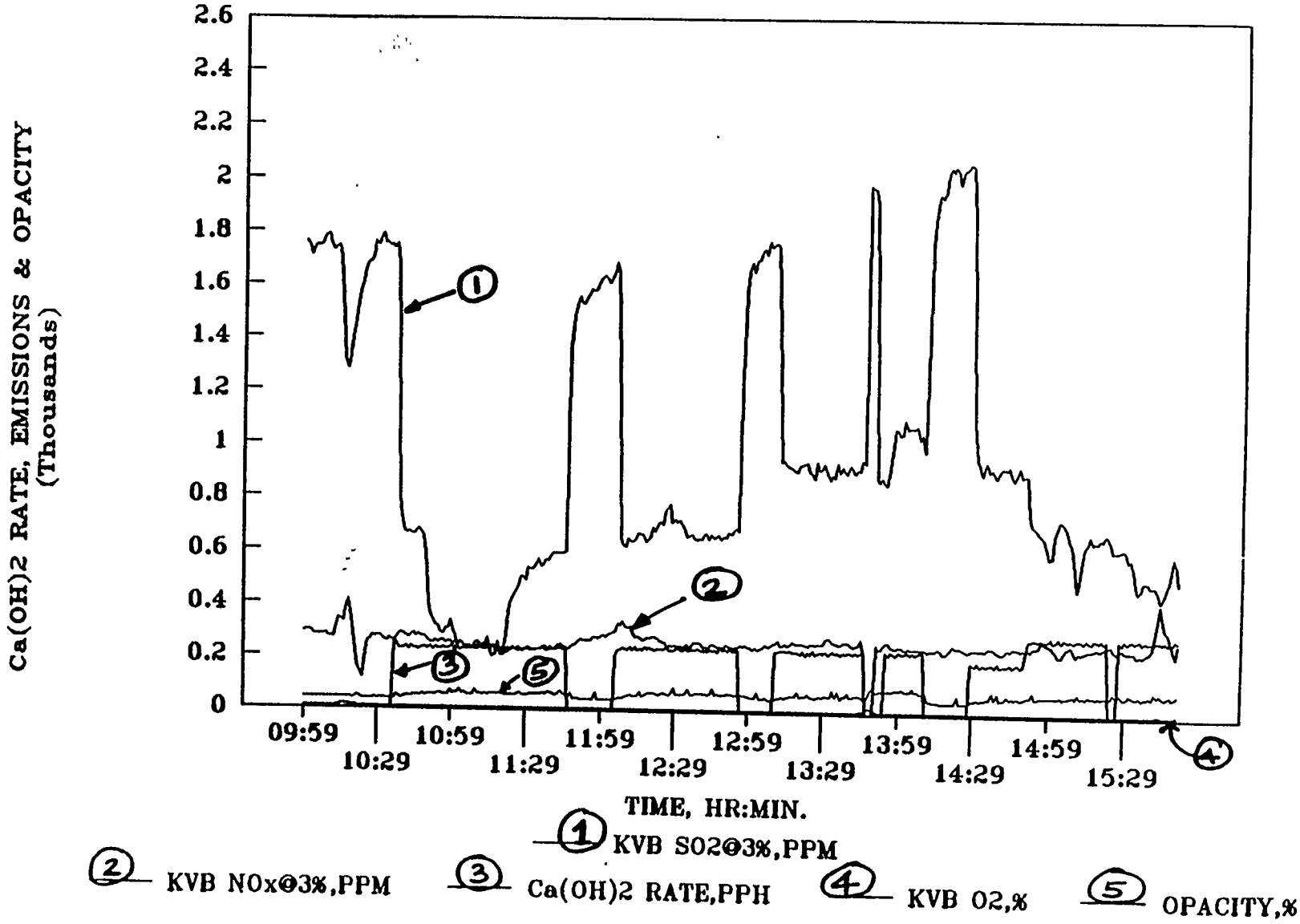


DATA TAKEN ON DEC. 04, 91



[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 06, 91



