

1988
Good report!
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LOUISIANA DIVISION INDUSTRIAL HYGIENE REPORT

AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

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CHLORINATED POLYETHYLENE PLANT	LAD-CPE-89.01	3/23/89
<u>TITLE</u>		
INDUSTRIAL HYGIENE SURVEY PROTOCOL FOR CPE		
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SUMMARY/RECOMMENDATIONS

SUMMARY: The employees that had a potential for exposure to noise, chlorine talc, tetrahydrofuran, and xylene were monitored using approved sampling and analytical methods. This data was generated during 1987 and 1988. Based on this data and the priority ratings from the chemical and physical agent inventories, future plans for exposure monitoring were made.

CONCLUSIONS: The monitoring results for tetrahydrofuran, xylene and talc indicate that potential exposures to these materials were well below the exposure guidelines in 1987 and 1988. Noise exposure monitoring for 1987 and 1988 did not reveal any potential exposures above the OSHA PEL. Area and personnel exposure monitoring for chlorine continues to show a down trend. However there are still some problems with instantaneous exposures to chlorine above the 1 ppm ceiling limit. For these locations and jobs approved respiratory protection is required until planned engineering controls are completed. Surveillance of these areas have been enhanced by the addition of an area monitoring system. Personnel monitoring will also continue until the controls are completed.

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CPE INDUSTRIAL HYGIENE PROTOCOL

THE PURPOSE OF THIS PROTOCOL IS TO IDENTIFY, EVALUATE AND DOCUMENT THE POTENTIAL CHEMICAL AND PHYSICAL AGENT EXPOSURES IN THE PLANT;AND TO PLAN FOR FUTURE SURVEILLANCE AND CONTROL OF THESE EXPOSURES.

WHEN THE EXPOSURE DATA INDICATES A PROBLEM, CONTROL MEASURES WILL BE RECOMMENDED. METHODS OF CONTROL INCLUDES ENGINEERING CONTROLS, ADMINISTRATIVE CONTROLS, AND PERSONAL PROTECTIVE EQUIPMENT. ENGINEERING CONTROL METHODS INCLUDE CONTAINMENT, ISOLATION, SUBSTITUTION WITH A LESS TOXIC SUBSTANCE, LOCAL EXHAUST VENTILATION, GENERAL VENTILATION, AND CHANGE OF OPERATION PROCEDURE. ADMINISTRATIVE CONTROLS LIMIT EXPOSURE TIME THROUGH REMOTE OPERATION OR JOB ROTATION. PERSONAL PROTECTIVE EQUIPMENT MAY BE USED AS A LAST RESORT WHEN OTHER CONTROLS ARE NOT FEASIBLE OR UNTIL OTHER CONTROLS CAN BE IMPLEMENTED.

EXPOSURE MONITORING SURVEY FOR 1987 AND 1988 INCLUDED:

AGENT	EXPOSURE GUIDELINE	SOURCE
NOISE	90 DECIBELS	OSHA
CHLORINE	1 PPM CEILING	OSHA
TALC	2 MG/M3	ACGIH
TETRAHYDROFURAN	200 PPM TWA; 250 PPM STEL	ACGIH
XYLENE	100 PPM TWA; 150 PPM STEL	ACGIH

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DEFINING EMPLOYEE EXPOSURE/SAMPLING STRATEGY

THE SURVEY PRIORITIES WERE DETERMINED FROM THE CHEMICAL AND PHYSICAL AGENT INVENTORIES AND FROM STATISTICAL EVALUATION OF THE EXISTING DATA. SETTING PRIORITIES IN THIS MANNER DEVELOPS AN EFFICIENT AND LOGICAL FRAMEWORK FOR AN INDUSTRIAL HYGIENE SURVEY.

THE CHEMICAL AND PHYSICAL AGENT INVENTORY WAS USED TO MEET TWO BASIC REQUIREMENTS OF A REALISTIC SURVEY.

