PLAINTIFF'S EXHIBIT

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LOUISIANA DIVISION
CAUSTIC PLANT INDUSTRIAL HYGIENE
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REVIEW OF PAST EXPOSURE MONITORING

Employee exposures to 50% caustic, hydrochloric acid, and noise were evaluated during the years 1980 to 1984 and 1987 to 1988 (Table I). The results of the monitoring performed showed exposure levels for operations personnel to be within acceptable Industrial Hygiene guidelines. Since exposure levels did not change over the years studied, it was determined that yearly studies would be conducted only in problem areas.

Caustic exposure testing revealed that operations exposure data results were well below the TLV limit. The hydrochloric acid exposure data in the past was well below the TLV limit. Due to the construction of a new iron cell area, the 1988 HCl levels were virtually non-detectable.

Noise studies revealed that most personnel samples were within allowable limits, but several area samples were high. Area noise monitoring data has not changed over the past several years. However, noise warning signs are posted in these areas and operations personnel are required to wear hearing protection in these areas. Noise monitoring was not conducted during 1988.

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Table 1. Review of Past Industrial Hygiene Personnel Monitoring Data

Caustic (Limit: 2 mg/m^3)

Job Classification	(mg/m^3)	No. of Samples	Date
SS	0.022	3	1980
SOS	0.016	3	1980
OS	<0.022	9	1980
OS	0.01	17	1982
SOS	< 0.01	2	1983
OS	< 0.01	2	1983
SOS	<0.04	4	1987
OS	<.07	7	1987

HCl (Limit: 7 mg/m^3)

Job Classification	(ppm)	No. of Samples	Date
OS	0.8	2	1982
OS	<1.3	3	1987

Noise * (Limit: 90 DB(A))

Job Classification	% of Allowable (8-hour TWA)	No. of Samples	Date
OS	<5	4	1983
SS	15	1	1984
SOS	37	3	1984
OS	<69	7	1984
SOS	<20	4	1987
OS	<42	6	1987

* Hearing protection was worn.

Asbestos ** (Limit: 0.2 fibers/cc > 5 microns in length)

Job Classification	(f/cc >5 m)	Samples	Date
Insulator	0.03/0.22	2	1987

** Comfo II half-mask (HEPA filters) was worn, along with proper clothing and protective gear

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SURVEILLANCE PROGRAM

A. Rationale.

Since past personnel exposure levels of caustic were well below the TLV ceiling limit, personnel monitoring will not be performed every year. Personnel exposure studies will be performed in problem areas or in areas where there have been a process change.

The potential was high for personnel exposure to hydrochloric acid in the iron cell area. However, the new iron cell area was returned to operations in 1988, and exposure to hydrochloric acid has been undetectable to date. Therefore, monitoring in this area will be done only as needed.

Area and personnel noise surveys in 1987 did not reveal any significant changes in noise levels. Because of this, whole plant surveys will not be done on a yearly basis. Only in problem areas or in areas where process changes occur will monitoring be analyzed. Area noise surveys will be conducted every two years.

Asbestos will be monitored as necessary during asbestos removal jobs by trained maintenance personnel. Also, the OS (Loader) will be sampled at the loading rack since the gasket material for loading tank cars is made out of asbestos.

The Industrial Hygiene contact will conduct the monitoring and do the analysis of the samples. The Industrial Hygiene group will provide assistance with the monitoring if necessary

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B. SAMPLING STRATEGY

CAUSTIC PERSONNEL MONITORING

Job Classification	Job Tasks	No. of Samples	Frequency
SOS	Evaporator Area	2	2 yrs.
SOS	Finishing End	2	2 yrs
OS	Evaporator Area	3	2 yrs.
OS	Finishing End	3	2 yrs.
OS	Iron Cell Area	4	1 yr
OS and contract	Loading Area	2	1 yr.

HYDROCHLORIC ACID PERSONNEL MONITORING

Job Classification	Job Tasks	No. of Samples	Frequency
OS	Acidizing Iron Cells	4	2 yrs

NOISE AREA AND PERSONNEL MONITORING

Plant Area			2 yrs

ASBESTOS PERSONNEL MONITORING

Job Classification	Job Task	No. of Samples	Frequency
OS	Changing Gaskets	8	1 yr.
Craftsmen	Removing Insulation	As needed	1 yr

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C. METHODOLOGY

1. Caustic Exposure.

The caustic that operations personnel may potentially be exposed to in normal operations is 50% regular grade caustic.

