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Louisiana Gasification Technology, Inc.

INDUSTRIAL HYGIENE SURVEY
1987

April 11, 1988

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LOUISIANA DIVISION INDUSTRIAL HYGIENE REPORT

AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

DEPARTMENT	FILE NUMBER	DATE
LGTI Louisiana Gasification Technology, Incorporated	LAD-LGTI-87.01	4/11/88
TITLE		
LGTI Industrial Hygiene Survey, 1987		
AUTHOR(S) SIGNATURE(S)		
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SUMMARY/RECOMMENDATIONS

The Dow Syngas Project, commonly referred to as LGTI - Louisiana Gasification Technology Incorporated, completed construction during March of 1987, and commenced with start-up and initial operations at that time. Industrial Hygiene efforts during 1987 were mainly directed toward program development and initial implementation. A number of process and area audits were performed to assist with placement of area monitors, selection of personal and portable monitors and development of Physical and Chemical Agent Inventories. Extensive monitoring for hydrogen sulfide and carbon monoxide occurred during the year, in addition to less frequent monitoring for noise, dust and benzene soluble organics.

Industrial Hygiene monitoring performed to date confirmed area monitor locations, defined the basis for personnel protective equipment requirements, and indicated areas of potential exposure such that corrective measures could be taken to eliminate the exposure. Typical levels of hydrogen sulfide and carbon monoxide detected were well below the TLV's for the compounds. A more pronounced effort for Industrial Hygiene monitoring is planned for 1988.

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LGTI INDUSTRIAL HYGIENE SURVEY, 1987

I. OVERVIEW OF 1987 INDUSTRIAL HYGIENE PROGRAM

A. INTRODUCTION

The Environmental Monitoring Program of the Dow Syngas Project, commonly referred to as LGTI - Louisiana Gasification Technology, Incorporated, is detailed in the Environmental Monitoring Plan (EMP) of the Project. The EMP was submitted to the U. S. Synthetic Fuels Corporation (SFC) and its Consulting Agencies in accordance with the requirements of the Energy Security Act, and the Price Guarantee Commitment between LGTI, the Dow Chemical Company and SFC. The EMP details Industrial Hygiene Monitoring for LGTI, synergistically combining the monitoring guidelines of Dow with those of the SFC.

B. SUMMARY/RECOMMENDATIONS

The Dow Syngas Project, commonly referred to as LGTI - Louisiana Gasification Technology Incorporated, completed construction during March of 1987, and commenced with start-up and initial operations at that time. Industrial Hygiene efforts during 1987 were mainly directed toward program development and initial implementation. A number of process and area audits were performed to assist with placement of area monitors, selection of personal and portable monitors and development of Physical and Chemical Agent Inventories. Extensive monitoring for hydrogen sulfide and carbon monoxide occurred during the year, in addition to less frequent monitoring for noise, dust and benzene soluble organics.

Industrial Hygiene monitoring performed to date confirmed area monitor locations, defined the basis for personnel protective equipment requirements, and indicated areas of potential exposure such that corrective measures could be taken to eliminate the exposure. Typical levels of hydrogen sulfide and carbon monoxide detected were well below the TLV's for the compounds. A more pronounced effort for Industrial Hygiene monitoring is planned for 1988.

C. CONCLUSIONS

Industrial Hygiene monitoring performed during the start-up and initial operation of LGTI confirmed the need for area and personnel monitoring for hydrogen sulfide (H₂S) and carbon monoxide (CO) to warn for potentially serious situations as a result of process leaks. Monitoring for noise and dust provided information to determine minimum requirements for personal safety equipment. Data from the organics testing performed will be used to establish future monitoring programs for the compounds, with the goal of eliminating exposure to the Benzene Soluble Organics.

Industrial Hygiene monitoring at LGTI will continue and increase during 1988, as operation of the facility becomes more routine. All personnel classifications, and various operating conditions will be monitored.

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II. 1987 LGTI EXPOSURE EVALUATION

A. MONITORING PROGRAM RATIONALE

Construction of the LGTI facility continued through the first quarter of 1987, with the Construction-Stage Health and Safety Review of the Project held on January 27, 1987. Each area of the workplace was audited by a number of Industrial Hygiene, Safety, Research, and Engineering Professionals.

Pre-operational process area audits established the following hazard parameters to be monitored during operation as well as maintenance:

Area*	Parameter
-----	-----
A. Coal Handling	Dust Noise
B. Coal Gasification and Particulate Removal	Heat H2S CO Noise Selected Organics Particulate Matter
C. Sulfur Removal and	H2S
D. Incineration of Waste Gas	SO2 H2S Heat

*See Figure 1 (Figures found in Appendix 1) for area designations.

B. PERSONNEL MONITORING

Some personnel monitoring occurred during 1987 for noise, dust, organics, CO and H2S. Much of 1987 was spent developing appropriate mechanisms for documenting and reporting Industrial Hygiene data. The LGTI Process Area Access Policy (See Appendix 2) require CO and H2S monitors for entry to certain locations. This monitoring, though extensive, was not documented during 1987. For 1988, data will be collected from the CO and H2S monitors to document actual exposures. Personnel monitoring data gathered in 1987 is included as Appendix 3.

C. AREA MONITORING

A number of area monitors for CO and H₂S are located throughout the LGTI plant (see Figure 2). This monitoring has been operational since startup, and is utilized to warn of leaks and potentially hazardous situations. In addition, some area monitoring for noise occurred during 1987. As a result of noise testing at the coal unloading area, hearing protective equipment requirements were increased during this operation. The entire process area has been designated to require hearing protection for entry. This data is included as Appendix 4.

D. PROCESS AREA SURVEYS

Industrial Hygiene and Environmental surveys of the process areas were also used as the basis for generating Chemical and Physical Agent Inventories for the sixteen worker classifications associated with LGTI operations and maintenance.

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III. 1988 SURVEILLANCE PROGRAM

A. RATIONALE

In order to protect the employees from overexposure to concentrations of chemicals in the air or through skin contact, dust, noise, or heat, the industrial hygiene monitoring for LGTI will use personnel monitoring for CO₂, SO₂, and NH₃ with the use of Drager (R) Tubes; personal, portable and area monitors for H₂S and CO; personnel sampling pumps for dust; sound level meters and noise dosimeters for noise; and oxygen/combustibles detectors for vessel entry. The potential for exposure to constituents from benzene soluble aerosols will also be monitored by sampling for selected PNAs (Polynuclear Aromatics). Industrial Hygiene sampling and analytical methods are included as Appendix 5.

B. SAMPLING STRATEGY PLAN

Major emphasis will be placed on increasing the sampling frequency of both personnel and area monitoring during 1988. To help insure meeting this important goal, an Environmental Assistant has been named at LGTI, with responsibility for coordinating the effort.

1. HYDROGEN SULFIDE AND CARBON MONOXIDE

Current area and personnel monitoring for access to process area potentially containing H₂S and CO will continue. During various plant conditions, such as startup, operation, shutdown, and maintenance, monitoring of personnel of all classifications will be documented to indicate actual exposure levels.

2. NOISE

Personnel of all classifications will be monitored for noise exposure during 1988. In addition, annual area noise surveys will begin in 1988.

3. BENZENE SOLUBLE ORGANICS

Monitoring for benzene soluble organics begun in 1987, will increase and continue during 1988. The 1988 program will include GC/MS scans for specific polynuclear aromatics. Surface wipes will be utilized to determine whether or not organic compounds are being carried from the process area to the control stations or other buildings.

IV. 1987 ACCOMPLISHMENTS AND 1988 GOALS

Accomplishment: Developed Chemical and Physical Agent Inventories.

Goal: Update Inventories on an annual basis.

Accomplishment: Ordered, received and made fully operational area, personal, and portable Industrial Hygiene monitoring equipment associated with detection of noise, organics, dust, CO and H2S.

Goal: Review effectiveness of monitoring equipment on an annual basis.

Accomplishment: Began actual Industrial Hygiene monitoring of personnel and areas during start-up and initial operation of LGTI.

Named Environmental Assistant to coordinate Industrial Hygiene Program.

Goal: Increase monitoring effort, improved documentation and reporting procedures.

Accomplishment: Area audits were performed during all phases of the LGTI start-up in an effort to verify the placement of the area monitors and requirements for personal and portable monitors for entry, and to aid in establishing areas with the highest potential for fugitive emissions. As a result of the audits, problems with the release of dissolved gases from the recycle water tanks in the process area were discovered, and the vent systems were successfully modified.

Goal: Continue with area audits on a quarterly basis.

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V. EDUCATION AND TRAINING PROGRAMS

A. HAZARD COMMUNICATION TRAINING

On an annual basis, permanent employees are trained on the hazardous properties of the chemicals they work with or could be exposed to and are allowed access to written information about the chemicals especially as contained in the Material Safety Data Sheets. Also incorporated into this session is information on the consequences of overexposure to these chemicals and reactive chemical considerations associated with the process. Temporary contract personnel assigned to the block are trained via a Contractor Block Indoctrination Film. Additional training is administered as appropriate on the handling and disposal of asbestos and the proper use of CO and H2S monitors.

B. RESPIRATOR PROGRAM

The effectiveness of the respirator program at LGTI is audited quarterly, with semi-annual cartridge changeouts, and annual training on the proper use and care of the respirators.

C. HEARING PROTECTION PROGRAM

Ear protection requirements at LGTI are reviewed via annual training sessions typically incorporated into the monthly safety meetings.

VI. PLANT DESCRIPTION

A. PROJECT OVERVIEW AND LOCATION

The Dow Syngas Project produces medium BTU synthetic gas (syngas) for consumption by the existing gas turbine power generation units at Dow's Louisiana Division chemical complex in Plaquemine, Louisiana. Figure 3 shows the location of the Louisiana Division. Figure 4 shows the location of the Dow Syngas Project facilities at the Louisiana Division site.

At capacity, the Dow Syngas Project will produce 30,000MM BTU of synthetic gas per day from approximately 2,200 tons per day of western sub-bituminous coal from the Powder River Basin in Wyoming. The design-basis coal, used for purposes of sizing equipment, is a lignite coal. The Project will use sub-bituminous coal initially and intends to switch to lignite or other types of coal later on in the project life. All ranges of coal, including anthracite, bituminous, sub-bituminous, and lignite, may be used if the specific plant design is adapted to that coal type and as long as the feedstock does not exceed 1.2% sulfur as allowed in the air permit for the project.

B. PROCESS DESCRIPTION

The block diagram in Figure 5 illustrates the process used by the Dow Syngas Project. The following subsections describe various portions of the project.

COAL SLURRY FACILITY

The existing coal slurry facility, which was designed to support the Prototype II coal gasification plant, was expanded to provide the coal slurry feed for the commercial facilities. Coal is delivered in bottom dump hopper cars and discharged from the railcars into unload pit hoppers. Conveyors move the coal from the hoppers to a radial stacker which distributes coal over the entire stockpile area and keeps dust emission to a minimum. Reclaiming of the coal from the stockpile is accomplished by using a bulldozer to feed the coal in to reclaim pit hoppers where it is then ground and slurried with recycled process water and transferred to storage tanks. Coal slurry is transferred to the process site via pipeline into a storage tank located at the process site.