1 KVB SO2@3%,PPM

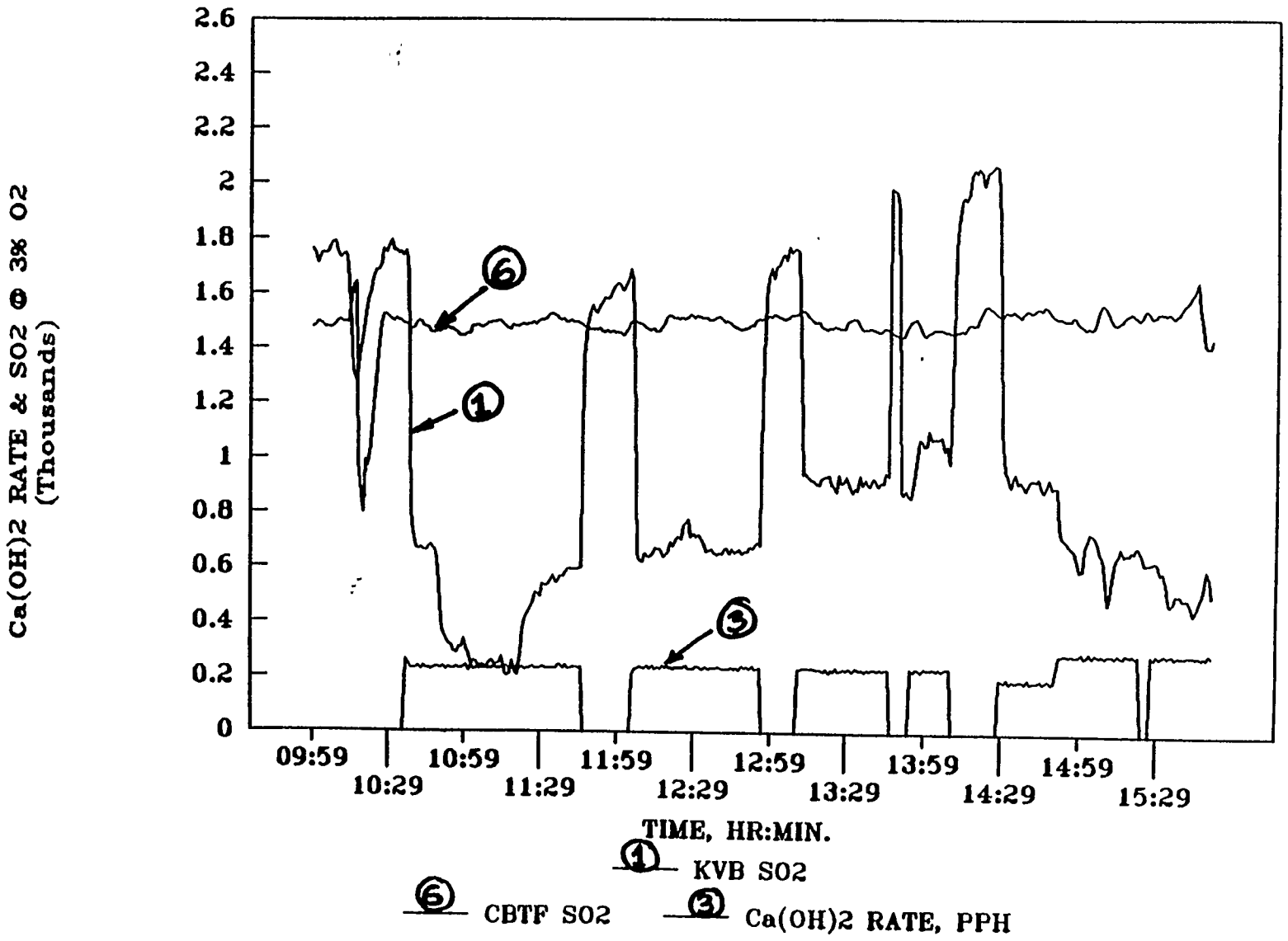
2 KVB NOx@3%,PPM

3 Ca(OH)2 RATE,PPH

4 KVB O2,%

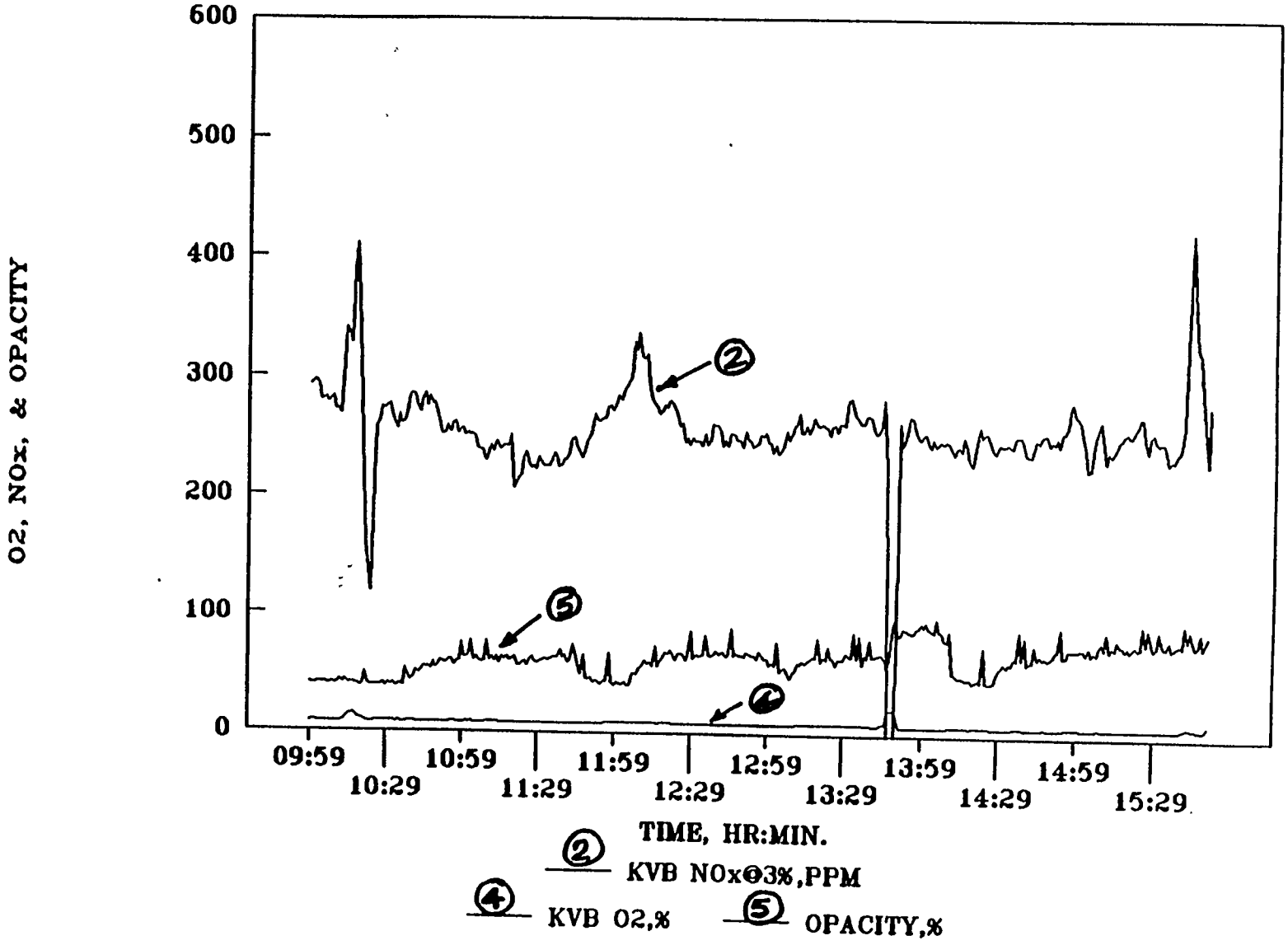