The American Conference of Governmental Industrial Hygiene (ACGIH) Threshold Limit Value-Ceiling for sodium hydroxide is 2 mg/m^3. The threshold limit value is the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek to which all workers may be repeatedly exposed without adverse effect. However, the ceiling is the concentration that should not be exceeded during any part of the working exposure

The method of sampling was taken over an eight hour period and included six samples for the OS classification. The personnel samples were obtained from the operators' breathing zones and represent actual exposures as nearly as possible.

The samples were pulled through a size 0.8 micron milipore filter at a rate of 2 liters per minute using a three piece filter at the end of a high flow sample pump

The pump was calibrated with a bubblemeter to 2.0 liters before and after all readings were taken.

2 Hydrochloric Acid Exposure

The ACGIH Threshold Limit Value for hydrochloric acid is a 5 ppm or a 7 mg/m^3 ceiling. The threshold limit value is the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek to which all workers may be repeatedly exposed without adverse effect. However, the ceiling is the concentration that should not be exceeded during any part of the working exposure.

The method of sampling included four samples from the OS classification during the acidizing of the iron cells. The personnel samples were located in the operators' breathing zones and represent actual

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exposures as nearly as possible.

Since hydrochloric acid was used in a batch process, the samples were taken whenever the iron cells were being acidized. The samples were taken using diffusion Drager tubes (10/a-D) clipped to the collar of the operator's shirt.

3. Asbestos Exposure.

The ACGIH Threshold Limit Value for asbestos is 0.2 fibers/cc greater than 5 microns in length. The method of sampling was taken as an excursion for varying lengths of time. The sampling was done on the asbestos insulation removal group. The personnel samples were obtained from the breathing zone, but represent potential exposure levels since protective personal equipment is worn.

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The samples were collected using a Gilian high flow pump calibrated at 2.0 liters per minute with a 25 mm, 0.8 micron pore size mixed cellulose filter and a 50 mm cowl. The pump was calibrated before and after sampling.

Analyses were performed by an outside lab using NIOSH method 7400A.

D. Quality Control.

Routine quality control procedures shall be an integral part of the sampling and analysis procedures and functions. These procedures shall include the following:

1. Routine checking, calibration, and maintaining in good working order all equipment and instruments. Air sampling pumps will be calibrated both before and after use.

2. Routine checking of procedures and results

E. Exposure Evaluation.

1. Caustic Results.

Personnel Monitoring:

As shown in Table II, all exposure levels were well below the TLV ceiling limit. Monitoring was conducted on operations making general rounds, and catching and running samples. These are peak exposure areas, even though levels were well below acceptable limits.

Area Surveys:

The areas with the highest potential of caustic exposure were the iron cell area and the centrifuge area. By the end of the fourth quarter of 1988, a new iron cell area was installed which has greatly reduced caustic exposure levels. The structure is a multi-level open area which allows free air circulation. Each individual cell now has rubber skirting around the edges of the cell fume hoods to minimize migration of caustic mist.

A new centrifuge deck has been installed and the primary centrifuge has casing seals which eliminate caustic vapors from escaping. The spare centrifuge will have casing seals installed by 1990. The tanks beneath the centrifuges have vapor recovery piping in place for 1991 installation of a vent recovery system. Several process vessels which vent steam to the air will also be tied in to the vent recovery system. These projects will greatly reduce the already low exposure levels in these areas.

2. Hydrochloric Acid Results.

Personnel Monitoring.

Referring to Table III, all exposure levels were nondetectable.

Area Monitoring.

Since the hydrochloric acid is used as a batch process, the only area with the potential for hydrochloric acid exposure is the iron cell area. Process design improvements have been incorporated into the new iron cell area which completely contains the acid in a piping system. These improvements provide a more controlled means of containing the acid in block limits and treating it later for proper disposal. The vent hood skirts mentioned above also reduce exposure to HCl when the cells are full of acid.

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3. Asbestos Results.

Monitoring was conducted on the OS/contract loaders and the asbestos insulation removal group. Referring to Table IV, all of the samples were well below the allowable limit.