1. DETERMINE THE DEGREE OF EXPOSURE FOR EACH JOB CLASSIFICATION TO EACH CHEMICAL USED IN THE PLANT. THIS IS BASED ON THE NORMAL CONDITIONS OF USE AND THE PHYSICAL PROPERTIES OF THE MATERIAL. (APPENDIX 1)
2. DETERMINE A PRIORITY RATING FOR EACH JOB/AGENT COMBINATION THAT IS BASED ON THE DEGREE OF EXPOSURE AND THE TOXICITY OF THE AGENT. (APPENDIX 2)

THE STATISTICAL GUIDELINES IN APPENDIX 3 WERE USED TO EVALUATE THE EXPOSURE DATA. THESE GUIDELINES ARE BASED ON THE FOLLOWING:

1. THE LOGNORMAL DISTRIBUTION IS USED TO MODEL LONG TERM OCCUPATIONAL EXPOSURES. THIS DISTRIBUTION IS CHARACTERIZED BY THE GEOMETRIC MEAN AND THE GEOMETRIC STANDARD DEVIATION.
2. MOST WORKPLACE ENVIRONMENTS HAVE GEOMETRIC STANDARD DEVIATIONS BETWEEN 1.5 AND 3.0.
3. FOR CHEMICALS THAT ARE DOSE-RATE INDEPENDENT, THE UPPER 95% CONFIDENCE LIMIT SHOULD BE USED TO TEST IF THE ARITHMETIC MEAN IS BELOW THE EXPOSURE GUIDELINE.
4. FOR CHEMICALS THAT ARE DOSE-RATE DEPENDENT, A TOLERANCE LIMIT APPROACH SHOULD BE USED TO TEST IF THE 95TH PERCENTILE IS BELOW THE EXPOSURE GUIDELINE.

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NOISE EXPOSURE EVALUATION

EVALUATION CRITERIA

THE OSHA PERMISSABLE EXPOSURE LIMIT (PEL) FOR NOISE IS THE CRITERIA USED TO EVALUATE NOISE EXPOSURE. THE PEL IS AN AVERAGE DOSE OF 90 DECIBELS (DB) ON THE A-WEIGHTED SCALE FOR AN EIGHT HOUR DAY. ALSO THERE SHOULD BE NO EXPOSURE TO CONTINUOUS NOISE ABOVE 115 DECIBELS (A).

SAMPLING METHOD

THE DUPONT MK-2 AUDIO DOSIMETER WAS USED TO MEASURE EMPLOYEE'S EXPOSURES TO NOISE. THE DOSIMETER MEETS OR EXCEEDS ALL CURRENT REQUIREMENTS BY GOVERNMENT AGENCIES IN THE UNITED STATES FOR PERSONNEL AUDIO DOSIMETERS. NOISE MEASUREMENTS WERE MADE USING AN 80 DB(A) THRESHOLD LEVEL AND A 90 DB(A) CRITERION LEVEL. THE THRESHOLD IS THE LEVEL THAT THE NOISE MUST EXCEED TO BE INCLUDED IN THE DOSE CALCULATION. THE CRITERION IS THE LEVEL THAT WILL YIELD 100% DOSE IN EIGHT HOURS.

TOXICOLOGICAL SUMMARY

PROLONGED AND REPEATED EXPOSURES TO NOISE LEVELS ABOVE 90 DECIBELS MAY CAUSE SEVERE DAMAGE TO THE NERVES IN THE INNER EAR RESULTING IN HEARING LOSS.

PERSONNEL MONITORING SUMMARY, 1987

BECAUSE HEARING PROTECTION IS REQUIRED IN ALL AREAS OF THE PLANT THAT ARE ABOVE 90 DECIBELS, THE NOISE DOSES THAT WERE DETECTED ARE ONLY POTENTIAL DOSES.

SEVEN SAMPLES WERE COLLECTED ON THE JOBS WHERE THE LIKELIHOOD FOR NOISE EXPOSURE WAS THE GREATEST. NONE OF THE SAMPLES WERE ABOVE THE OSHA PEL FOR NOISE. DATA IS EXPRESSED AS PERCENTAGES OF THE PEL.

JOB	NUMBER OF SAMPLES	DURATION	DOSE
WHSE LABORER (TRUCKLOADING)	1	380 MINS	55%
WHSE LABORER (BAGGING)	1	386 MINS	51%
ENVIRO-SPECIALIST	1	287 MINS	21%
MAINT-COORDINATOR	1	438 MINS	29%
OUTSIDE O.S.	1	437 MINS	19%
OUTSIDE S.O.T.	1	439 MINS	30%
O.T.	1	392 MINS	20%

PLEASE REFER TO TABLE 1 FOR MORE DETAILS.