5 OPACITY,%

DATA TAKEN ON DEC. 06, 91



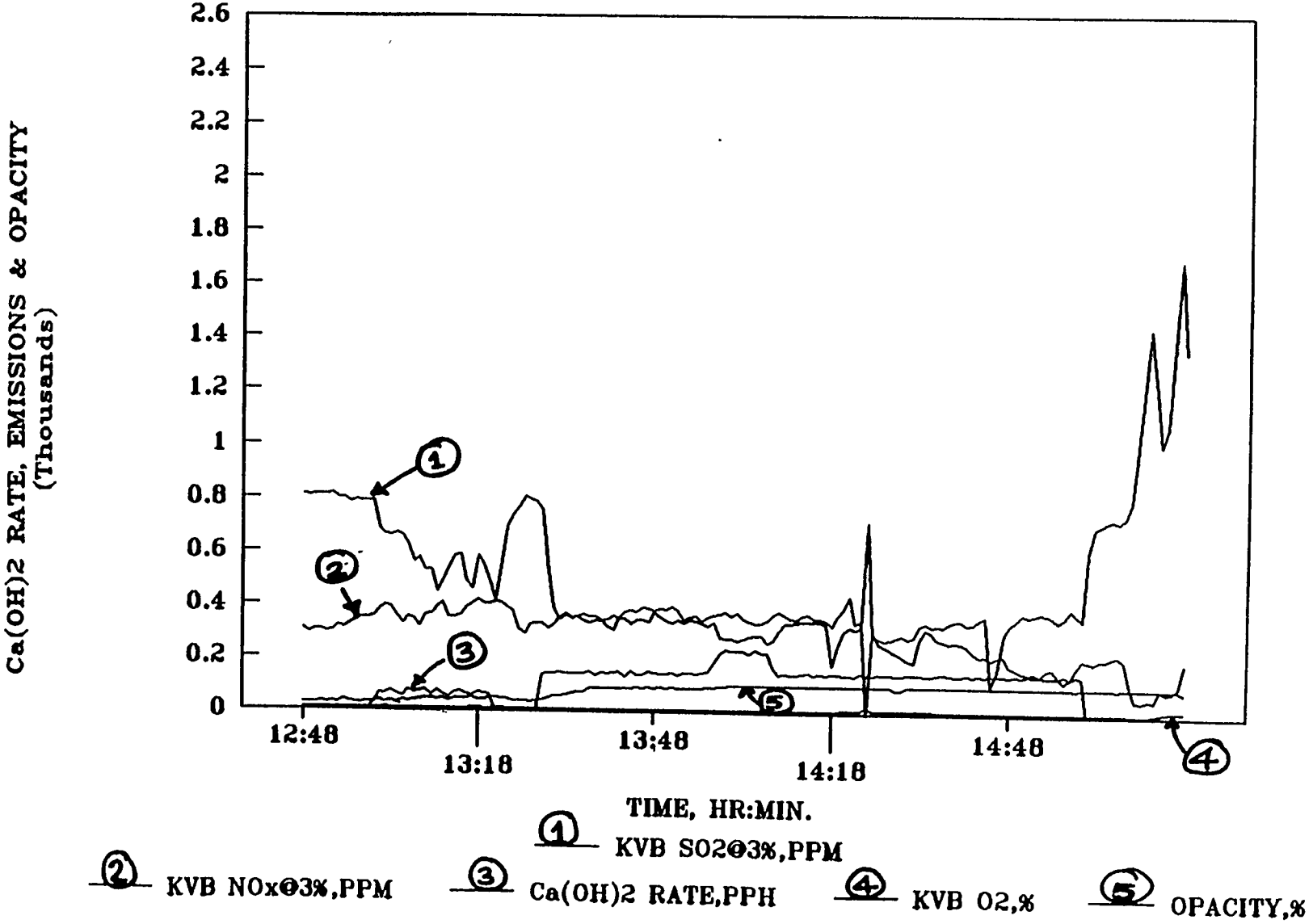
DRY SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 06, 91