Asbestos monitoring will continue being collected on the craftsmen removing asbestos insulation. Also, monitoring will be performed on the OS/contract loaders as gaskets are removed from the tank cars.

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Table II. 1988 Personnel Exposure Monitoring to Sodium Hydroxide

Limit: 2 mg/m^3 Ceiling
8 hour TWA

Employee I.D. No	Job Class	Sample Number	Sample Duration (minutes)	TWA Exposure (Total Milligrams)
433057	OS	09342	540	ND
434249	OS	09257	660	ND
433057	OS	09245	720	ND
433325	OS	09248	480	ND
433290	OS	09339	480	ND
432241	OS	09247	480	ND

* ND denotes not detected

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Table III. 1988 Personnel Exposure Monitoring to Hydrochloric Acid *

Limit: 7 mg/m^3 Ceiling
8 hour TWA

Employee I. D. No.	Job Class	Drager Tube No.	Sample Duration (minutes)	TWA Exposure (Total ppm)
433057	OS	NA	480	ND
433304	OS	NA	480	ND
433048	OS	NA	480	ND
432393	OS	NA	480	ND

* All samples taken during the acidizing of iron cells. ND denotes nondetectable and NA denotes not applicable.

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Table IV. 1988 Personnel Exposure Monitoring on Asbestos

Limit: 0.2 fibers/cc > 5 microns in length
8 hour TWA

Sample No.	Soc. Sec. # or Employee #	Method Performed	Duration (min.)	Fibers/CC >5 microns	8-Hr TWA Fibers/CC
CONTRACT INSULATORS:					
09009	438-88-9412	Wet	225	0.01	0.01 *
09010	436-15-9555	Wet	225	0.01	0.01 *

* Proper protective clothing and a North 7500 half face respirator with high efficiency filters was worn during the job.

OPERATIONS SPECIALISTS:				
09246	433048	420	0.073	0.064
09244	433304	720	0.039	0.058
09341	432806	660	0.026	0.036
09343	433304	690	0.010	0.014
09344	433057	660	0.045	0.062
09246	433290	480	0.010	0.010

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EDUCATION PROGRAM

A. ANNUAL HEALTH HAZARD TRAINING.

The Industrial Hygiene Education Program is designed to inform workers of the chemical and physical agents in the workplace which may have an adverse effect on the health of the employee. An understanding of the hazards of the chemical and physical agents will reinforce safe handling by the employees.

The Industrial Hygiene Education Program will focus on the following key chemicals and physical agents:

	TLV or IHG
Sodium Hydroxide	2 mg/m^3 Ceiling
Hydrochloric Acid	7 mg/m^3 Ceiling
Asbestos	0.2 fibers/cc > 5 microns
Noise	90 dB(A)

The education program will include presentations by the Industrial Hygiene contact reviewing the toxicities of the key chemicals and physical agents in the block. Discussions about specific job procedures for tasks with a potential for employee exposure and the control methods in use will also be included in these presentations. Presentations will be given as part of the block training program held throughout the year.

An Industrial Hygiene Manual (HAZCOM manual) contains information about the effects of overexposure to each chemical in the plant. A copy of this manual is kept in the Industrial Hygiene contact's office. The secretary's office, the control room, the lab office, the maintenance office, and the safety office all contain copies of the MSDS sheets pertaining to the Caustic plant. During yearly training, all personnel are reminded of the existence and locations of the HAZCOM manual. Each year, the manual will be updated to ensure the current listing of chemicals are correct. The manual was last updated on December, 1988.

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Participation in the Industrial Hygiene Education Program is documented. The training documentation forms are in the Industrial Hygiene contact's file cabinet. These forms briefly describe the program's content and contain the signature of all employees in attendance.

B. Monitoring Results.

Monitoring results from the chemical and noise surveys will be communicated to the affected personnel as soon as possible after sample analysis. This communication also takes place during the annual Industrial Hygiene training.

C. Hazard Communication Training.

New or transfer employees and/or new chemicals introduced into the workplace will require specific training. This is incorporated in the Hazard Communication training program and will be documented. Training also includes the toxic and hazardous properties of chemicals and physical agents, the limits of exposure, symptoms of overexposure, and what to do in case of overexposure.