PERSONNEL MONITORING SUMMARY, 1988

BECAUSE HEARING PROTECTION IS REQUIRED IN ALL AREAS OF THE PLANT THAT ARE ABOVE 90 DB(A), THE NOISE DOSES THAT WERE DETECTED ARE ONLY POTENTIAL DOSES.

SIX SAMPLES WERE COLLECTED IN THREE JOB CLASSIFICATIONS. NONE OF THE SAMPLES WERE ABOVE THE OSHA PEL FOR NOISE EXPOSURE. SEE TABLE 2.

JOB	# OF SAMPLES	DURATION	AVG	HIGH	RANGE
WHSE LABORER (TRUCKLOADER)	3	427-450 MINS	23%	33%	14-33%
O.S. (BAGGING)	1	445 MINS	--	37%	----
OUTSIDE O.S.	1	427 MINS	--	84%	----
OUTSIDE S.O.S.	1	427 MINS	--	31%	----

AREA NOISE MONITORING SUMMARY, 1988

IN GENERAL THE AREAS OF THE PLANT THAT ARE ABOVE 90 DB(A) ARE THE EXPRESSOR BUILDING AREA, THE FLUID BED DRYERS AREAS, THE AIR COMPRESSOR AREA, THE BLENDER AREAS BEHIND THE WAREHOUSE AND THE CYCLONE BLOWER AREAS UPSTAIRS ON BOTH TRAINS. THE COMPLETE AREA NOISE SURVEY IS SHOWN IN ATTACHMENTS 3-5.

HIGH NOISE WARNING SIGNS ARE POSTED AROUND ALL AREAS OF THE PLANT THAT ARE ABOVE 90 DB(A).

SAMPLING STRATEGY FOR NOISE IN 1989

AREA SURVEY - A COMPLETE SURVEY OF ALL PLANT AREAS WILL BE MADE TO ENSURE THAT AREA LEVELS HAVE NOT INCREASED SIGNIFICANTLY.

PERSONNEL MONITORING - BASED ON THE CHEMICAL AND PHYSICAL AGENT INVENTORIES FOR 1989, THE FOLLOWING PERSONNEL WILL BE MONITORED FOR NOISE EXPOSURE:

JOB	# OF SAMPLES
CONTRACT WELDER	3
CONTRACT PIPEFITTER	3
OUTSIDE O.S.	2
OUTSIDE S.O.S.	2

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CHLORINE EXPOSURE EVALUATION

EVALUATION CRITERIA

THE OSHA PERMISSABLE EXPOSURE LIMIT OF 1 PPM CEILING IS THE CRITERIA USED TO EVALUATE EXPOSURE TO CHLORINE. A CEILING LIMIT SHOULD NOT BE EXCEEDED FOR ANY PERIOD OF TIME.

SAMPLING AND ANALYTICAL METHOD SUMMARY

PERSONNEL SAMPLES FOR CHLORINE WERE OBTAINED USING A WOLCOTT PROBE IN CONJUNCTION WITH A DATA LOGGER. THIS EQUIPMENT MEASURES CHLORINE CONCENTRATIONS IN AIR CONTINUOUSLY, STORING THE HIGHEST THIRTY SECOND AVERAGES AS AN INDICATOR OF PEAK EXPOSURES FOR COMPARISON TO THE CEILING LIMIT. OTHER INFORMATION OBTAINED USING THIS TYPE OF EQUIPMENT IS THE EIGHT HOUR TIME WEIGHTED AVERAGE AND ALSO A REAL TIME PLOT OF TIME VERSUS CONCENTRATION FOR THE SAMPLING PERIOD. ALL OF THE SAMPLING EQUIPMENT WAS CALIBRATED BEFORE AND AFTER EACH SAMPLE WITH A KNOWN CONCENTRATION OF CHLORINE IN AIR USING A DYNACALIBRATOR. THE SAMPLING EQUIPMENT WAS CALIBRATED AND ANALYZED AT THE INDUSTRIAL HYGIENE DEPARTMENT.

TOXICOLOGICAL SUMMARY

OVEREXPOSURE BY THE INHALATION ROUTE WILL PRODUCE MARKED IRRITATION OF THE NASAL AND THROAT LININGS WITH POSSIBLE LUNG INJURY. THE LC50 FOR RATS AND MICE RESPECTIVELY IS 293 AND 137 PPM, AFTER AN INHALATION EXPOSURE OF 1 HOUR. CHLORINE IS ALSO CAPABLE OF PRODUCING BURNS TO THE EYES AND SKIN.