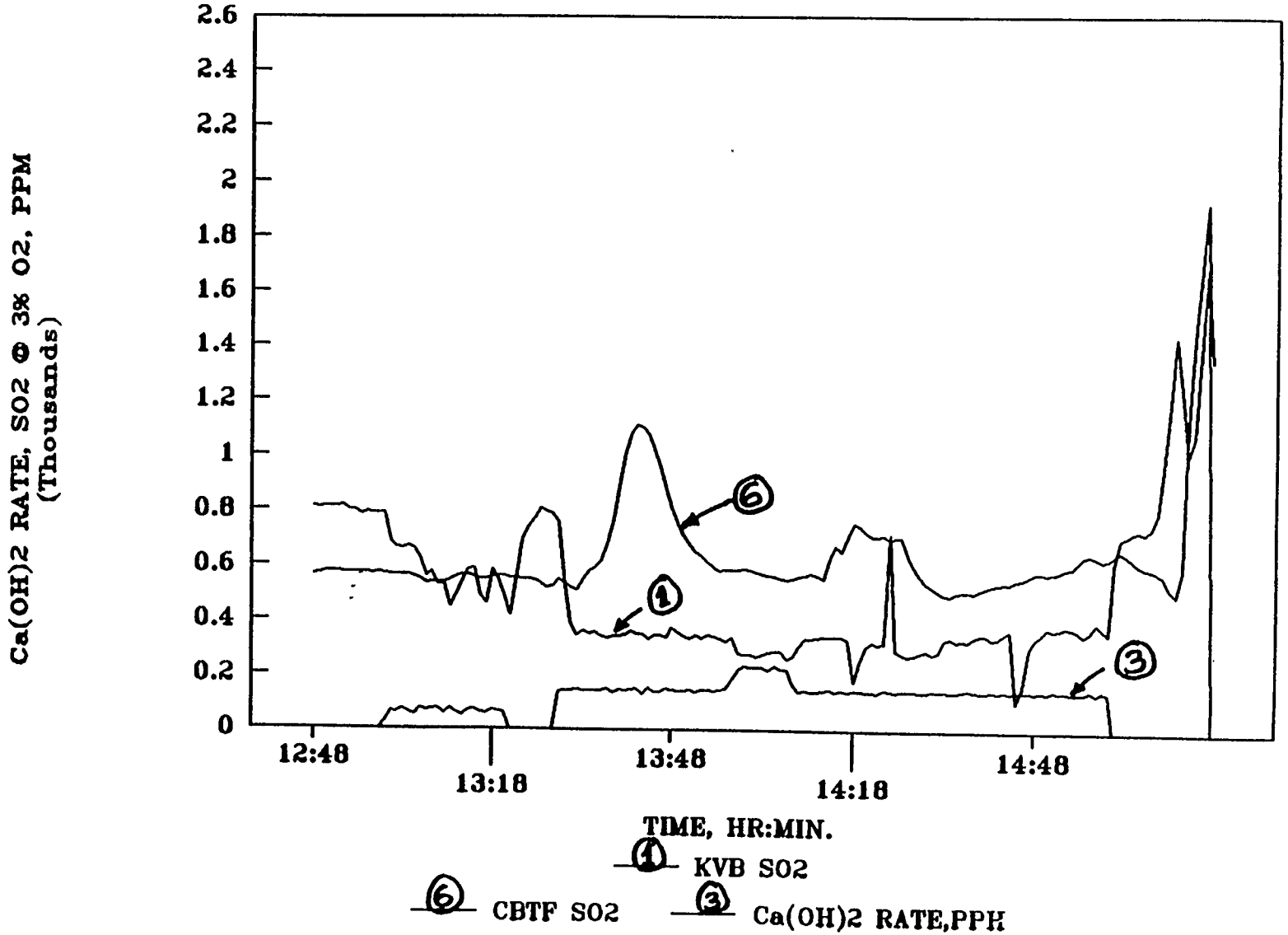


SORBENT INJECTION TESTS

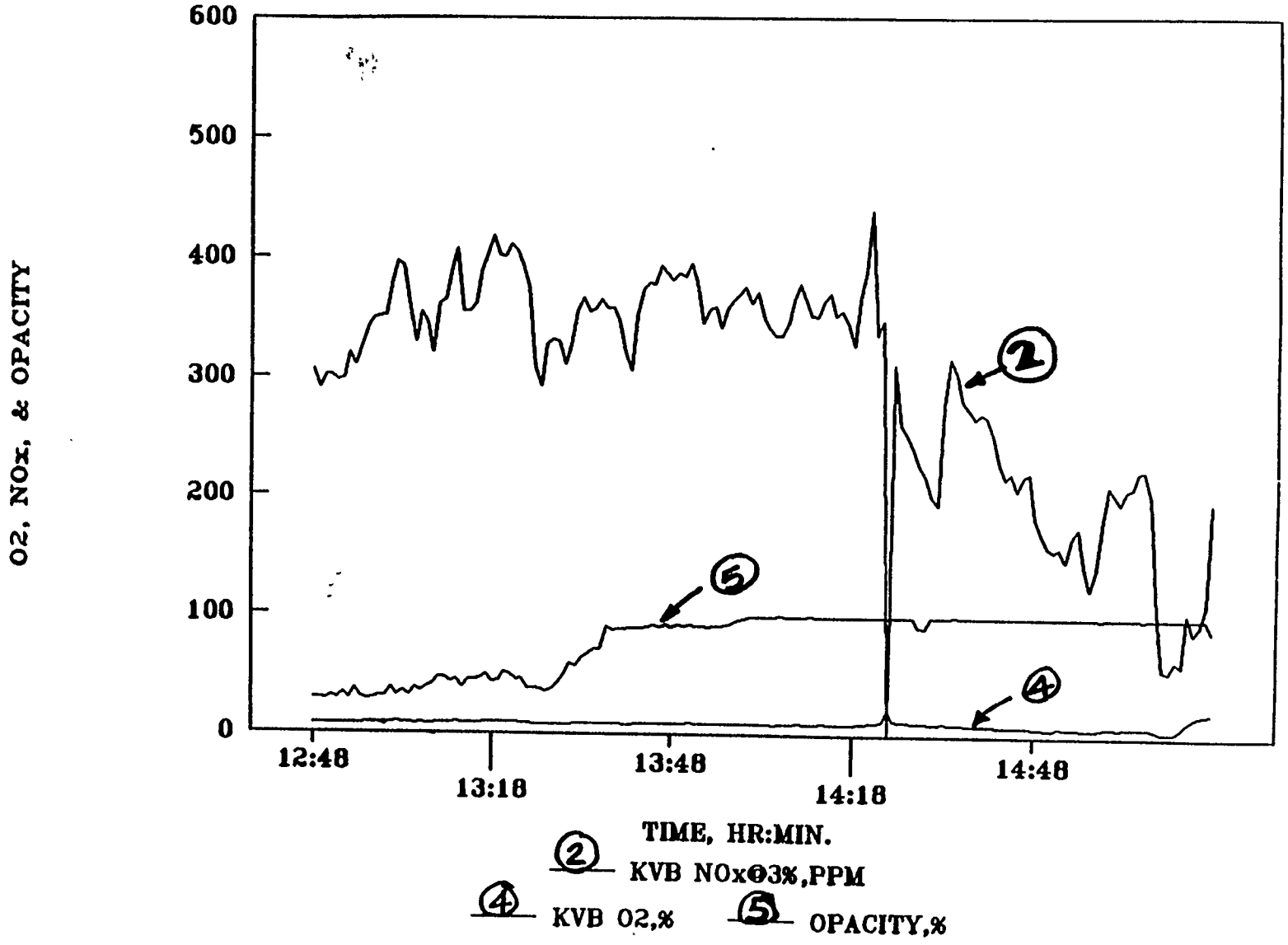
DATA TAKEN ON DEC. 11, 91