GASIFICATION, PRIMARY PARTICULATE RECYCLE, AND HEAT RECOVERY

The Dow Syngas Project gasifier design is proprietary, but can be generally classified as a high-temperature, entrained-flow, slagging design.

The coal slurry is fed to the reactor, where it is mixed with oxygen and the reactor temperature is carefully controlled to maintain a specific narrow range. The coal is almost totally gasified by partial combustion to produce synthetic gas consisting principally of hydrogen, carbon monoxide, carbon dioxide, and water. The sulfur in the coal is converted almost totally to hydrogen sulfide with small amounts of carbonyl sulfide. The nitrogen from the coal is converted primarily to elemental nitrogen with some ammonia found and to a lesser degree to hydrogen cyanide and thiocyanate.

The ash is fused in the flame and is drained as molten slag from the bottom of the reactor by an enclosed system. The slag will be used for commercial purposes, rather than being disposed of as a solid waste.

The gas is passed through a cyclone separator to remove most of the entrained char. The removed char particles are slurried with recycled water and the slurry recycled back to the gasifier. The raw synthetic gas containing some entrained particulates (char) is then cooled in a heat recovery train, generating steam.

SECONDARY PARTICULATE RECYCLE AND COOLING

The syngas passes from the heat recovery train to a wet particulate scrubber and the resulting slurry produced is pumped back to the gasifier. Thus, none of the particulate matter or scrubber water is discharged as waste streams.

The scrubber product gas is then cooled through a series of heat exchangers before entering the H₂S removal process. Water condensed from the product gas as it is cooled (sour condensate water) is stripped of the sour gases and much of the water recycled back to the process. Any excess water that has been stripped (sweet condensate water) will be discharged to the Division canal.

SELECTAMINE H₂S REMOVAL, SELECTOX SULFUR RECOVERY, AND TAIL GAS INCINERATION

The sulfur in the sour syngas is removed by the Selectamine or GAS/SPEC ST-1 acid gas removal (AGR) process, which is a process licensed from the Dow Chemical Company. The sweetened product gas is suitable as fuel for the gas turbine power generation system, and the extracted acid gas is suitable as feed to the sulfur recovery unit.

Selectox sulfur recovery process is licensed through the Ralph M. Parsons Company, and the liquid sulfur produced by the Selectox process will be sold as a by-product.

The tail gas from the Selectox unit is fed to an incinerator which oxidizes the remaining H₂S to SO₂ and vents it to the atmosphere. Small amounts of acid gas collected from various other points in the process are also disposed through the incinerator.

EXISTING GAS TURBINES

The clean syngas stream from the AGR is used to fire the equivalent of one existing gas turbine in the Power II facility at Dow's Louisiana Division. Two gas turbines are expected to be able to switch from natural gas to syngas as well as operate on blends of syngas and natural gas.

EMERGENCY FLARE SYSTEM

The location of the flare stack is in an area dedicated for that purpose. Adequate area has been left unoccupied to avoid any hazards when flaring.

PROCESS WASTEWATER TREATMENT

The water condensed from the product gas as it is cooled is passed through a water treatment system for removal of dissolved gases, primarily H₂S and NH₃. Much of the condensate from the water treatment system will be recycled to the coal slurry process. Any excess water (90 - 225 gpm; 175-225 gpm for lignite and 90-140 gpm for western subbituminous coal) that is not recycled to the process will be discharged to the Louisiana Division canal through a permitted outfall.

The sweet condensate water will be characterized for contaminants that it may contain. If the level of contaminants are above the permitted level for discharge, the excess sweet condensate water will undergo secondary treatment for the removal of the impurities before being discharged. The secondary treatment will consist of treatment by activated sludge in the existing Louisiana Division wastewater treatment facilities.

INDUSTRIAL SOLID WASTE LANDFILL

The spent catalysts which are periodically removed from the Selectox sulfur recovery unit will be landfilled. These are the primary solid wastes from the Dow Syngas Project that will be disposed of in landfills. The gasifier slag and liquid sulfur from the Selectox unit will be sold.

The spent Claus catalyst will be landfilled in the solid waste landfill permitted for the Louisiana Division of the Dow Chemical Company.

Spent Selectox catalyst is considered hazardous since it contains vanadium pentoxide, an acutely toxic chemical. It will be disposed in the hazardous waste landfill located within the Louisiana Division.

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VII. JOB DESCRIPTIONS

PLANT SUPERINTENDENT

Under the general direction of the Solid Fuels Major Manager, incumbent has the responsibility for operation, maintenance, and application of new technology of the LGTI Coal Gasification Plant. The organization consists of 11 technical, 5 non-technical supervisors and 38 non-exempt operators. This facility consists of (1) Block 70 - a coal unloading and stockpile area, a coal slurry plant and (2) Block 57 - a coal gasifier with feed systems, high and low temperature heat recovery, a gas scrubbing system with an elemental sulfur plant and an excess water cleanup system.

PRODUCTION OFFICE ASSISTANT

Provide secretarial/clerical support for LGTI operations (57 people) and the Contract Administrator as well as Instrument and Electrical, Computer, Energy Research and Process Engineering personnel located at LGTI.

PRODUCTION SUPERVISOR - OPERATIONS/SAFETY

Under the general direction of the Plant Superintendent, is responsible for the overall safety, operation, reliability, and improvement of the LGTI Coal Gasification Plant and the LGTI Coal Slurry Preparation Plant. The incumbent has direct supervisory responsibility of the operations staff which has the day-to-day operations responsibility for the LGTI plant.

PRODUCTION SUPERVISOR - ENGINEERING/PROJECTS

Under the general direction of the Plant Superintendent, the incumbent is responsible for the process control, overall plant maintenance, and the implementation of technical improvements in terms of quality, productivity, and operability of the LGTI plant. These tasks he/she accomplishes through direct supervision of the LGTI technical staff and maintenance staff, as well as directing the activities of the Dow support personnel assigned to the plant.

ENVIRONMENTAL/LAB SUPERVISOR

Under the general direction of the Plant Superintendent, is responsible for maintaining and improving the operation of the LGTI Laboratory (supervision of 10 full-time non-technical employees), implementation of the Environmental Monitoring Plan for the Dow Syngas Project, and performing Environmental and Industrial Hygiene Contact duties for LGTI.

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PRODUCTION SPECIALIST

Under the general direction of the Technical Supervisor, the incumbent demonstrates proficiency in the application of engineering principles and researches, investigates, and applies new technology to improve the quality and productivity of the areas for which he/she is responsible. The incumbent is recognized as a technical expert in his/her area of responsibility, and is recognized as a leader in promoting this expertise.

SENIOR PRODUCTION ENGINEER

Under the general direction of the Technical Supervisor, the incumbent demonstrates proficiency in the application of engineering principles and researches and investigates new technology to improve the quality and productivity of the areas for which he/she is responsible. The incumbent has developed expertise and is recognized as a developing expert in his/her technical field.

PRODUCTION ENGINEER

Under the general direction of the Technical Supervisor, the incumbent demonstrates proficiency in the application of engineering principles and researches and investigates new technology to improve the quality and productivity of the areas for which he/she is responsible.

SHIFT SUPERVISOR

Within guidelines set by the plant Technical Staff and under the general direction of the Production Supervisor, the incumbent supervises operations personnel on his shift, coordinating the activities required to operate the LGTI Coal Gasification Plant and the LGTI Coal Slurry Preparation Plant.

MAINTENANCE SUPERVISOR

Under the general direction of the Production Supervisor, the incumbent coordinates maintenance activities of the LGTI Coal Gasification Plant and the LGTI Coal Slurry Preparation Plant by effective utilization of manpower and equipment. Through cooperation and coordination, he/she works toward achieving maintenance goals set internally (LGTI) and externally (Louisiana Division). He/she supervises Dow and non-Dow maintenance manpower for LGTI and ensures that material needs are met through the direct supervision of the material controller.

SAFETY AND TRAINING COORDINATOR

Under the general direction of the Production Supervisor and in general association with the entire LGTI Operating and Technical Staff, incumbent is responsible for safe operation by people and safe equipment condition via development, improvement, and coordination of the LGTI Safety Program. He/she is responsible for maintenance of up-to-date emergency procedures and administers the plant C-9 checklist program. In addition, the incumbent coordinates and implements the LGTI training program including operating procedures and training documentation updates and communications.

OPERATIONS SPECIALIST*

Within the guidelines set by the plant Technical Staff and under the general direction of the Shift Supervisor, the incumbent demonstrates proficiency as the control board operator at coordinating the activities required to operate the LGTI Coal Gasification Plant. He/she is responsible for coordinating the efforts of three outside operators necessary to operate the plant. He/she is responsible for taking the initial emergency response to any plant upset conditions and is responsible for communicating the plant upset. He/she is also responsible for controlling the plant within regulatory limits.

SENIOR ASSISTANT CHEMIST

Under the direction of the Lab Supervisor, Shift Supervisors, and plant Technical Staff, incumbent coordinates the daily activities in the lab and works to improve the reliability and dependability of the lab. He/she helps ensure that the lab operators catch and analyze numerous samples to provide both process and environmental information, and assists with this effort when necessary. In addition, he/she coordinates all lab training, is system manager for the lab data management system, and QA/QC Coordinator for the Environmental Monitoring Plan.

SENIOR OPERATIONS TECHNICIAN - BLOCK 70*

Under the direction of the Shift Supervisor and in association with the Block 57 Control Room Operations Specialist and Block 57 Slurry Operator, the incumbent demonstrates proficiency at performing all of the control room and outside duties necessary to operate Block 70. The operator assists the coal unload area

*There is some rotation of these operations classifications, although only the Operations Specialist are control board operators. This is also true for other classifications shown with * on the following pages.

operators in troubleshooting and is responsible for their training. The operator is responsible for taking the initial emergency response during a plant upset. The operator prepares all jobs for contract workers in Block 70 and is responsible for safety indoctrinations, personal safety equipment, etc. The operator catches and analyzes numerous samples to provide process and environmental information.

SENIOR OPERATIONS TECHNICIAN - REACTOR AND SULFUR AREAS*

Under the direction of the Shift Supervisor and in association with the Control Room Operations Specialist, the incumbent demonstrates proficiency at performing the outside duties necessary to operate the Reactor and High and Low Temperature Heat Recovery Areas (or Sulfur Removal and Recovery) and associated auxiliary systems of the LGTI coal gasification plant. The operator assists the control room operator in troubleshooting problems in these areas. The operator catches and analyzes numerous samples to provide process and environmental information. The operator assists in general plant operation and daily maintenance in all areas of Block 57.

MATERIAL CONTROLLER

Under the general direction of the Maintenance Supervisor, the incumbent provides an adequate inventory or delivery of material for block activities, including stock items, spare parts, safety equipment, supplies, etc. He/she monitors material usage and cost to provide feedback to the LGTI Technical Staff. In addition, the material controller is responsible for helping to develop and coordinate implementation of the computerized materials and maintenance system at LGTI.