PERSONNEL MONITORING SUMMARY, 1987

EIGHT SAMPLES WERE TAKEN IN THE OUTSIDE O.S. AND S.O.T. JOB CLASSIFICATIONS. NONE OF THE SAMPLES TAKEN IN THE OUTSIDE O.S. JOB CLASS WERE ABOVE THE OSHA PEL. THREE OF THE FOUR SAMPLES IN THE OUTSIDE S.O.T. JOB CLASS WERE SLIGHTLY ABOVE THE OSHA PEL, WITH THE HIGHEST SAMPLE AT 2.6 PPM FOR 30 SECONDS. THE EIGHT HOUR TIME WEIGHTED AVERAGES FOR ALL OF THE SAMPLES WERE BELOW THE DETECTION LIMITS (0.05 PPM).

JOB	# OF SAMPLES	DURATION (MINS)	AVG (PEAK)	HIGH (PEAK)	RANGE
OUTSIDE O.S.	4	334-361	<0.2 PPM	0.3 PPM	<0.1-0.3 PPM
OUTSIDE S.O.T.	4	331-372	1.6 PPM	2.6 PPM	0.5-2.6 PPM

PLEASE REFER TO TABLE 3 FOR MORE DETAILS.

AREA MONITORING FOR CHLORINE SUMMARY, 1987 (ATTACHMENTS 7-11)

AREA SAMPLES FOR CHLORINE WERE OBTAINED USING TWO SAMPLING METHODS. THE WOLCOTT PROBE WITH DATA LOGGER WAS USED FOR SAMPLING AROUND THE FLUME, THE FLOCCULATOR, AND THE CLARIFIER TO EVALUATE THE CONCENTRATION AND FREQUENCY OF CHLORINE EMISSIONS FROM THESE AREAS. A WOLCOTT PROBE WITH A DIRECT READING CHLORINE DOSIMETER WAS USED TO OBTAIN EXCURSION SAMPLES FROM AROUND THE TWO REACTOR AREAS DURING REACTOR TRANSFERS.

THE RESULTS OF THE AREA SAMPLES SHOWED NO DETECTABLE AMOUNTS OF CHLORINE FROM THE FLOCCULATOR AND THE CLARIFIER. TWO AREA SAMPLES OF THE FLUME COVERING AN AVERAGE TIME PERIOD OF 253 MINUTES REVEALED ONLY TWO 30 SECOND DURATION PEAKS OF CHLORINE SLIGHTLY ABOVE THE OSHA PEL(1.2 PPM HIGH). FIVE AREA SAMPLES OF THE REACTOR AREAS SHOWED THE IMMEDIATE AREAS AROUND THE WASH COLUMNS AS THE ONLY LOCATIONS WITH A POTENTIAL OF HAVING CHLORINE CONCENTRATIONS ABOVE 1 PPM. THE CHLORINE EMISSIONS THAT WERE DETECTED AROUND THE WASH COLUMN WERE ONLY PRESENT DURING REACTOR TRANSFERS AND VARIED IN CONCENTRATION AND DURATION. THE EMISSIONS FROM THESE AREAS RANGED FROM <0.1 TO 12 PPM. AN APPROVED RESPIRATOR FOR CHLORINE IS REQUIRED WHEN ENTERING THE RESTRICTED AREA AROUND THE WASH COLUMNS WHERE CONCENTRATIONS MAY EXCEED 1 PPM. IN ADDITION TO THE PROTECTIVE EQUIPMENT REQUIREMENTS PLANS TO ELIMINATE THESE EMISSIONS WERE MADE. ALSO INSTALLATION OF A CONTINUOUS AREA MONITOR FOR CHLORINE WAS BEGUN.

PERSONNEL MONITORING SUMMARY, 1988

A TOTAL OF SIX SAMPLES WERE OBTAINED FROM THE OUTSIDE O.S. AND S.O.S. JOBS. FOUR OF THESE SAMPLES SHOWED NO 30 SECOND EXPOSURES DURING THE WORKDAY ABOVE 1 PPM. THE OTHER TWO SAMPLES INDICATED POTENTIAL EXPOSURES OF 4.3 AND 11.1 PPM FOR 30 SECONDS EACH DURING THE WORKDAY. THE 4.3 PPM OCCURRED WHEN THE OPERATOR WAS IN THE WASH COLUMN AREA (RESPIRATOR REQUIRED). THE 11.1 PPM OCCURRED WHEN THE OPERATOR WAS WORKING ON THE WASH COLUMN STATIC SCREEN (RESPIRATOR REQUIRED).