D. Other Industrial Hygiene Related Activities

1. A respirator program is in effect to train all personnel on the use of the personal respirator. All personal respirators are cleaned and filters are replaced on a yearly basis. A written respirator policy for the Caustic plant exists. All of this information is documented
2. Training is held on the use of self-contained breathing apparatus (SCBA) on a quarterly basis and is documented.
3. On a quarterly basis, the SCBA equipment is checked: the masks are checked for cracks; air lines and fittings are checked and cleaned; and everyday the air pressure is checked on the cylinders. All of this information is documented.
4. Safety showers are checked for proper working conditions on a monthly basis.
5. The acid suits and hoods are checked on a monthly basis.
6. The lab hood is checked on a yearly basis for proper operation

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PROCESS DESCRIPTION

Evaporation.

Co-generated steam from the Power plants is used to evaporate water from a by-product of chlorine production called cell effluent, a weak caustic and salt solution. The cell effluent is circulated with large axial flow pumps through four evaporators that utilize the effect of the steam four times. The condensed steam is then returned to the Power plants for reuse.

Salt Removal

As the caustic solution becomes concentrated to 50 percent, salt crystallizes and must be removed with four cyclones, two salt columns, and two solid bowl centrifuges. The product is then cooled to crystallize most of the remaining salt, allowing its removal by a clarifier and four large filters. The salt is returned to the Chlorine plant for reuse in the manufacture of chlorine.

Finished Product

The final step in finishing the product is the removal of iron, nickel, and other metals that the caustic solution has picked up during its manufacture. These metals are removed electrolytically in the iron cell area. The 50 percent caustic is then pumped to our storage facility. A portion of the product is further evaporated to 73 percent caustic for some of our customers.

Distribution.

The finished product is then sent out by ship, barge, tank car, or tank truck to the respective customer. The Caustic plant does all of its own loading. Some of the finished 50 percent caustic and the raw cell effluent is distributed to other plants within the Louisiana division which is also done by the Caustic plant personnel.

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JOB DESCRIPTIONS

PLANT SUPERINTENDENT: (1)

The superintendent manages the operations of the plant in a cost-effective and productive manner. This includes managing the operating budget and projects, maximizing production, and implementing good human relations practices. He is also supervisor of the technical staff and responsible for environmental in the plant.

Estimated time distribution is 90% in the office and 10% in the field. There is negligible potential exposure to any of the plant's chemical or physical stresses in the performance of the job.

PRODUCTION SUPERVISOR: (1)

The production supervisor supervises all phases of operations, including production, safety, training, and analytical. He is also responsible for system troubleshooting and the engineering and implementing of projects

The time distribution is 20% in the field and 80% in the office. The probability of experiencing a significant exposure to the plant's hazardous stresses is low due to the time distribution.

MAINTENANCE ENGINEER: (1)

The maintenance engineer coordinates maintenance, including manpower, equipment, and budgeting He also supervises the material controller, EDO day crew, the maintenance O.S., and the instrument O.S. He is also responsible for engineering and implementing projects, troubleshooting mechanical problems, and the operation of utilities of the plant. The maintenance engineer is the environmental and industrial hygiene contact for the plant.

The time distribution is 20% in the field and 80% in the office The probability of potential exposure to the plant's hazardous stresses is low.

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PRODUCTION/PROJECT ENGINEER: (3)

The project engineer coordinates projects (capital, routine maintenance, and expansion), including initiation, engineering, budgeting, manpower, and training. Included in this category would be summer engineering interns and COOP students.

The time distribution is 25% in the field and 75% in the office. There is a low probability of potential exposure to hazardous stresses.

SHIFT SUPERVISOR: (2)

The shift supervisor coordinates the operation of the plant, supervises the operations personnel, and is responsible for the safety, ecology, and industrial health of the operations personnel. He is to be effective in relating and communicating in a productive manner with everyone in the plant. Other duties include: responsible for all decision concerning plant operations; knowledgeable of the process and the equipment; actively participate in continually training plant personnel; and motivate people to accomplish their duties with a minimum of supervision.

The timing distribution is 40 % in the field and 60% in the office. There is moderate potential exposure to 50% caustic and noise in the plant.