ENVIRONMENTAL ASSISTANT

Under the general direction of the Environmental/Lab Supervisor, the incumbent performs various Environmental and Industrial Hygiene Contact duties for LGTI as needed to meet both Louisiana Division requirements and others associated with implementation of the Environmental Monitoring Plan (EMP) for the Dow Syngas Project. In addition, the job includes other responsibilities associated with the LGTI Lab, operations function and/or Safety Program.

LABORATORY OPERATOR

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Under the general direction of the Lab Supervisor, Shift Supervisor, and Senior Assistant Chemist, the lab operator catches and analyzes numerous gaseous, aqueous and solid samples to provide both process and environmental information. The test results are required in order that the plant run efficiently, product quality is ensured, performance of on-stream analyzers is confirmed, and the environmental impact of the process be assessed. The lab operator is responsible for on-shift training of operations personnel in lab methods and procedures.

OPERATIONS TECHNICIAN - AS LABORATORY OPERATOR*

Under the general direction of the Lab Supervisor, Shift Supervisor, and Senior Assistant Chemist, the operator catches and analyzes numerous samples to provide both process and environmental information. The test results are required in order that the plant run efficiently, product quality is ensured, performance of on-stream analyzers is confirmed, and the environmental impact of the process be assessed.

OPERATIONS TECHNICIAN - SLURRY AREA*

Under the direction of the Shift Supervisor and in association with the Control Room Operations Specialist, the incumbent demonstrates proficiency at performing the outside duties necessary to operate the Slurry Feed, Char Recycle, and Slag Handling Systems of the LGTI Coal Gasification plant. The operator assists the control room operator in troubleshooting problems in these areas. The operator catches and analyzes numerous samples to provide process and environmental information. The operator assists in general plant operation and daily maintenance in all areas of Block 57.

INSTRUMENT AND ELECTRICAL DEPARTMENT PERSONNEL

Under the general direction of the Production Supervisor, and in association with plant Technical Staff, these support personnel utilize their expertise to maintain and improve instruments, electrical and analyzer equipment associated with the operation and maintenance of the Coal Gasification Plant.

COMPUTER SUPPORT PERSONNEL
ENERGY RESEARCH PERSONNEL

In association with the plant Technical Staff, these support and research personnel utilize their expertise to maintain, and improve functions associated with data acquisition, interpretation and reporting to allow operation and/or technology improvements associated with the Coal Gasification Plant.

CONTRACT PERSONNEL - FOREMAN

Under the general direction of contract supervision and in association with the Maintenance Supervisor, the incumbent supervises and directs the activities of the other contract personnel assigned to the LGTI plant. He/she is responsible for safe and efficient workmanship from these contract employees.

CONTRACT PERSONNEL - ASSISTANT MATERIAL CONTROLLER

Under the general direction of contract supervision and in association with the LGTI Material Controller, the incumbent assists with the functions of the Material Controller, especially as associated with order entry, material receipt, and inventory control.

CONTRACT PERSONNEL - WELDERS, PIPEFITTERS, MILLWRIGHTS,
ELECTRICIANS, AND INSULATORS

Under the general direction of contract supervision and in association with the Maintenance Supervisor, the incumbents perform routine and shutdown maintenance jobs associated with their prescribed areas of expertise. They are involved to some degree with the troubleshooting of problems in an effort to improve the overall operation of LGTI.

CONTRACT PERSONNEL - LABORERS

Under the general direction of contract supervision and in association with the Maintenance Supervisor, Environmental/Lab Supervisor and Environmental Assistant, the incumbents perform general housekeeping and associated activities at both the Coal Slurry facility and the Coal Gasification plant. These personnel are also associated with the proper handling and disposal of solid wastes generated by LGTI.

APPENDIX 1

FIGURES

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APPENDIX 2

LGTI ACCESS POLICIES

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APPENDIX 3

1987 PERSONNEL MONITORING

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1987 AREA MONITORING

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APPENDIX 5

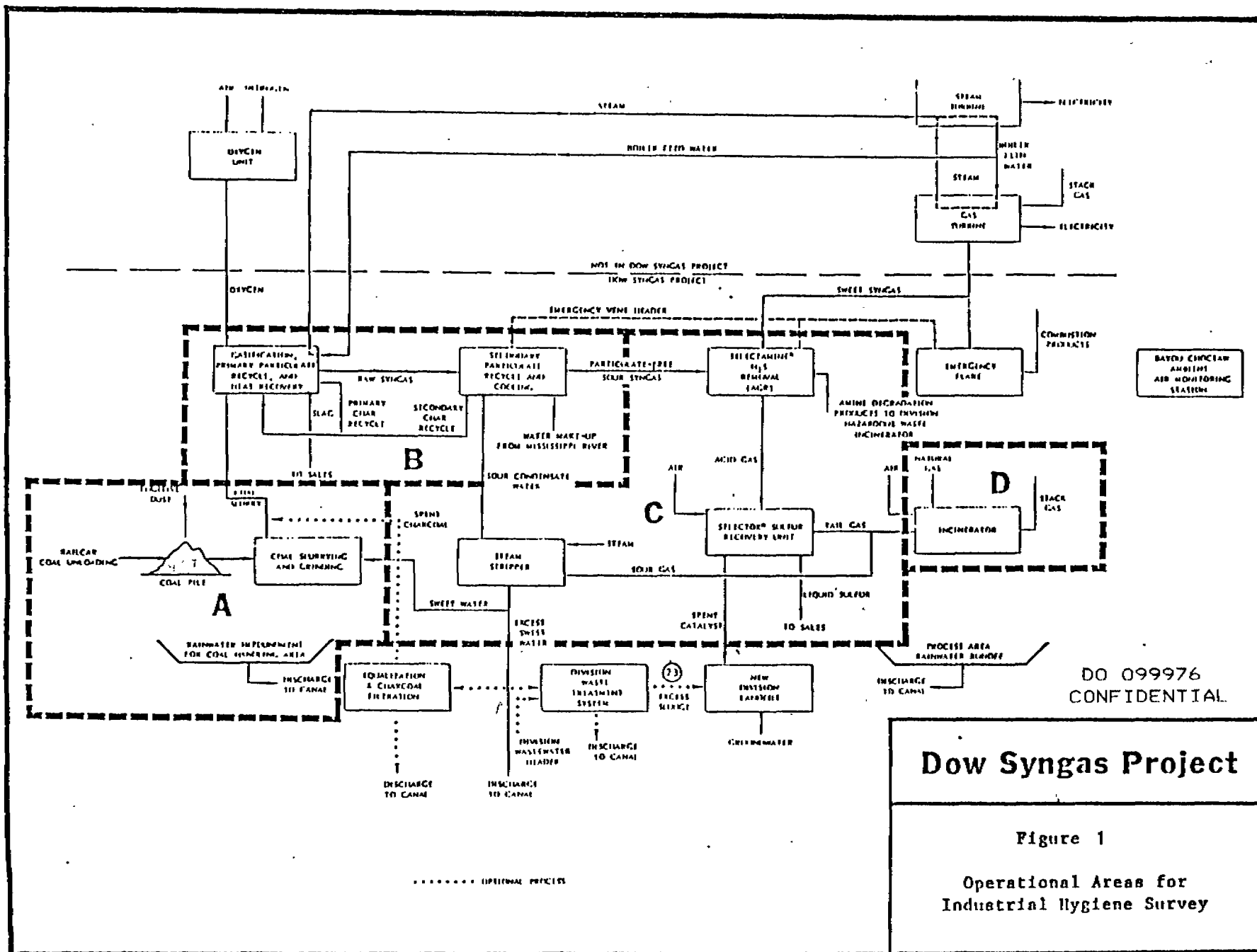
SAMPLING AND ANALYTICAL METHODS

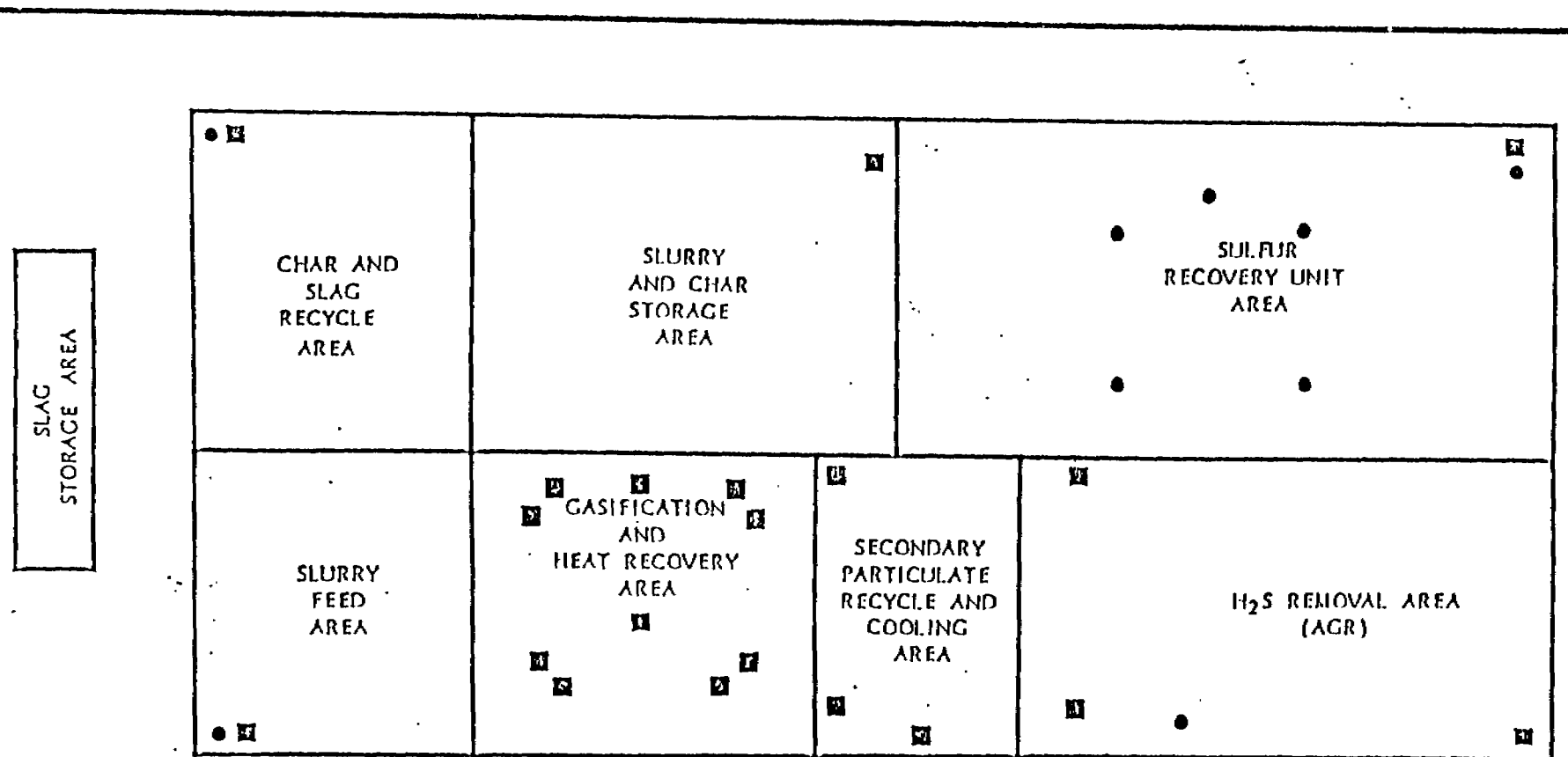
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APPENDIX 1

FIGURES

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(This figure is a diagrammatic representation of the equipment layout area of the Synfuels Project site.)