JOB	# OF SAMPLES	DURATION (MINS)	AVG (PEAK)	HIGH (PEAK)	RANGE
OUTSIDE O.S.	3	353-365	<3.8 PPM	11.1 PPM	<0.05-11.1
OUTSIDE S.O.S.	3	350-355	<1.5 PPM	4.3 PPM	<0.05- 4.3

PLEASE REFER TO TABLE 4 FOR MORE DETAILS.

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SUMMARY OF CHLORINE EXPOSURE CONTROLS, 1987

TO ELIMINATE THE PRIMARY SOURCE OF CHLORINE EMISSIONS IN THE PLANT, WASTE WATER DRAINAGE FROM THE WASH COLUMNS AND NEUTRALIZERS WERE REROUTED FROM OPEN TRENCHES INSIDE THE PROCESS AREA BY SOLID PIPING TO AN ENVIRONMENTAL TREATMENT SYSTEM. REDUCTIONS IN AREA CHLORINE LEVELS WERE SIGNIFICANT. BEFORE THESE CONTROLS THERE WAS A POTENTIAL FOR A MAJORITY OF THE REACTOR AREAS TO BE ABOVE 1 PPM DURING REACTOR TRANSFERS ONLY, DEPENDING ON PROCESS CONDITIONS AND WIND DIRECTION. THIS REQUIRED EXTENSIVE USE OF RESPIRATORY PROTECTION THROUGHOUT THE PLANT. AFTER THE CONTROLS WERE IMPLEMENTED, THE ONLY AREAS WITH A POTENTIAL FOR HAVING CHLORINE LEVELS ABOVE 1 PPM WERE THE IMMEDIATE AREAS AROUND THE WASH COLUMNS DURING REACTOR TRANSFERS. CURRENTLY THESE ARE THE ONLY RESPIRATOR REQUIRED AREAS OF THE PLANT. AS AN ADDED PRECAUTION, TRAVEL INTO THE PROCESS AREAS IS RESTRICTED AND WARNING LIGHTS HAVE BEEN INSTALLED TO WARN PERSONNEL WHEN A REACTOR TRANSFER IS IN PROCESS.

SUMMARY OF CHLORINE EXPOSURE CONTROLS, 1988

A CONTINUOUS AREA MONITORING SYSTEM FOR CHLORINE WAS INSTALLED TO ALERT PLANT PERSONNEL WHEN CHLORINE LEVELS EXCEEDED 1 PPM AND TO EVALUATE THE EFFECTIVENESS OF PRESENT AND FUTURE CONTROL MEASURES. ADDITIONALLY, SUCTION BLOWERS WERE INSTALLED ON THE WASH COLUMN OVERS LINES TO DIVERT CHLORINE EMISSIONS FROM THE PROCESS AREA TO THE CHLORINE SCRUBBER. ACCORDING TO THE CONTINUOUS AREA MONITOR DATA THIS HAS REDUCED THE FREQUENCY OF CHLORINE EMISSIONS ABOVE 1 PPM FROM THESE SOURCES, BUT HAS NOT ELIMINATED THEM. THESE AREAS REMAIN RESTRICTED UNTIL A PERMANENT SOLUTION IS FOUND. CONSIDERABLE WORK IS BEING DONE IN THE ENVIRONMENTAL TREATMENT SECTION OF THE PLANT TO OPTIMIZE TREATMENT OF THE WASTE WATER WITH SODIUM THIOSULFATE TO NEUTRALIZE THE RESIDUAL CHLORINE. THE PLANT IS WORKING CLOSELY WITH THE RESEARCH ANALYZER GROUP ON THIS PROJECT.