DATA TAKEN ON DEC. 11, 91

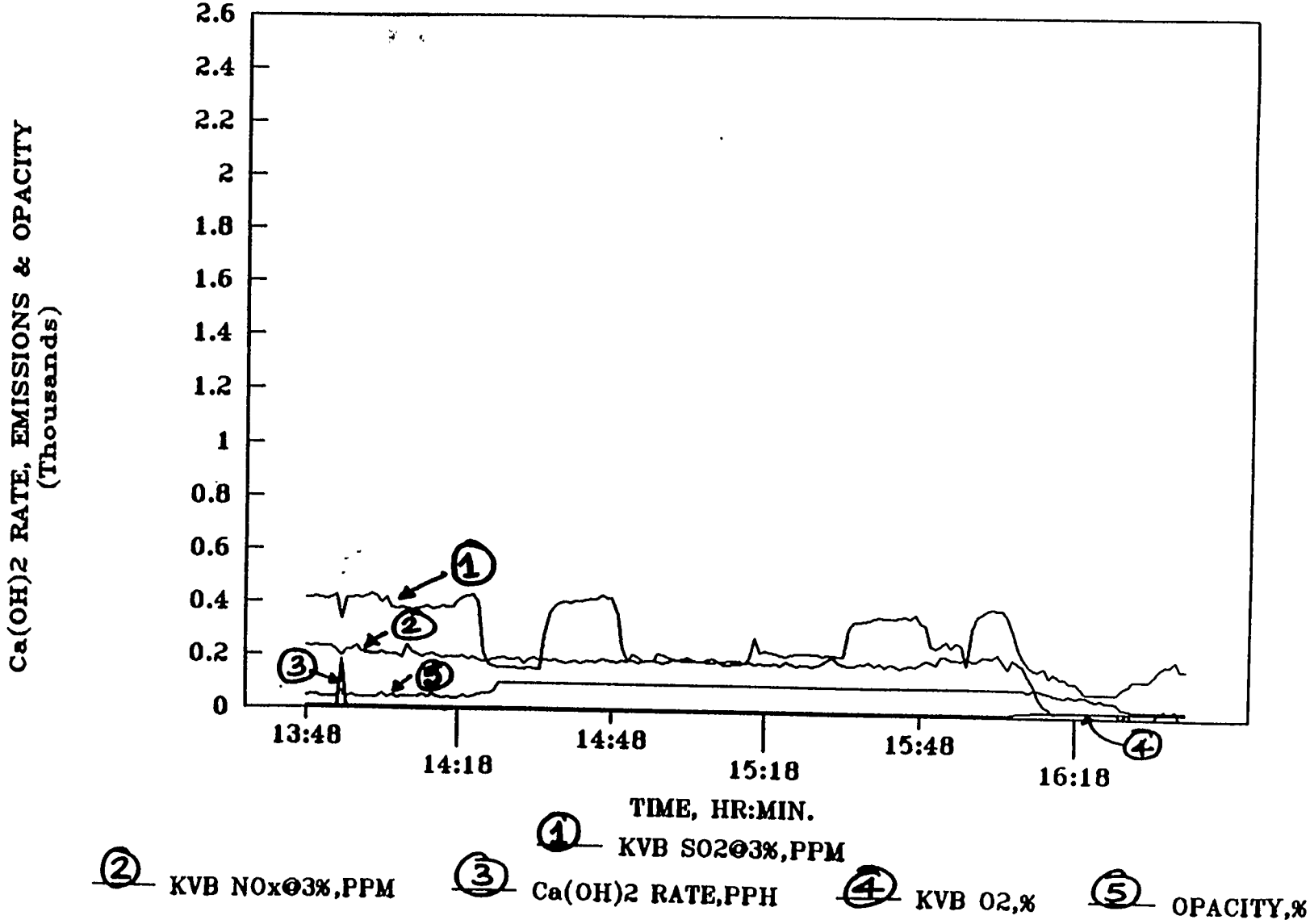


DATA TAKEN ON DEC. 11, 91

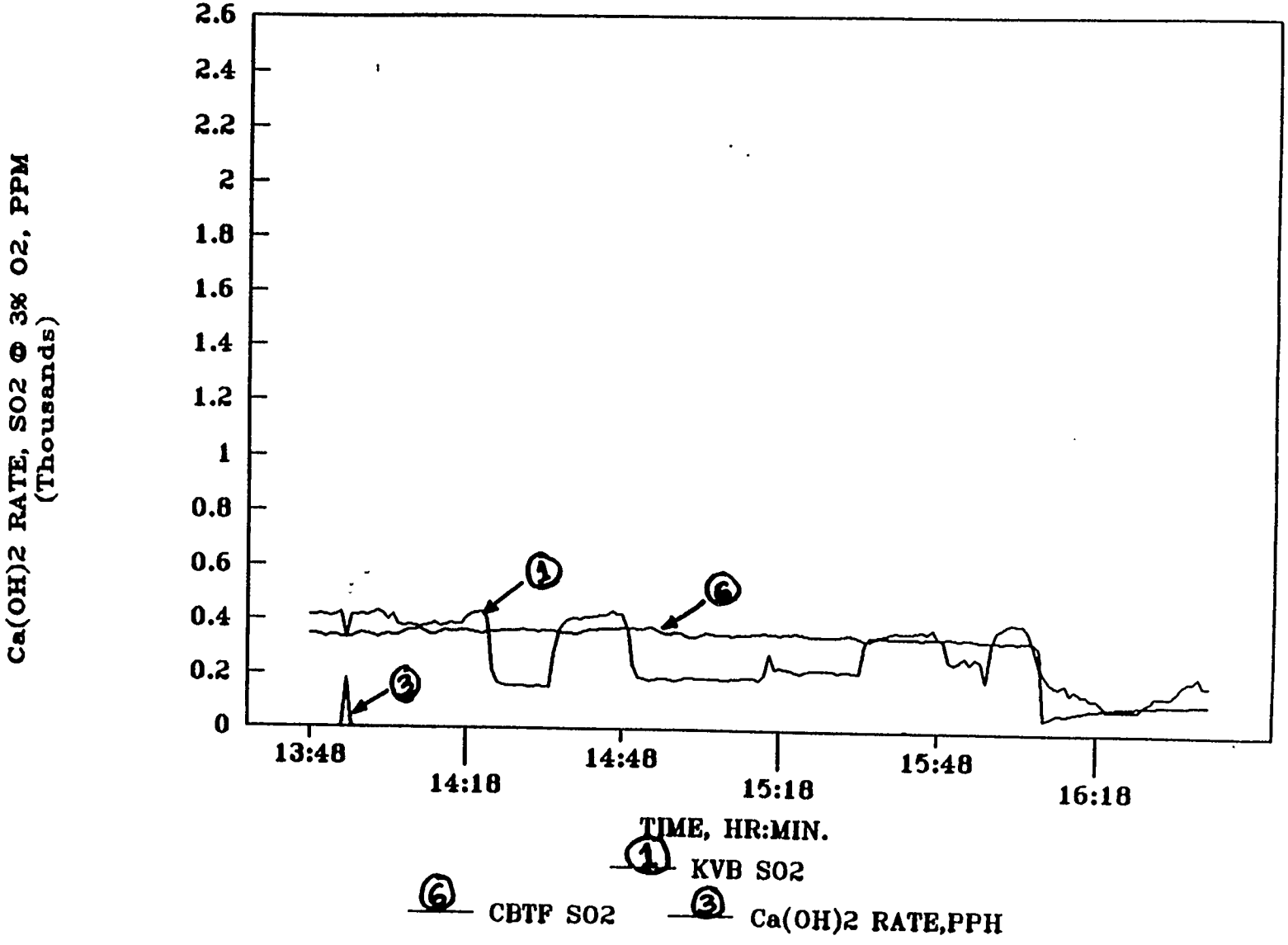