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Legend

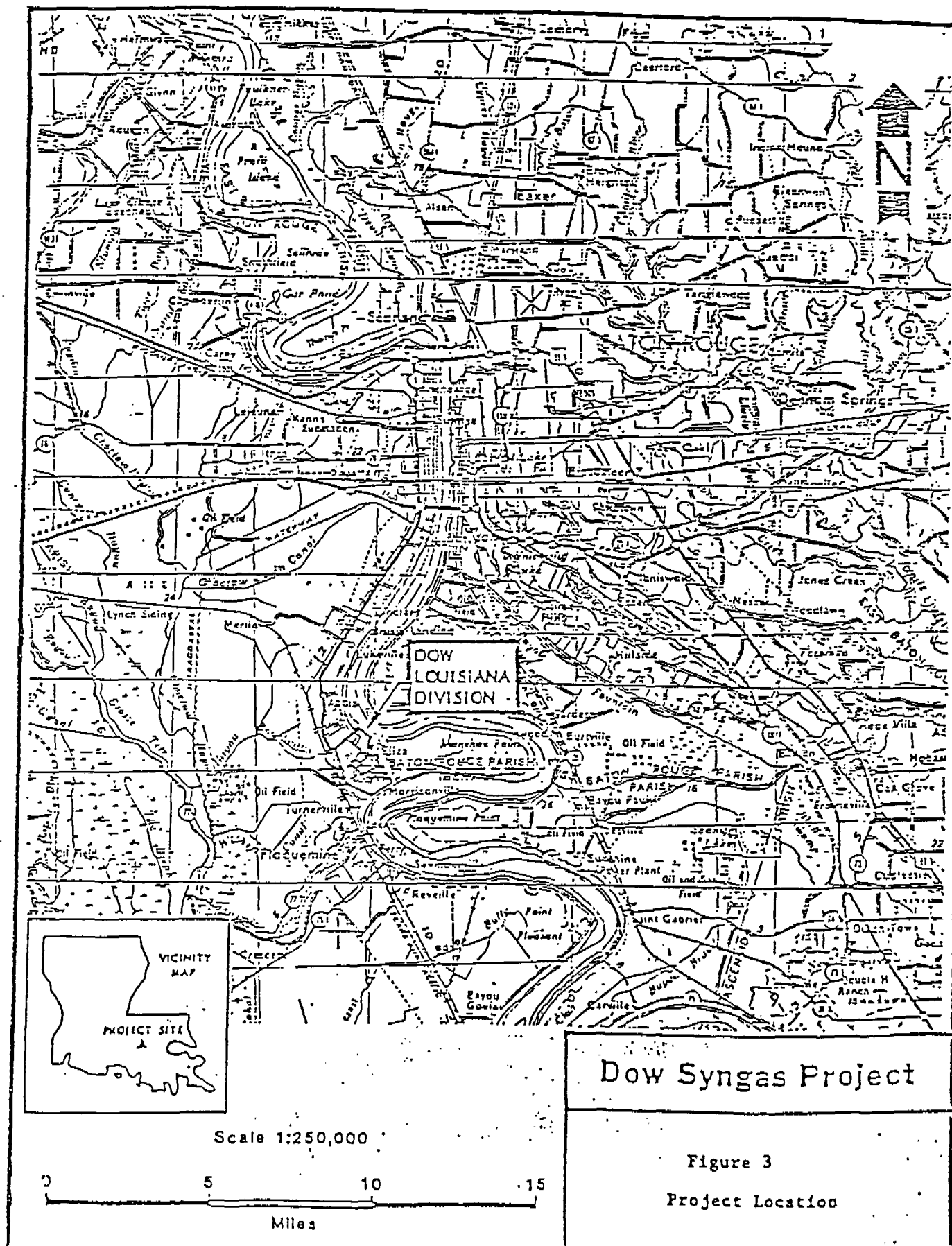
■ Location of CO Area Monitoring Detectors

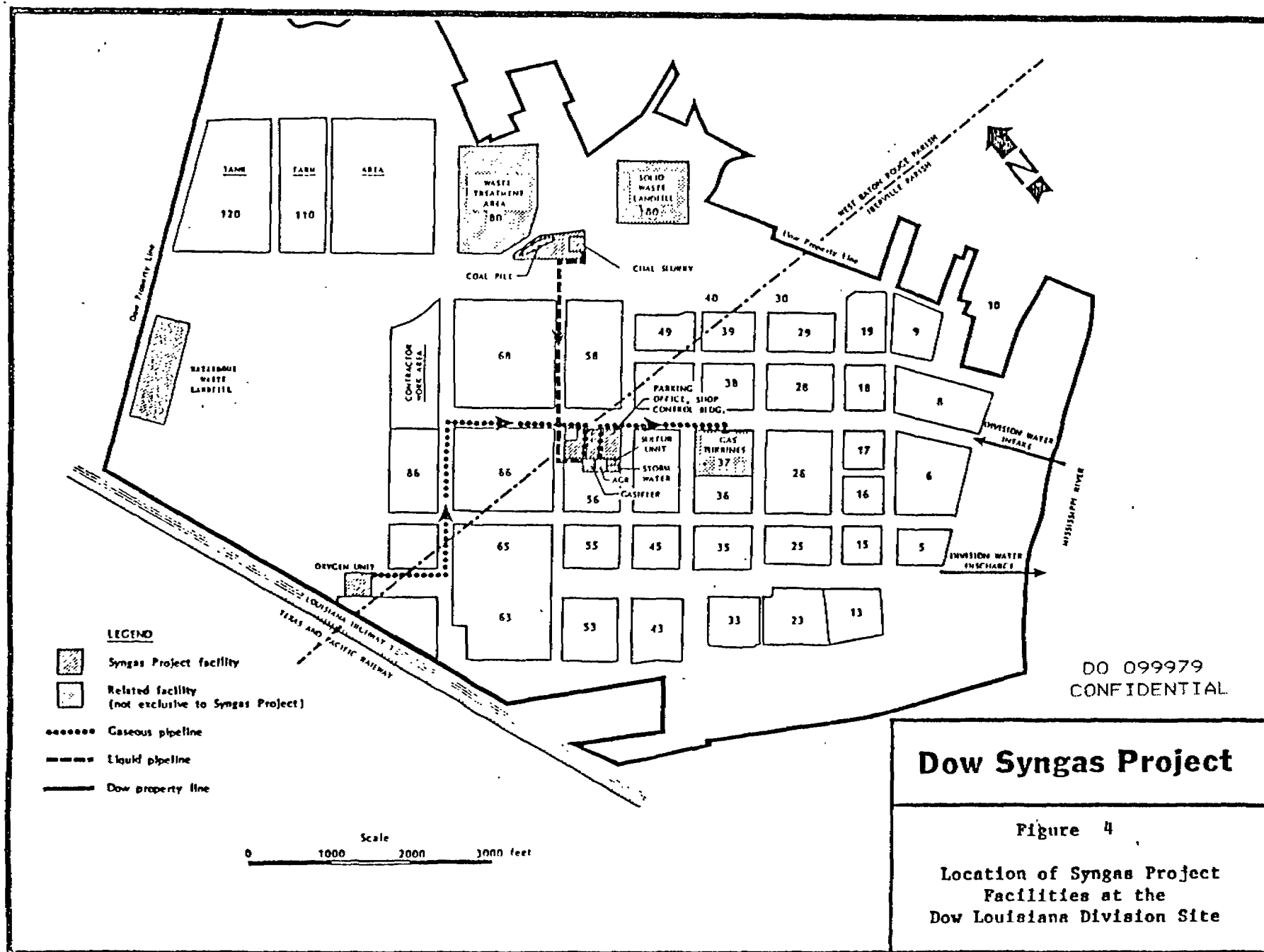
● Location of H₂S Area Monitoring Detectors