SUMMARY OF FUTURE CONTROL PLANS

A MAJOR FUTURE PLAN TO ELIMINATE POTENTIAL CHLORINE EXPOSURE IN THE PLANT IS THE INSTALLATION OF A LARGER CAPACITY CHLORINE SCRUBBER. WORK ON THIS INSTALLATION SHOULD BEGIN SOMETIME IN THE FOURTH QUARTER OF 1989. BENEFITS WILL BE THE ABILITY TO TIE ALL OF THE POTENTIAL CHLORINE EMITTING VENTS INTO THE SCRUBBER. UNTIL THEN EFFORTS TO REDUCE EMISSIONS FROM THE WASH COLUMN VENTS USING THE SUCTION BLOWER SYSTEM AND PRESENT SCRUBBER WILL CONTINUE.

SAMPLING STRATEGY FOR CHLORINE, 1989

BASED ON THE PREVIOUS MONITORING DATA, THE FOLLOWING PERSONNEL SAMPLES WILL BE COLLECTED IN 1989.

JOB	# OF SAMPLES
OUTSIDE O.S.	3
OUTSIDE S.O.S.	3
WORKING OVER	
WASH COLUMN	2
STATIC SCREEN	

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TALC EXPOSURE EVALUATION

EVALUATION CRITERIA

THE AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENIST (ACGIH) THRESHOLD LIMIT VALUE (TLV)--TIME WEIGHTED AVERAGE (TWA) OF 2 MG/M3 IS THE CRITERIA USED TO EVALUATE POTENTIAL EXPOSURES TO TALC CONTAINING NO ASBESTOS.

SAMPLING AND ANALYTICAL METHOD SUMMARY

A SIBATA P-5 DIRECT READING DUST INDICATOR WAS USED TO OBTAIN BREATHING ZONE SAMPLES FOR POTENTIAL EXPOSURE TO RESPIRABLE TALC. THE INSTRUMENT MEASURES DUST FROM SUBMICRON TO 10 MICRONS IN SIZE. MEASURING RANGE IS 0.001 TO 10 MG/M3. ACCURACY IS PLUS OR MINUS 10% AS COMPARED TO GRAVIMETRIC METHOD USING STEARIC ACID.

TOXICOLOGICAL SUMMARY

THERE IS SOME EVIDENCE THAT TALC CONTAINING NO ASBESTOS FIBERS MAY CAUSE A MILD PNEUMOCONIOSIS AFTER 10 TO 30 YEARS OF PROLONGED OVER-EXPOSURE. THIS CONDITION MAY OR MAY NOT EXIST WITH LUNG FUNCTION IMPAIRMENT. EXPOSURE OTHER THAN INHALATION MAY PRODUCE MECHANICAL IRRITATION SIMILAR TO ANY SOLID PARTICLE.

BREATHING ZONE SAMPLING SUMMARY, 1987

TWO SAMPLES WERE OBTAINED ON THE O.T. WHILE LOADING BAGS OF TALC ON THE BAG SLITTER. BOTH OF THE SAMPLES SHOWED POTENTIAL EXPOSURE TO BE BELOW THE TLV FOR RESPIRABLE TALC. DUE TO THE DUST RESPIRATOR REQUIREMENTS WHEN HANDLING TALC, THE DATA REPRESENTS POTENTIAL EXPOSURE ONLY.

JOB	# OF SAMPLES	DURATION (MINS)	POTENTIAL EXPOSURE
O.T.-- LOADING TALC	1	26	0.1 MG/M3
O.T.-- LOADING TALC	1	9	0.1 MG/M3

PLEASE REFER TO TABLE 5 FOR MORE DETAILS.

SAMPLING STRATEGY FOR 1989

BASED ON THE PREVIOUS DATA TWO SAMPLES ON THE TALC LOADING JOB WILL BE OBTAINED. ALSO AN AREA DUST SURVEY OF THE ENTIRE WAREHOUSE INCLUDING THE WEIGH FEEDER ROOM WILL BE MADE TO ENSURE THAT AMBIENT LEVELS OF RESPIRABLE DUST ARE NOT EXCESSIVE.

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TETRAHYDROFURAN EXPOSURE EVALUATION

EVALUATION CRITERIA

THE AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENIST (ACGIH) THRESHOLD LIMIT VALUE (TLV) WAS USED TO EVALUATE EXPOSURE TO TETRAHYDROFURAN. THE LIMIT IS 200 PPM ON A TIME WEIGHTED AVERAGE BASIS AND THERE IS ALSO A SHORT TERM EXPOSURE LIMIT (15 MINUTES) OF 250 PPM.