QUALITY ASSURANCE SUPERVISOR: (1)

The quality assurance supervisor is the quality contact for the plant and is responsible for caustic finished product quality assurance. He is also responsible for maintaining and improving finished product quality He is the lab supervisor and is responsible for the following: standardizing process and quality test procedures; improving analytical precision; keeping up to date on analytical requirements; maintaining and upgrading lab equipment; and maintaining lab analytical database.

The quality assurance supervisor is also the supervisor for the O S. Loading Coordinator. He is the emergency response contact and the customer service and QSPP contact.

The time distribution is 90% in the office or lab and 10% in the field. The probability of potential exposure to hazardous stresses is low.

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SHIFT S.O.S. (BOARD): (4)

The control room operator has the duties of running plant operations. He also has the following responsibilities: monitoring plant conditions; analyze samples and make adjustments where necessary; commutations with other plants; coordinate OS work as necessary; work with engineers on problem areas; record readings and problems in daily logs; assist with permits as needed; and performing the job safely.

The time distribution is 100% inside the control room which would result in a negligible potential exposure to the plant's hazards.

SHIFT S.O.S. (UTILITY): (4)

The utility S.O.S. has the following duties: make rounds in the plant including out of plant equipment; make transfers to and from the tank farm, load barges and ships, and gauge tanks; assist the O.S.'s if needed; prepare red tagging of lines and equipment for maintenance; perform plant audits and plant housekeeping; assist the board S.O.S. in running samples; load tank cars and tank trucks if needed; perform maintenance work; assist operations in any manner as needed; perform his job safely.

The utility S.O.S. spends his time 90% in the field and 10% in the control room. There is a high probability of potential exposure to 50% caustic and noise in the plant.

O.S. (EVAPORATOR AREA): (4)

The evaporator area O.S. has the following responsibilities: make rounds and check equipment for proper operation and mechanical problems; catch, analyze, and record samples; operational responsibility and control of the area, and troubleshoot if necessary; cell effluent distribution; assist finishing O.S. as needed; prepare equipment for red tagging and maintenance; perform small maintenance jobs; perform audits and area housekeeping; assist with tank truck loading; assist engineers with problem areas; start up and shutdown the plant; and perform the job safely.

The time distribution is 90% in the field and 10% inside the control room. There is a high potential for exposure to 50% caustic and noise.

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O.S. (FINISHING AREA): (4)

The finishing area O.S. has the following responsibilities: make rounds to check equipment for proper operation and mechanical problems; catch, analyze, and record samples; operational responsibility and control of the area, troubleshoot if needed; load tank cars, barges, ships, make tank farm rounds, and river water pumps rounds; off load caustic tank cars; caustic distribution for tank farm areas; start up and shutdown of equipment, including acidizing the iron cells; perform audits and area housekeeping; assist the evaporator O.S. if needed; assist engineers with problem areas; prepare equipment for red tagging and maintenance; perform small maintenance jobs; and perform the job safely.

The time distribution is 90% in the field and 10% in the control room There is high probability for potential exposure to 50% caustic, hydrochloric acid, and noise.

O.S. and CONTRACT LOADERS: (6)

The loading O.S. is responsible for the following: loading of tank cars and tank trucks; providing the proper documentation.

The loading O.S. spends 90% of his time in the field and 10% of the time indoors. There is a high probability of potential exposure to 50% caustic and noise in his job.

SAFETY S.O.S.: (1)

In this six month rotational job, the safety S.O.S. has the following duties: issue safe work permits daily; keep the safety manual up to date; administer the safety program for the whole plant; conduct the safety meetings for the plant; conduct all safety indoctrinations in the plant; administer the unsafe condition report program; acts as the emergency drill contact; carries out the C9 checklist; investigates all injuries, spills, noncompliances, and record-keeping; monitors all work in the plant to ensure that all work is being done safely.

The time distribution for this job is 60% in the field and 40% in the office There is moderate probability of potential exposure to 50% caustic and noise in this job

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LAB O.S.: (1)

The lab O.S. has the following responsibilities: runs samples for reports and control; keep the caustic sample retainer room up to date; runs all composite samples; runs special samples as needed; runs quality analysis on all load tanks; orders and keeps lab reagents on hand; inputs analysis results in the computer; acts as a back up to the lab shipping coordinator; performs area housekeeping; communications to all involved; calibrates all lab equipment; and performs the job safely

The time distribution is 90% in the lab or control room and 10% in the field. There is moderate probability of potential exposure to 50% caustic in sample form.