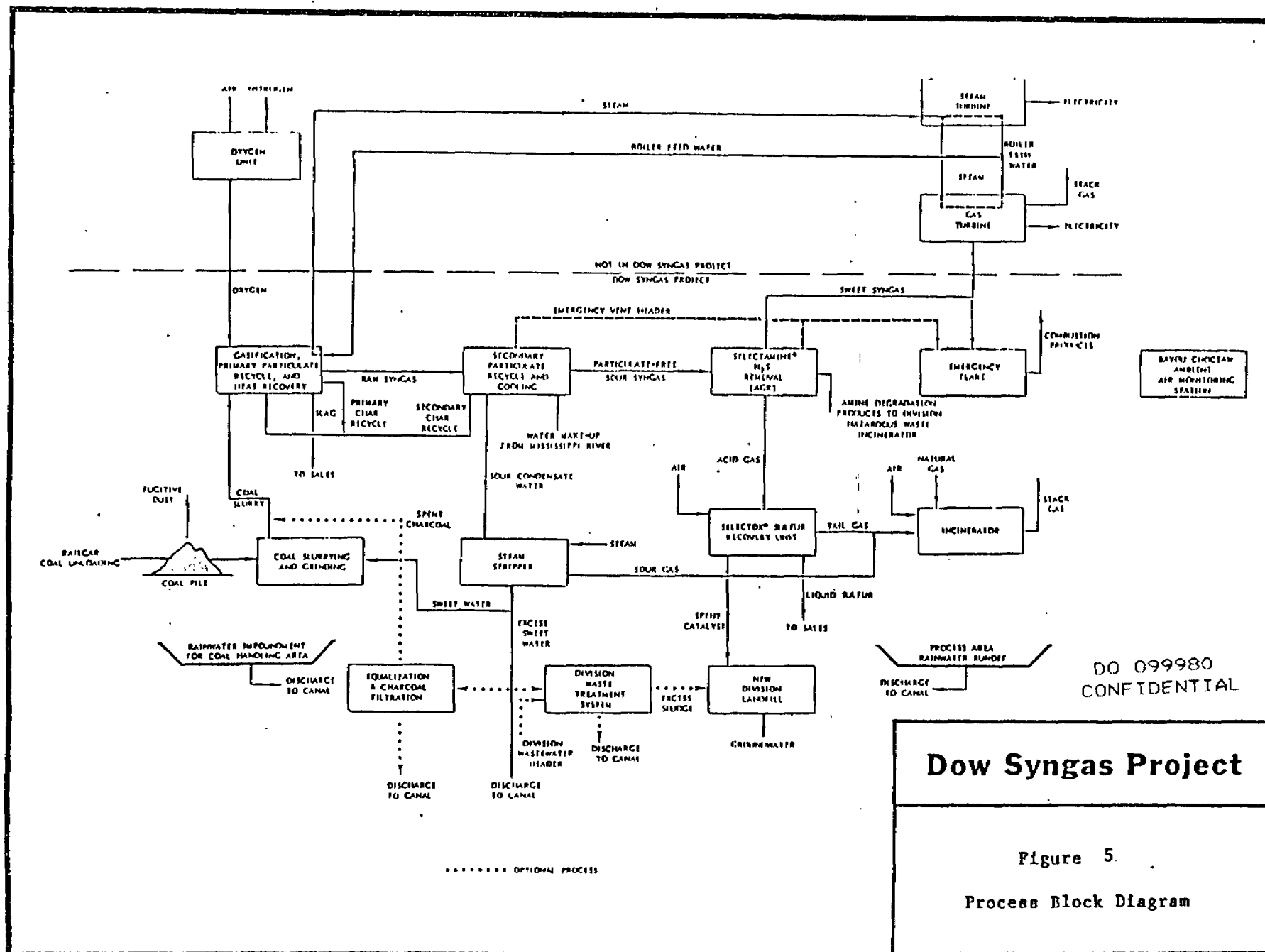
Dow Syngas Project

Figure 2

Sampling Locations for
Process Area H₂S
and CO Monitoring







APPENDIX 2

LGTI ACCESS POLICIES

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LOUISIANA GASIFICATION TECHNOLOGY INCORPORATED STRUCTURE ACCESS POLICY

During the operation of the plant, the following policy must be utilized:

ATMOSPHERIC PREHEAT:

- A. No one is allowed around the atmospheric burner while a light off is being attempted.

PRESSURIZED METHANE/COAL OPERATION:

- A. No access is allowed to the MX-120 and MX-121/122 decks during methane or coal startup.
- B. Access to the reactor structure (main burner deck and above) requires the following:
 - 1. Reactor system in a safe operating condition as determined by the board operator after reviewing:
 - a. System stability
 - b. Hot spots
 - c. Syngas/steam leaks
 - d. Area gas monitors
 - 2. Clearance from the board operator.
 - 3. All personnel must be logged in on the reactor structure access log. Personnel must be logged out when reactor structure access has been completed.
 - 4. Additional safety equipment required: CO personnel monitor (one per group).
 - 5. Process changes should be minimized while access to the structure has been granted.
- C. Access to the sulfur area structure requires the following:

Additional safety equipment required: H2S personnel monitor (one per group).
- D. Access to all other areas above ground level will require a CO personnel monitor (one per group) only when scheduled by the Environmental Co-ordinator.

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APPENDIX 3

1987 PERSONNEL MONITORING

DO 099983
CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Darwin F. Passman, Jr.

CHEMICAL NAME Benzene Soluble Organics DR#

PLANT LGTI PLANT NO. 57

SAMPLE DATE (MMDDYY) 12-22-87

SAMPLE NUMBER 08714

SAMPLING TIME IN MIN. 420

SAMPLE VOLUME IN LITERS 841.64

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

IF AREA, DESCRIBE P

RESPIRATOR TYPE (1 TO 7)* 1

8 OR 12 HOUR SHIFT 12

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO. 434085

IH JOB ASSIGNMENT # Lab Tech OT

SAMPLE CONCENTRATION RESULT N.D. (.07 mg/M³)

COMMENTS: Performed tar sampling and analysis of gaseous process
streams. Below MDL (1.0mg)

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0748

STOP TIME: 1448

BEGINNING FLOW RATE: 2.0024

ENDING FLOW RATE: 2.0078

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Rodney P. Roubique

CHEMICAL NAME Benzene Soluble Organics OR#

PLANT L G T I PLANT NO. 57

SAMPLE DATE (MMDDYY)	<u>12-23-87</u>
SAMPLE NUMBER	<u>08713</u>
SAMPLING TIME IN MIN.	<u>360</u>
SAMPLE VOLUME IN LITERS	<u>726.66</u>
SAMPLE TYPE (A, S OR P)	<u> </u>
A=AREA	
S=SHORT TERM	
P=PERSONAL	
IF AREA, DESCRIBE	<u>P</u>
RESPIRATOR TYPE (1 TO 7)*	<u>1</u>
8 OR 12 HOUR SHIFT	<u>12</u>
SHIFT 1, 2, OR 3	<u>1</u>
EMPLOYEE I.D. NO.	<u>434349</u>
IH JOB ASSIGNMENT #	<u>Slurry Area OT</u>

SAMPLE CONCENTRATION RESULT N. D. (.082 mg/M³)

COMMENTS: Operator performed operations + sampling duties in Slurry/Char/Slag areas. Below MDL (1.0 mg)

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0800 hrs
STOP TIME: 1400 hrs
BEGINNING FLOW RATE: 2.006
ENDING FLOW RATE: 2.031

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Francis Ivanisky

CHEMICAL NAME Benzene Soluble Organics OR#

PLANT LGTI FLANT NO. 57

SAMPLE DATE (MMDDYY) 1-8-88
 SAMPLE NUMBER 08689
 SAMPLING TIME IN MIN. 498
 SAMPLE VOLUME IN LITERS 992.76
 SAMPLE TYPE (A,S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7):*

8 OR 12 HOUR SHIFT

SHIFT 1, 2, OR 3

EMPLOYEE I.D. NO.

IN JOB ASSIGNMENT #

-

1

12

1

432660

Reactor Area SOT

SAMPLE CONCENTRATION RESULT 2.52 mg/M³

COMMENTS: Operator in charge of operations and sampling duties in the reactor area.

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
 4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0730

STOP TIME: 1548

BEGINNING FLOW RATE: 2.003

ENDING FLOW RATE: 1.984

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Kermit J. Harris

CHEMICAL NAME Benzene Soluble Organics OR#

PLANT LGTI PLANT NO. 57

SAMPLE DATE (MMDDYY) 1-12-88

SAMPLE NUMBER 08690

SAMPLING TIME IN MIN. 421

SAMPLE VOLUME IN LITERS 875.05

SAMPLE TYPE (A,S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7)* 1

8 OR 12 HOUR SHIFT 8

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO. S.S. 436-11-3908

IN JOB ASSIGNMENT # Solid Waste Handling Tech. (contractor)

SAMPLE CONCENTRATION RESULT 1.26 mg./M³

COMMENTS: Kermit handled packaging and readying for disposal MDEA wastewater
and cloth filters containing char and organics

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0830 hrs.

STOP TIME: 1531 hrs.

BEGINNING FLOW RATE: 2.059

ENDING FLOW RATE: 2.098

DO 099987
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INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Jody Hudson

CHEMICAL NAME Benzene Soluble Organics DR#

PLANT LGTI PLANT NO. 57

SAMPLE DATE (MMDDYY) 1-13-88

SAMPLE NUMBER 08691

SAMPLING TIME IN MIN. 476

SAMPLE VOLUME IN LITERS 962.71

SAMPLE TYPE (A,S OR P) -

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7)*

8 OR 12 HOUR SHIFT

SHIFT 1, 2, OR 3

EMPLOYEE I.D. NO.

IH JOB ASSIGNMENT #

-

1

8

1

S.S. 525-23-4774

Pipefitter for UMC

SAMPLE CONCENTRATION RESULT 1.14 mg./M³

COMMENTS: Worked during shutdown to remove a large spool piece from the top of the reactor.

RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0730 hrs

STOP TIME: 1526 hrs

BEGINNING FLOW RATE: 2.044

ENDING FLOW RATE: 2.001

DO 099988
CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Byron Sharp

CHEMICAL NAME Benzene Soluble Organics DR#

PLANT LGTI PLANT NO. 57

SAMPLE DATE (MMDDYY) 1-14-88

SAMPLE NUMBER 08693

SAMPLING TIME IN MIN. 435

SAMPLE VOLUME IN LITERS 785.61

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7):

6

8 OR 12 HOUR SHIFT

12

SHIFT 1, 2, OR 3

1

EMPLOYEE I.D. NO.

S.S. 434-02-0057

IN JOB ASSIGNMENT #

Welder UMC Contractor

SAMPLE CONCENTRATION RESULT * 17.56 mg./M³

COMMENTS: Performed arc gouging job removing a stainless steel plate from CY-120.
Slag deposits were present.

* This sample had large amount of dust particles that is believed to have
contributed heavily to end result.

RESPIRATOR TYPE: 1 = NOT USED

2 = MOUTH-BIT

3 = HALF FACE

4 = FULL FACE

5 = AIR LINE

6 = DUST MASK

7 = SCBA

RAW DATA:

START TIME: 0800 hrs.

STOP TIME: 1515 hrs.

BEGINNING FLOW RATE: 1.936

ENDING FLOW RATE: 1.676

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Dennis Jewell

CHEMICAL NAME Benzene Soluble Organics OR#

PLANT LGTI PLANT NO. 57

SAMPLE DATE (MMDDYY) 1-14-88

SAMPLE NUMBER 08692

SAMPLING TIME IN MIN. 477

SAMPLE VOLUME IN LITERS 910.59

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7)*

1

8 OR 12 HOUR SHIFT

8

SHIFT 1, 2, OR 3

1

EMPLOYEE I.D. NO.

085820

IH JOB ASSIGNMENT #

Production Engineer

SAMPLE CONCENTRATION RESULT N.D. (.055 mg./M³)

COMMENTS: Below MDL (Method Detection Limit)

MDL - 1 mg.

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-PIECE 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0741 hrs.

STOP TIME: 1538 hrs.

BEGINNING FLOW RATE: 2.12

ENDING FLOW RATE: 1.698

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Blank

CHEMICAL NAME Benzene Soluble Organics OR#

PLANT LGTI PLANT NO. 57

SAMPLE DATE (MMDDYY) 1-14-88
 SAMPLE NUMBER 08694
 SAMPLING TIME IN MIN. -
 SAMPLE VOLUME IN LITERS -
 SAMPLE TYPE (A, S OR P) -

A=AREA

S=SHORT TERM

P=PERSONAL

IF AREA, DESCRIBE P

RESPIRATOR TYPE (1 TO 7)* 1

8 OR 12 HOUR SHIFT 8

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO. -

IN JOB ASSIGNMENT # -

SAMPLE CONCENTRATION RESULT .01 mg.

COMMENTS: Blank for QA/QC determination

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
 4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: -
 STOP TIME: -
 BEGINNING FLOW RATE: -
 ENDING FLOW RATE: -

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Lyndell Ricard

CHEMICAL NAME Coal Dust OR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY) 3-17-87

SAMPLE NUMBER 07654

SAMPLING TIME IN MIN. 480

SAMPLE VOLUME IN LITERS 960

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7)* 6

8 OR 12 HOUR SHIFT 8

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO.