[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 17, 91

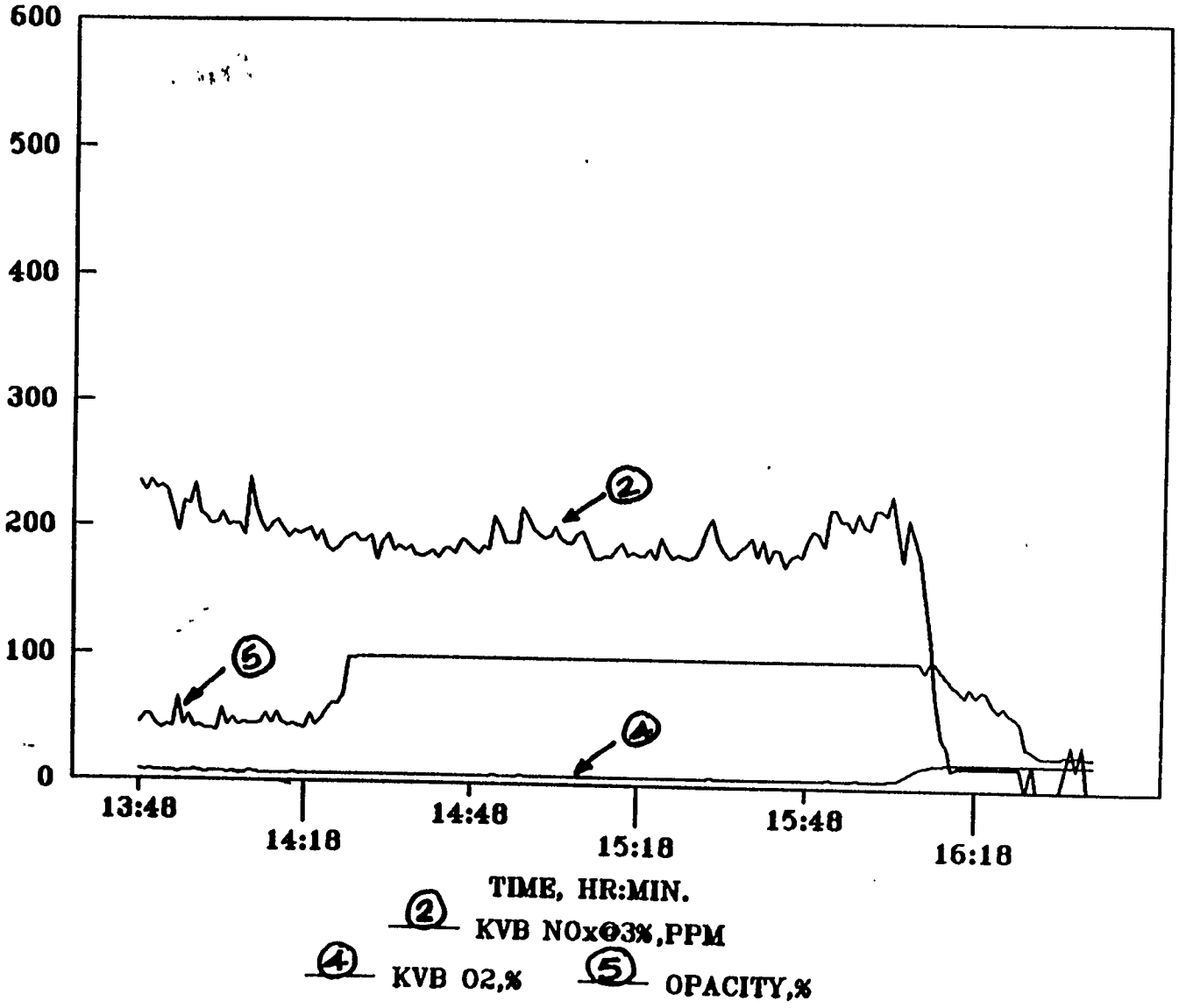


DATA TAKEN ON DEC. 17, 91

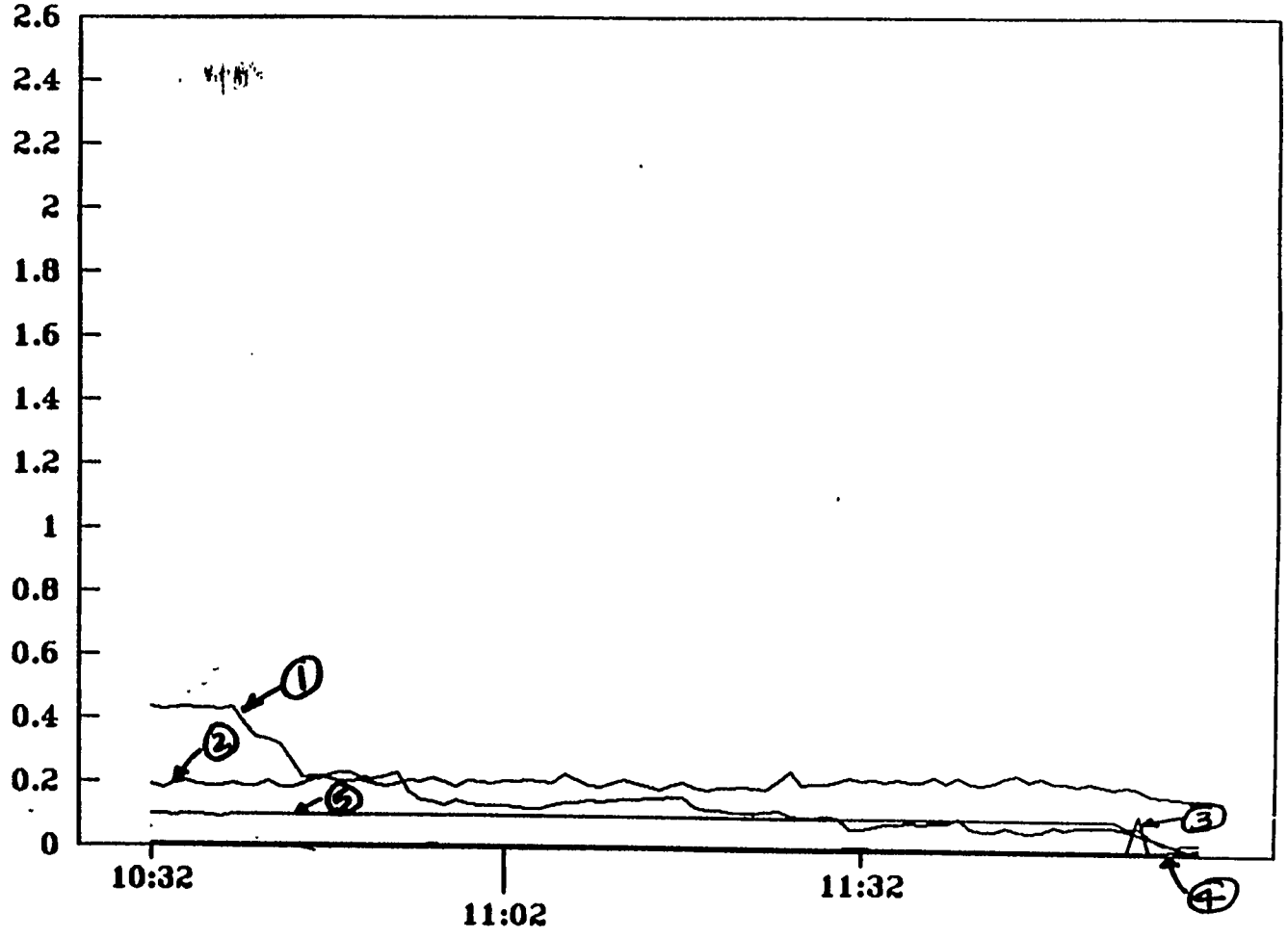