S.O.S. SHIPPING COORDINATOR: (1)

In this six month rotational job, the shipping coordinator has the following responsibilities: checks levels in the load tanks daily before loading; inspects all tank cars before loading to ensure quality of product; keeps loading spurs isolated during loading; checks concentrations on load tanks for quality prior to loading; loads tank cars, trucks, or other as needed; cooperates and communicates with the lab, control room, and railroad as needed; practice safe operations throughout the job; secure cars properly before shipment; post inspection of all tank cars loaded; and area housekeeping.

The time distribution is 20% in the field and 80% inside the lab. There is low probability of potential exposure to 50% caustic

MATERIAL CONTROLLER O.S.: (1)

The material controller has the following responsibilities: maintain the office, warehouse, and storage yard in an orderly manner; store all materials safely and promptly; requisition, expedite, receive, and issue materials; maintain sufficient spare parts inventory; physically audit inventory levels,and code and tag all items; maintain communications with all areas concerned; be knowledgeable of area equipment, warehouse operations, maintenance and project jobs, and plant safety rules; and

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maintain records

The material controller spends 90% of his time in the warehouse and 10% in the field. The potential exposure to the plant's hazardous stresses is negligible.

INSTRUMENT S.O.S.: (1)

The instrument S.O.S. has the following responsibilities: installation, maintenance, and calibration of the plant's process instrument systems; assist engineers with project work; maintain the TDC and TI computer systems; maintain the ph systems and compositors; maintain PA systems; keep supplied stock of required instrumentation; assist in troubleshooting of problem areas and make adjustments as necessary; keep up to date with the latest technology and training;maintain critical instruments and document; upgrade and maintain P&ID's blue prints; update and maintain flow meter spec. sheets; and perform the job in a safe manner.

The time distribution is 80% in the field and 20% in the office. There is a moderate probability of potential exposure to 50% caustic and noise in this job.

MAINTENANCE S.O.S. (1):

In the six month rotational job, the maintenance S.O.S. duties include the following: plan and schedule all routine maintenance work; troubleshoot problem areas; order the needed equipment in order to get the work done; work with the material controller to order needed material; oversee maintenance work and maintenance crew; write daily schedules, weekly schedules, monitor backlog manhours, and minimize break-in jobs; and make sure all work is performed safely

The time distribution is 50% in the field and 50% in the office. There is moderate probability of potential exposure to 50% caustic and noise in this job

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COMPUTER TECHNICIAN: (1)

The responsibilities for the computer technician include the following: write all programs for the plant, including all production reports and calculations; assist engineers with computer programming needs for projects and routine needs; maintain the computer systems; order and install all necessary computer equipment; and perform the job in a safe manner.

The time distribution is 95% in the office and 5% in the field which results in negligible probability of potential exposure to the plant's hazardous stresses.

PRODUCTION OFFICE ASSISTANT: (1)

The secretary performs all office and clerical duties, including production report compilation, correspondence, and organization. The office is maintained in an orderly manner. The secretary is also responsible for keeping office supplies on hand.

The secretary spends 100% of the time in the office. There is a negligible probability of potential exposure to the plant's chemical and physical stresses.

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INDUSTRIAL HYGIENE ACCOMPLISHMENTS IN 1988

1. THE NEW IRON CELL AREA WAS INSTALLED WHICH WILL HELP REDUCE CAUSTIC AND HYDROCHLORIC ACID EXPOSURES. THE PROJECT WAS COMPLETED IN 4Q, 1988. SEVERAL PROCESS CHANGES WILL REDUCE CHEMICAL EXPOSURE:

   A. VENT HOODS HAVE BEEN REDESIGNED TO CONTAIN CAUSTIC AND HYDROGEN VAPORS. RUBBER SKIRTING HAS BEEN INSTALLED AROUND THE SPACE BETWEEN THE HOODS AND THE CELLS.

   B. A CATCH DECK WAS INSTALLED DIRECTLY UNDERNEATH THE CELLS TO REDUCE EXPOSURE TO THE CAUSTIC AND HYDROCHLORIC ACID.

   C. HIGH LEVEL PROBES WERE INSTALLED IN THE IRON CELLS TO ELIMINATE THE OVERFLOW OF CELLS AND REDUCE EXPOSURE TO OPERATIONS.