IH JOB ASSIGNMENT # Slurry OT

SAMPLE CONCENTRATION RESULT Respirable .052 mg/m³/total .055 mg/m³

COMMENTS: Emptying coal cars

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-PIE 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0900 hrs

STOP TIME: 1700 hrs

BEGINNING FLOW RATE: 2.0

ENDING FLOW RATE:

DO 099992
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INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Jeff Kelleher

CHEMICAL NAME Coal Dust

OR# _____

PLANT Coal Slurry

PLANT NO. 70

SAMPLE DATE (MMDDYY) _____

3-17-87

SAMPLE NUMBER _____

07653

SAMPLING TIME IN MIN. _____

480

SAMPLE VOLUME IN LITERS _____

960

SAMPLE TYPE (A, S OR P) _____

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE _____

RESPIRATOR TYPE (1 TO 7)* _____

6

8 OR 12 HOUR SHIFT _____

8

SHIFT 1, 2, OR 3 _____

1

EMPLOYEE I.D. NO. _____

IH JOB ASSIGNMENT # _____

Slurry OT

SAMPLE CONCENTRATION RESULT Respirable .052 mg/m³/Total .054 mg/m³

COMMENTS: Emptying coal cars

RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-PIECE 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0900 hrs

STOP TIME: 1700 hrs

BEGINNING FLOW RATE: 2.00

ENDING FLOW RATE: _____

DO 099993
CONFIDENTIAL

AUDIO DOSIMETER DISPLAY DATA

DATE	2/3/87
EMPLOYEE ADMINISTERING SURVEY	SED GCL
EMPLOYEE SURVEYED	Keith Nuttall
LOCATION SURVEYED	Block 70 Unload Area
EXPOSURE TIME (HR:MN)	5:39
DOSE % (90db for 8 hours = 100%)	36.1
SOUND LEVEL, AVERAGE db	85.2
MAXIMUM 1 SECOND SOUND LEVEL	126.3
PROJECTED 8-HOUR DOSE %	50.6

DO 099994
CONFIDENTIAL

APPENDIX 4

1987 AREA MONITORING

DO 099995
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PLANT Coal Slurry PLANT NO. 70

IN JOB ASSIGNMENT #

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[illegible]

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NAME OF INVESTIGATOR: Steve Dihero