[illegible] SORBENT INJECTION TESTS

DATA TAKEN ON DEC. 17, 91



DATA TAKEN ON DEC. 18, 91



1 KVB SO2@3%,PPM

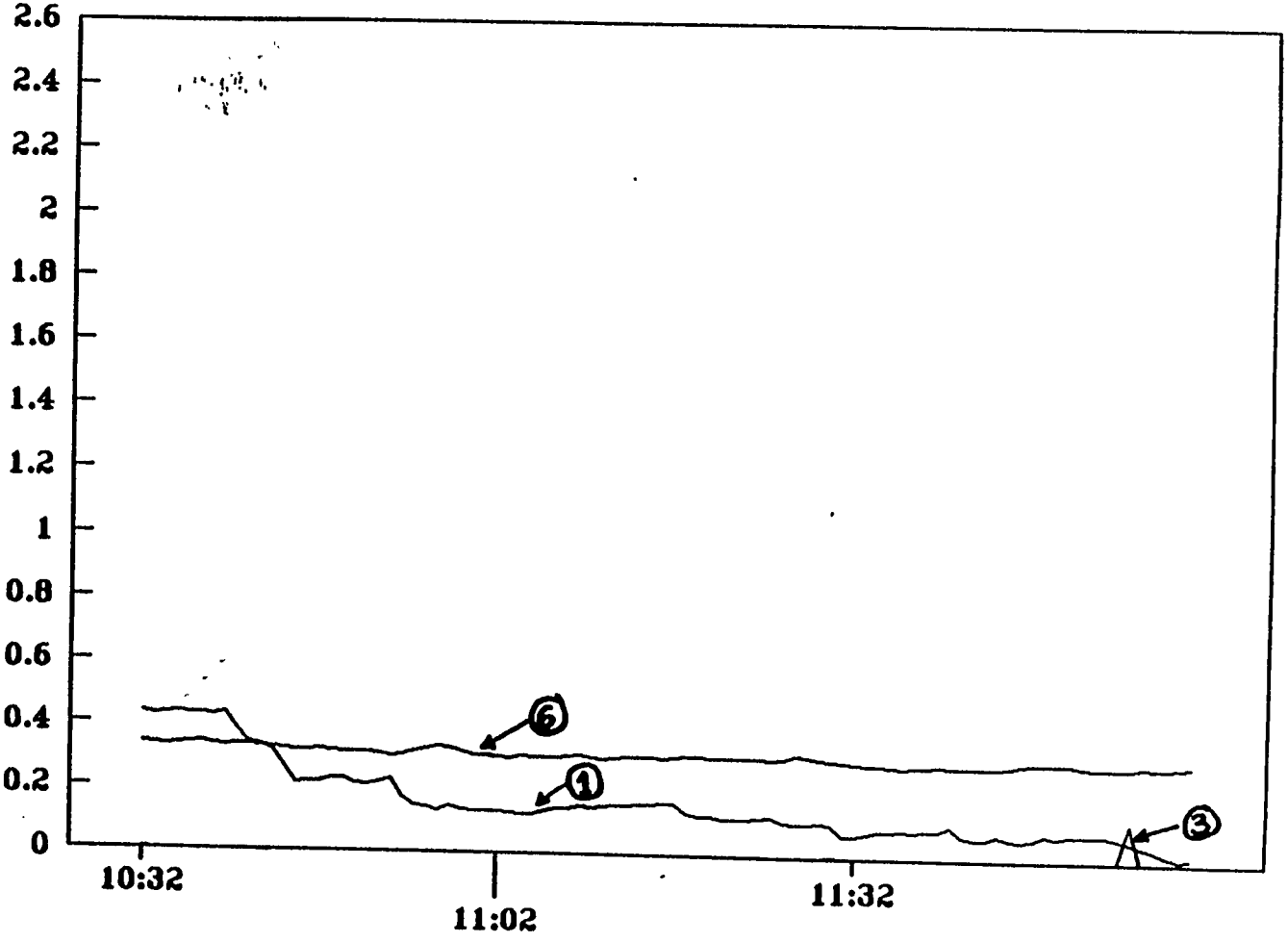
2 KVB NOx@3%,PPM

3 Ca(OH)2 RATE,PPH

4 KVB O2,%

5 OPACITY,%

DATA TAKEN ON DEC. 18, 91



DATA TAKEN ON DEC. 18, 91