   D. THE STRUCTURE IS MORE OPEN AND LESS CROWDED ALLOWING EASIER ACCESS FOR MAINTENANCE.

2. A NEW CENTRIFUGE AREA HAS BEEN INSTALLED WITH A SPARE CENTRIFUGE:

   A. THE DECK IS MUCH LARGER AND EASIER TO ACCESS FOR MAINTENANCE

   B. THE PRIMARY CENTRIFUGE HAS CASING SEALS TO HELP ELIMINATE RELEASE OF CAUSTIC MIST.

   C. THE CATCH TANKS UNDERNEATH THE CENTRIFUGES ARE TIED TO A COMMON VENT PIPING SYSTEM WHICH DIVERTS THE CAUSTIC VAPORS TO A COMMON ELEVATED STACK. EVENTUALLY THIS VENT SYSTEM WILL BE TIED TO A VENT RECOVERY SYSTEM.

   D. THE CHUTES ENTERING THE CATCH TANKS HAVE BEEN REDESIGNED TO ELIMINATE LEAKAGE.

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3. DECKING HAS BEEN INSTALLED BY THE WEST CANAL pH PROBE TO ALLOW SAFE ACCESS TO THE PROBE FOR MAINTENANCE.

4. A CONTINUOUS IMPROVEMENT PROGRAM HAS BEEN IMPLEMENTED ON THE CELL EFFLUENT DISTRIBUTION PIPING SYSTEM TO UPGRADE MATERIALS OF CONSTRUCTION AT A $600,000 PER YEAR SPENDING RATE. THIS UPGRADE IS DONE TO ELIMINATE CELL EFFLUENT SPILLS IN THE DIVISION PIPING SYSTEM.

5. PROJECT FUNDING FOR THE REPLACEMENT OF THE CAUSTIC TRANSFER LINE TO CELLULOSE HAS BEEN APPROVED. THE REPLACEMENT OF THIS LINE WILL REDUCE PERSONNEL EXPOSURE TO CAUSTIC.

6. BYPASS LOOPS WERE INSTALLED AROUND FOUR CRITICAL CAUSTIC CONTROL VALVES REQUIRING FREQUENT MAINTENANCE. THIS WILL GREATLY REDUCE THE POTENTIAL FOR EXPOSURE TO CAUSTIC WHEN ADJUSTMENTS ARE MADE TO THESE VALVES.

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INDUSTRIAL HYGIENE GOALS

1. DESIGN OF A VENT RECOVERY SYSTEM FOR T-204, T-205, D-205 AND CENTRIFUGE TANK VENTS TO CATCH CAUSTIC VAPORS LEAVING THE VENTS.

2. A CENTRIFUGE CASE SEAL WILL BE INSTALLED IN 1989 ON THE SPARE CENTRIFUGE. THIS WILL ELIMINATE CAUSTIC VAPORS FROM LEAVING THE CASING AND REDUCE CAUSTIC EXPOSURE TO OPERATIONS.

3. CONTINUE WITH THE CELL EFFLUENT DISTRIBUTION IMPROVEMENT PROGRAM TO UPGRADE MATERIALS OF CONSTRUCTION. THE PURPOSE OF THIS UPGRADE IS TO PREVENT SPILLS ALONG THE CELL EFFLUENT DISTRIBUTION PIPING SYSTEM.

4. THREE EVAPORATOR HEAT EXCHANGERS WILL BE REPLACED BY 1993. THIS WILL ELIMINATE EXISTING FLANGE LEAKS AND REDUCE EXPOSURE TO CAUSTIC.

5. PLATFORMS WILL BE BUILT FOR THE BAROMETRIC PH PROBE AND E-202 DEMISTER DIFFERENTIAL PRESSURE TRANSMITTER TO ELIMINATE PERSONNEL STRAIN

6. POUR A PERMANENT SLAB AT WEST CANAL PH PROBE LOCATION SINCE THE GROUND IS ERODING INTO THE CANAL. THIS WILL REPLACE THE EXITING TEMPORARY FOOTING AND ELIMINATE A FALLING HAZARD WHEN OPERATIONS PERSONNEL WORKS ON THE PROBE.

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