CHEMICAL NAME Coal Dust DR#

FLANT Coal Slurry FLANT NO. 70

SAMPLE DATE (MMDDYY) 3-7-87

SAMPLE NUMBER. 07686

SAMPLING TIME IN MIN. 510

SAMPLE VOLUME IN LITERS	1020
-------------------------	------

SAMPLE TYPE (A, S OR P) _____

A=25E2

S=SHORT TERM

F=PERSONAL

IF AREA, DESCRIBE	Coal Dumping Area
-------------------	-------------------

REFRIGERATOR TYPE (1 TO 7): 6

8 OR 12 HOUR SHIFT	12
--------------------	----

SHIFT 1, 2, OR 3

EMPLOYEE I.D. NO. _____

IN JOB ASSIGNMENT #

SAMPLE CONCENTRATION RESULT Respirable .7 mg/m³/Total 2.5 mg/m³

COMMENTS: Emptying coal cars

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#RESPIRATOR TYPE: 1 = NOT USED      2 = MOUTH-PIE      3 = HALF FACE
                  4 = FULL FACE      5 = AIR LINE        6 = DUST MASK      7 = SCBA

```

RAW DATA:

START TIME: 8.5 hrs

STOP TIME: ---

BEGINNING FLOW RATE: avd. 2.00 l

ENDING FLOW RATE:

DO 099998
CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Steve Dighero

CHEMICAL NAME Coal Dust DR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY)	<u>3-13-87</u>
SAMPLE NUMBER	<u>07656</u>
SAMPLING TIME IN MIN.	<u>480</u>
SAMPLE VOLUME IN LITERS	<u>960</u>
SAMPLE TYPE (A, S OR P)	<u> </u>

A=AREA

S=SHORT TERM

P=PERSONAL

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7)*

8 OR 12 HOUR SHIFT

SHIFT 1, 2, OR 3

EMPLOYEE I.D. NO.

IN JOB ASSIGNMENT #

<u>A</u>
<u>Coal Dumping Area</u>
<u>6</u>
<u>8</u>
<u>1</u>
<u>---</u>
<u>---</u>

SAMPLE CONCENTRATION RESULT Respirable .51 mg/m³

COMMENTS: Emptying coal cars.

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
 4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0900 hrs
 STOP TIME: 1700 hrs
 BEGINNING FLOW RATE: 2.0
 ENDING FLOW RATE: ---

AUDIO DOSIMETER DISPLAY DATA

DATE	1/30/87	2/2/87	2/4/87	2/16/87	2/17/87
EMPLOYEE ADMINISTERING SURVEY	SED	SED	SED	SED	SED
EMPLOYEE SURVEYED					
LOCATION SURVEYED	Block 70 Unload Area Shaker Controls	Block 70 Unload Area Shaker Controls	Block 70 Unload Area While Shaking	Block 70 Unload Area Inside Shack	Block 70 Unload Area Shaker Control
EXPOSURE TIME (HR:MN)	1:40	4:56	0:10	3:56	9:59
DOSE% (90 db for 8 hours = 100%)	117.9	143.0	53.1	3.7	16.2
SOUND LEVEL, AVERAGE db	102.5	96.1	114.2	71.4	75.3
MAXIMUM 1 SECOND SOUND LEVEL	108.5	123.1	122.3	94.1	116.4
PROJECTED 8 HOURS DOSE %	555	229	-	7.5	13.4

GCL:feb (80.1)
4/8/88

APPENDIX 5

SAMPLING AND ANALYTICAL METHODS

DO 100001
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SAMPLING COMPONENT S-1
ASPIRATOR OR VACUUM PUMP

PROCEDURES REFERENCE:

1. Code of Federal Regulations, 40 CFR 60, Appendix A, Methods 3 and 5.
2. Code of Federal Regulations, 50 CFR 61, Appendix B.

GENERAL DESCRIPTION:

A device capable of moving a fluid through a sampling system by applying a negative pressure on the system.

COMPONENT ILLUSTRATION:

(See Figure S-1-1)

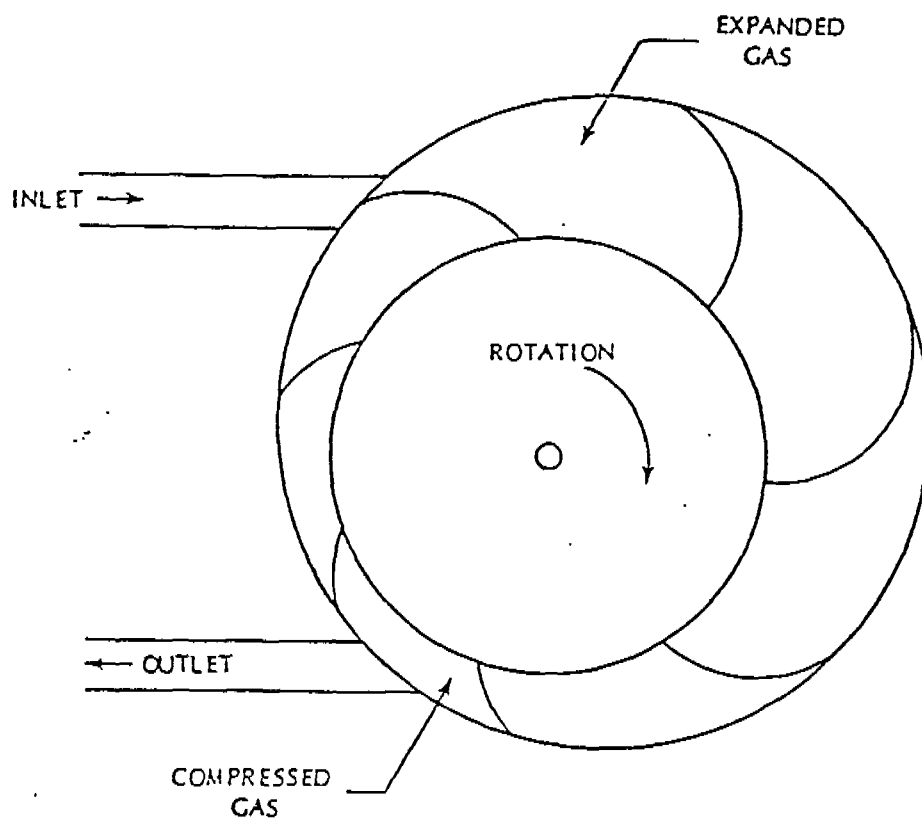
VARIATIONS:

- f. Vented to flare
- g. Recirculated to stream

PRE-SAMPLING PREPARATION:

In order to insure the most precise sampling operation, assure that all apparatus, sample containers and sampling train are clean and free of obstruction. Purge sample lines and sample system with several volumes of the sample stream before attempting to collect a representative sample.

Revision 0
11-19-84



DO 100003
CONFIDENTIAL

Dow Syngas Project

Figure S-1-1
Aspirator/Vacuum
Pump Diagram

SAMPLING COMPONENT S-2

FILTER

PROCEDURES REFERENCE:

1. Code of Federal Regulations, 40 CFR 60, Appendix A, and 40 CFR 61, Appendix B.
2. Environmental Monitoring Reference Manual, EPA 600/8-83-027, Methods S-06.

GENERAL DESCRIPTION:

Any of several different devices capable of removing one phase from another by purely mechanical means.

METHOD ILLUSTRATION:

(See Figure S-2-1)

VARIATIONS:

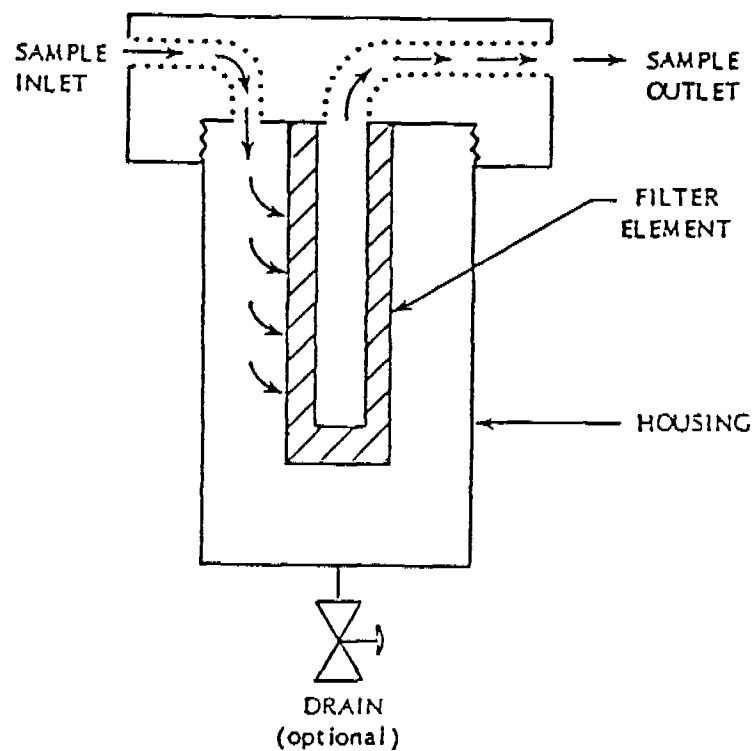
- a. Heated
- b. Cooled
- c. High pressure
- d. Low pressure
- h. Specialized material

PRE-SAMPLING PREPARATION:

In order to insure the most precise sampling operation, assure that all apparatus, sample containers and sampling train are clean and free of obstruction. Purge sample lines and sample system with several volumes of the sample stream before attempting to collect a representative sample.

DO 100004
CONFIDENTIAL

Revision 0
11-19-84



DO 100005
CONFIDENTIAL

Dow Syngas Project

Figure S-2-1

Filter Diagram

SAMPLING COMPONENT S-8

SORBENT COLUMN OR BED

PROCEDURES REFERENCE:

1. Code of Federal Regulations, 40 CFR 60, Appendix A and 40 CFR 61, Appendix B.
2. Environmental Monitoring Reference Manual, EPA 600/8-83-027, Method S-05, S-06.
3. American Society for Testing and Materials, Annual Book of ASTM Standards, Method D3686-78.

GENERAL DESCRIPTION:

A packed bed or column filled with a solid material capable of selectively removing species of interest by physio-chemical means of adsorption, absorption or reaction with the species. Vapor phase organics are sorbed by this technique, using most often the XAD-2 resin for moderately volatile compounds and Tenax-GC resin for volatile compounds.

COMPONENT ILLUSTRATION:

(See Figure S-8-1)

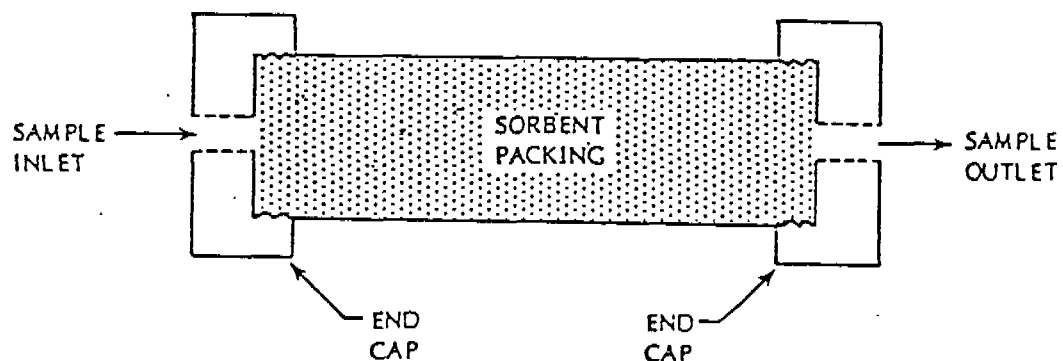
VARIATIONS:

- a. Heated
- b. Cooled
- c. High pressure
- d. Low pressure
- h. Specialized material

PRE-SAMPLING PREPARATION:

In order to insure the most precise sampling operation, assure that all apparatus, sample containers and sampling train are clean and free of obstruction. Purge sample lines and sample system with several volumes of the sample stream before attempting to collect a representative sample.

Revision 0
11-19-84



DO 100007
CONFIDENTIAL

Dow Syngas Project

Figure S-8-1
Sorbent Column Diagram

SAMPLING COMPONENT S-10
DIRECT READING COLORIMETRIC
INDICATOR TUBES (DRAEGER)

PROCEDURES REFERENCE:

Air Sampling Instruments, 5th Edition, ACGIH.

GENERAL DESCRIPTION:

Glass indicator tubes contain solid chemicals that react with special chemicals sampled to give a color change. The degree of color change is an indication of the concentration of the specific chemical in the air sampled.

METHODS:

Pre-Sampling Preparation:

Assure that the pump is operating correctly. Using the guidelines for Draeger tubes, determine the strokes required for the specific chemical.

Sample Preparation:

Sample must be in the form of a gas.

QA/QC:

Check expiration dates on tubes. Use G.C. to check gas if non-specific.

SAMPLING COMPONENT S-11

NOISE-AUDIO DOSIMETER

PROCEDURES REFERENCE:

DuPont MK-2 Operating Manual

GENERAL DESCRIPTION:

The DuPont Mark 2 Audio Dosimeter is a personal monitor that is controlled by a micro computer chip and measures noise exposure. It meets or exceeds all current U.S. Government Specifications for audio dosimeters, including O.S.H.A. and M.S.R.A.

METHODS:

Pre-Sampling Preparation:

Batter, displays, and calibration are checked. Calibration is achieved by using a DuPont AC-1 Acoustical Calibrator, or the DuPont C-114 Calibrator. Microphone is secured as close to the employees ear as practical and comfortable.

Sample Preparation:

None necessary.

QA/QC:

Calibration checks before and after each use. Proper instructions to employee by the Industrial Hygienist Trainer for this sampling.

Revision 1
2-25-87

SAMPLING COMPONENT S-12
PERSONAL H₂S/CO ALARM MONITORS

PROCEDURES REFERENCE:

GasTech, Inc., Models ES-82 and CO-82, Newark, California 94043.

GENERAL DESCRIPTION:

The personal monitors are direct reading personal indicators designed to detect the presence of H₂S and CO in the ppm range. Response time is rapid, and an alarm sounds. Detection is by an electrochemical cell. H₂S range is 0-50 ppm; CO range is 0-500 ppm.

METHODS:

Pre-Sampling Preparation:

Battery check and calibration with a standard gas in air is conducted.

QA/QC:

Standard calibration methods are used before and after use to assure correct readings.

Revision 0
2-25-87

SAMPLING COMPONENT S-13
PERSONAL H₂S/CO EXPOSURE LEVEL MONITOR

PROCEDURES REFERENCE:

GasTech, Inc., Model, GX-86 Four Gas Portable Monitor for O₂, %LEL, H₂S and CO, Newark, California 94043.

GENERAL DESCRIPTION:

The personal monitors are direct reading personal indicators designed to detect the presence of H₂S and CO in the ppm range. Response time is rapid, and an alarm sounds. The built in dosimeter records total exposure to H₂S and CO and calculates the time weighted average (TWA) from the moment the instrument is activated. Detection is by an electrochemical cell. H₂S range is 0-50 ppm; CO range is 0-500 ppm.

METHODS:

Pre-Sampling Preparation:

Battery check and calibration with a standard gas in air is conducted.

QA/QC:

Standard calibration methods are used before and after use to assure correct readings.

ANALYTICAL/TEST METHOD A-11

GAS CHROMATOGRAPHY - FLAME IONIZATION DETECTION

PROCEDURES REFERENCE:

1. Lentzen, D.E., D.E. Wagoner, E.D. Estes and W.F. Gutknecht. U.S. EPA/IERL-RTP Procedures Manual: Level 1 Environmental Assessment, EPA-600-7-78-201, RTP, NC, January, 1979. (NTIS No. PB 293795/AS).
2. Environmental Monitoring Reference Manual for Synthetic Fuels Facilities, EPA-600/8-83-027.

GENERAL DESCRIPTION:

Gas chromatography with flame ionization detection can be used to detect virtually any organic species which can be chromatographed. This technique is applicable to gas samples collected on sorbents or in impinger solutions, as well as aqueous and solid samples. The sample or sample extract is introduced into the gas chromatograph by either direct injection or thermal desorption. Separation of the sample components is achieved through use of a chromatographic column. A variety of columns are available and the column used is dependent on the separation needed. Both capillary and packed columns can be used. This technique can be used to determine if any organic species are present, to obtain an estimation of the total chromatographable organic loading, and/or to determine the presence or concentration of selected compounds by comparison to analytical standards.

METHODS:

Pre-Analysis Preparation:

The sample is introduced by thermal desorption or as an extract by direct injection. Procedures such as column separation, derivatization, or solvent partitioning are used particularly for complex samples as they provide for more reliable identification and quantification of species present.

Sample Analysis:

Direct injection or thermal desorption gas chromatography with flame ionization detection can be used in determining the presence of almost any organic species which can be chromatographed. GC conditions are determined from the analysis of calibration standards containing the analytes of interest. The method is not specific for any compound.

ANALYTICAL/TEST METHOD A-11

GAS CHROMATOGRAPHY - FLAME IONIZATION DETECTION

(CONTINUED)

QA/QC:

Regular calibration checks and reference analysis are performed in addition to standard laboratory procedures. The analytes of interest must be chromatographable. High concentrations of other organics can interfere with the analysis. The detector stability and linearity is established and verified prior to sample analysis. Identification is based on retention time only. This method cannot be used to unequivocally identify unknowns or provide any specific information about the unknown except estimated boiling points.

This method is tentative and must be validated for each sample or matrix on which it is used. During this process it may be determined that changes in reagents, equipment or procedures must be made.

DO 100013
CONFIDENTIAL

ANALYTICAL/TEST METHOD A-30
PROCESS AREA PORTABLE ORGANICS ANALYZER

PROCEDURES REFERENCE:

Air Sampling Instruments, 5th Edition, ACGIH.

GENERAL DESCRIPTION:

The instrument is non-specific, sensitive to detect less than 0.2 ppm of many organics. It is a photoionization analyzer, light weight and operates on rechargeable batteries. The sensor consists of a sealed ultraviolet light source that emits photons which ionize many trace organics but not the components of air (O₂, N₂, CO, CO₂, or H₂O).

METHODS:

Pre-Analysis Preparation:

Battery check and calibration with a standard gas in air is conducted.

Sample Analysis:

No preparation necessary. The sensor is non-specific, so only a single material can be measured as a gas in air.

QA/QC:

Standard calibration methods before and after sampling. Use G.C. to confirm that a single gas is present.

ANALYTICAL/TEST METHOD A-36

CONTINUOUS H_2S/SO_2 ANALYZER

PROCEDURES REFERENCE:

Teledyne Analytical Instruments, Model 600 UV/Visible Photometric Analyzer, 1983.

GENERAL DESCRIPTION:

An on-stream analyzer will automatically and continuously sample the process stream. Hydrogen sulfide or sulfur dioxide will be measured by utilizing infrared or ultraviolet absorption techniques.

METHODS:

Pre-Analysis Preparation:

Sample stream to analyzer will be routed through a sample system designed to remove particulate matter. This will be done by selective filtration.

Sample Analysis:

The sample stream will flow through a sample cell which is in an optical path consisting of a source lamp, the cell, and a detector. Sample flows continuously through the cell and absorbs optical energy at various wave lengths in accordance with its composition. The concentration of the absorbing compound is proportional to the logarithm of the energy entering the sample divided by the transmitted energy, and inversely proportional to the cell path length.

QA/QC:

The detector response will be checked by flowing a non-absorbing gas through the sample cell and calibrating the instrument to read 100%, then flowing a known concentration of gas through the sample cell and calibrating the instrument to read that concentration.

ANALYTICAL/TEST METHOD A-44

CONTINUOUS CARBON MONOXIDE ANALYZER

PROCEDURES REFERENCE:

40 CFR 60, Standards of Performance for New Stationary Sources, Appendix A;
Method 10 - Determination of Carbon Monoxide Emissions from Stationary
Sources.

GENERAL DESCRIPTION:

A continuous gas sample will be extracted from the sampling point in the
stack and analyzed for carbon monoxide (CO) content using a nondispersive
infrared analyzer (NDIR).

METHODS:

Pre-Analysis Preparation:

The NDIR will be calibrated prior to each test sequence using certified
zero and span gases. The sample line will be purged with nitrogen
before sampling.

Sample Analysis:

Samples will be extracted continuously through a stainless steel or
Pyrex® glass probe for the duration of each test. Sample gas will be
pre-treated by passing through an air-cooled condenser, an ice bath,
and silica gel to remove moisture. The sample then will be analyzed by
the NDIR.

QA/QC:

The NDIR will meet the performance specifications specified in EPA
Method 11. The NDIR will be calibrated prior to each sample analysis
using certified zero and span gases, which are traceable to NBS stan-
dards. The analyzer will be allowed to stabilize for five minutes
prior to reading the results.



DOW CHEMICAL U.S.A.

August 20, 1987

Rodney Webb, 5701
Roger Hudson, 5701
Gretchen LeBlanc, 5701

cc: Mike Nevill
Bill Ledford
Bruce Alexius

REVIEWED
OCT 16 1990
HANK GRACE

LOUISIANA DIVISION
P. O. BOX 150
PLAQUEMINE, LOUISIANA 70765-0150
504 389-8000

REVIEWED

FEB 20 1989

DARWIN PASSMAN

ASBESTOS SURVEY - BLOCK 57, LGTI PLANT

An asbestos identification survey was performed on August 17, 1987 for the permanent buildings located in Block 56, LGTI.

The survey included reviewing building specifications to identify potential problem areas and a walk-through visual inspection of areas likely to have asbestos-containing materials such as motor control centers and lab rooms.

The building specifications indicated the following:

1. Asbestos vinyl floor tile (Block 57 and Block 70) Sec. 9.5.3.1.

No other specific references to asbestos were found.

Other areas visually inspected:

<u>Building</u>	<u>Comments</u>
Lab	None found
Women's Locker Room	None found
Motor Control Center	Transite electrical insulation between the boxes

Our recommendations are as follows:

1. The motor control center has transite (asbestos-containing material) as electrical insulation between the boxes. This transite is in good condition; no remedial action is required.
2. Asbestos-containing materials (transite, gaskets) must be maintained, handled properly, and personnel trained according to the Louisiana Division Asbestos Guidelines.
3. A permanent file should be maintained identifying asbestos location, maintenance, and training records.

4. The results of this survey identify the location of asbestos-containing materials in the LGTI Plant's permanent buildings; however, caution is advised during the demolition of any building materials (i.e. flooring, insulation).
5. If further information, sampling, or material identification are required, please contact Industrial Hygiene (Ext. 6163) or Maintenance (Ext. 6443, or Radio 640).

LC Hollis

Leslie Hollis
Industrial Hygiene

sb

DO 100018
CONFIDENTIAL

coal
Tar
Pitch
Volatiles

TLV

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Darwin F. Passman, Jr.

CHEMICAL NAME Benzene Soluble Organics DR# 9999-0524

PLANT LGTI 05 PLANT NO. 057

SAMPLE DATE (MMDDYY) 12-22-87
SAMPLE NUMBER 08714
SAMPLING TIME IN MIN. 420
SAMPLE VOLUME IN LITERS 841.64

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7)*

8 OR 12 HOUR SHIFT

SHIFT 1, 2, OR 3

EMPLOYEE I.D. NO.

IH JOB ASSIGNMENT #

1

12

1

434085

Lab Tech OT

SAMPLE CONCENTRATION RESULT N.D. (0.07 mg/M³)

COMMENTS: Performed tar sampling and analysis of gaseous process
streams. Below MDL (1.0mg)

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0748
STOP TIME: 1448
BEGINNING FLOW RATE: 2.0024
ENDING FLOW RATE: 2.0078

DO 100019
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INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Rodney P. Roubique

CHEMICAL NAME Benzene Soluble Organics DR#

PLANT L G T I PLANT NO. 57

SAMPLE DATE (MMDDYY) 12-23-87

SAMPLE NUMBER 08713

SAMPLING TIME IN MIN. 360

SAMPLE VOLUME IN LITERS 726.66

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7):

8 OR 12 HOUR SHIFT

SHIFT 1, 2, OR 3

EMPLOYEE I.D. NO.

IH JOB ASSIGNMENT #

1

12

1

434349

Slurry Area OT

SAMPLE CONCENTRATION RESULT N. D. (.082 mg/M³)

COMMENTS: Operator performed operations + sampling duties in Slurry/Char/Slag
areas. Below MDL (1.0 mg)

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0800 hrs

STOP TIME: 1400 hrs

BEGINNING FLOW RATE: 2.006

ENDING FLOW RATE: 2.031

DO 100020
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INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Lyndell Ricard

CHEMICAL NAME Coal Dust DR# 9999-0525

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY) 3-17-87
 SAMPLE NUMBER 07658
 SAMPLING TIME IN MIN. 880
 SAMPLE VOLUME IN LITERS 960
 SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

P

IF AREA, DESCRIBE

RESPIRATOR TYPE (1 TO 7):

6

8 OR 12 HOUR SHIFT

8

SHIFT 1, 2, OR 3

1

EMPLOYEE I.D. NO.

434380

IH JOB ASSIGNMENT #

Slurry OT

SAMPLE CONCENTRATION RESULT Respirable .052 mg/m³/total .055 mg/m³

COMMENTS: Emptying coal cars

RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-PIE 3 = HALF FACE
 4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0900 hrs

STOP TIME: 1700 hrs

BEGINNING FLOW RATE: 2.0

ENDING FLOW RATE: ---

DO 100021
 CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Jeffrey JD
Jeff Kelleher

CHEMICAL NAME Coal Dust DR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY) 3-17-87
SAMPLE NUMBER 07653
SAMPLING TIME IN MIN. 480
SAMPLE VOLUME IN LITERS 960
SAMPLE TYPE (A, S, OR P)

A=AREA
S=SHORT TERM
P=PERSONAL
IF AREA, DESCRIBE
RESPIRATOR TYPE (1 TO 7)* 6
8 OR 12 HOUR SHIFT 8
SHIFT 1, 2, OR 3 1
EMPLOYEE I.D. NO. 433792
IH JOB ASSIGNMENT # Slurry OT

SAMPLE CONCENTRATION RESULT Respirable .052 mg/m³/Total .054 mg/m³

COMMENTS: Emptying coal cars

RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-PIE 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0900 hrs
STOP TIME: 1700 hrs
BEGINNING FLOW RATE: 2.00
ENDING FLOW RATE:

DO 100022
CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Bill Ledford

CHEMICAL NAME Coal Dust DR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY) 2-17-87

SAMPLE NUMBER 07660

SAMPLING TIME IN MIN. 240

SAMPLE VOLUME IN LITERS 460

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

IF AREA, DESCRIBE Coal Dumping Area

RESPIRATOR TYPE (1 TO 7)* 6

8 OR 12 HOUR SHIFT 12

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO.

IH JOB ASSIGNMENT #

SAMPLE CONCENTRATION RESULT .025 mg/m³ total dust

COMMENTS: Emptying coal cars

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 1415 hrs

STOP TIME: 1815 hrs

BEGINNING FLOW RATE: 1.92

ENDING FLOW RATE:

DO 100023
CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Bill Ledford

CHEMICAL NAME Coal Dust DR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY)	<u>2-17-87</u>
SAMPLE NUMBER	<u>07667</u>
SAMPLING TIME IN MIN.	<u>600</u>
SAMPLE VOLUME IN LITERS	<u>1110</u>
SAMPLE TYPE (A, S OR P)	<u> </u>

A=AREA
S=SHORT TERM
P=PERSONAL

IF AREA, DESCRIBE	<u>A</u>
RESPIRATOR TYPE (1 TO 7):*	<u>Coal dumping area</u>
8 OR 12 HOUR SHIFT	<u>6</u>
SHIFT 1, 2, OR 3	<u>12</u>
EMPLOYEE I.D. NO.	<u>1</u>
IH JOB ASSIGNMENT #	<u>---</u>

SAMPLE CONCENTRATION RESULT .18 mg/m³ Total dust

COMMENTS: Emptying coal cars

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0615 hrs
STOP TIME: 1815 hrs
BEGINNING FLOW RATE: 1.85 LPM
ENDING FLOW RATE: ---

DO 100024
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INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Steve DiChero

CHEMICAL NAME Coal Dust OR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY) 3-2-87

SAMPLE NUMBER 07586

SAMPLING TIME IN MIN. 510

SAMPLE VOLUME IN LITERS 1020

SAMPLE TYPE (A, S OR P)

A=AREA

S=SHORT TERM

P=PERSONAL

IF AREA, DESCRIBE A
Coal Dumping Area

RESPIRATOR TYPE (1 TO 7): 6

8 OR 12 HOUR SHIFT 12

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO. ---

IN JOB ASSIGNMENT # ---

SAMPLE CONCENTRATION RESULT Respirable .7 mg/m³/Total 2.5 mg/m³

COMMENTS: Emptying coal cars

RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 8.5 hrs

STOP TIME: ---

BEGINNING FLOW RATE: avg. 2.00 l

ENDING FLOW RATE: ---

DO 100025
CONFIDENTIAL

INDUSTRIAL HYGIENE SAMPLE CONCENTRATION DATA ENTRY

NAME OF INVESTIGATOR: Steve Dighero

CHEMICAL NAME Coal Dust DR#

PLANT Coal Slurry PLANT NO. 70

SAMPLE DATE (MMDDYY)	<u>3-13-87</u>
SAMPLE NUMBER	<u>07656</u>
SAMPLING TIME IN MIN.	<u>480</u>
SAMPLE VOLUME IN LITERS	<u>960</u>
SAMPLE TYPE (A,S OR P)	<u> </u>

A=AREA

S=SHORT TERM

P=PERSONAL

IF AREA, DESCRIBE Coal Dumping Area

RESPIRATOR TYPE (1 TO 7)* 6

8 OR 12 HOUR SHIFT 8

SHIFT 1, 2, OR 3 1

EMPLOYEE I.D. NO.

IH JOB ASSIGNMENT #

SAMPLE CONCENTRATION RESULT Respirable .51 mg/m³

COMMENTS: Emptying coal cars.

*RESPIRATOR TYPE: 1 = NOT USED 2 = MOUTH-BIT 3 = HALF FACE
 4 = FULL FACE 5 = AIR LINE 6 = DUST MASK 7 = SCBA

RAW DATA:

START TIME: 0900 hrs
 STOP TIME: 1700 hrs
 BEGINNING FLOW RATE: 2.0
 ENDING FLOW RATE: ---

DO 100026
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