SAMPLING AND ANALYTICAL METHOD

TWO SAMPLING METHODS WERE USED TO EVALUATE EXPOSURE TO TETRAHYDROFURAN. A CHARCOAL ADSORBENT TUBE IN CONJUNCTION WITH A CONSTANT FLOW AIR SAMPLING PUMP WAS USED TO OBTAIN SHORT TERM EXCURSION SAMPLES FOR COMPARISON WITH THE SHORT TERM EXPOSURE LIMIT. A 3M ORGANIC VAPOR MONITOR BADGE (CHARCOAL ADSORBENT-PASSIVE DOSIMETER) WAS USED TO OBTAIN EIGHT HOUR SAMPLES FOR COMPARISON TO THE TLV-TWA.

TOXICOLOGICAL SUMMARY

ACUTE EFFECTS OF OVEREXPOSURE BY THE INHALATION ROUTE ARE CENTRAL NERVOUS SYSTEM EFFECTS CHARACTERIZED BY HEADACHES, DIZZINESS, AND NAUSEA. POSSIBLE CHRONIC EFFECTS INCLUDE LIVER AND KIDNEY DAMAGE DUE PRIMARILY TO IMPURITIES THAT MAY BE PRESENT IN THE TETRAHYDROFURAN. EYE AND SKIN CONTACT WITH THE LIQUID MAY CAUSE IRRITATION.

PERSONNEL MONITORING SUMMARY, 1987

ONE EXCURSION SAMPLE WAS OBTAINED DURING OPERATION OF THE NEW CHLORIDES ANALYTICAL INSTRUMENT. THE RESULT WAS LESS THAN 27 PPM TETRAHYDROFURAN ON THE AVERAGE FOR 5 MINUTES. THREE TIME WEIGHTED AVERAGE SAMPLES WERE OBTAINED ON LAB PERSONNEL ON DAYS WHEN USING TETRAHYDROFURAN. NONE OF THE SAMPLES WERE ABOVE THE TLV-TWA. TETRAHYDROFURAN IS USED IN A PRODUCT PH ANALYSIS AND IS HANDLED UNDER A LAB FUME VENTILATION HOOD.

JOB	# OF SAMPLES	DURATION (MINS)	AVG (PPM)	HIGH (PPM)	RANGE (PPM)
ASST. CHEMIST	3	350-416	<8.5	25.0	<0.2-25.0
ASST. CHEMIST (CHLORIDES TEST)	1	5	---	<27.0	-----

PLEASE REFER TO TABLE 6 FOR MORE DETAILS.

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XYLENE EXPOSURE EVALUATION

EVALUATION CRITERIA

THE AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENIST THRESHOLD LIMIT VALUE (TLV) WAS USED TO EVALUATE EXPOSURES TO XYLENE CONTAINING MIXED ISOMERS. THE LIMIT IS A TIME WEIGHTED AVERAGE OF 100 PPM AND ALSO A SHORT TERM EXPOSURE LIMIT (15 MINUTES) OF 150 PPM.

SAMPLING AND ANALYTICAL METHOD

THE 3M ORGANIC VAPOR MONITOR (CHARCOAL ADSORBENT-PASSIVE DOSIMETER) WAS USED TO OBTAIN PERSONNEL SAMPLES OF LAB PERSONNEL PERFORMING PRODUCT TESTS USING XYLENE. THE ANALYTICAL METHOD CONSISTED OF DESORBING THE CHARCOAL IN CARBON DISULPHIDE AND ANALYZING AN ALIQUOT OF THE SAMPLE BY GAS CHROMATOGRAPH. ANALYSIS WERE PERFORMED BY THE ENVIROMENTAL DEPARTMENT LAB.

TOXICOLOGICAL SUMMARY

ACUTE OVEREXPOSURE BY THE INHALATION ROUTE MAY PRODUCE SEVERE IRRITANT AND NARCOTIC EFFECTS. THERE HAVE BEEN SOME REPORTS OF BLOOD AND LIVER EFFECTS FROM BOTH CHRONIC OVEREXPOSURE AND VERY HIGH ACUTE EXPOSURES TO XYLENE. REPEATED SKIN CONTACT MAY PRODUCE DERMATITIS.

PERSONNEL MONITORING SUMMARY, 1987

THREE SAMPLES WERE OBTAINED ON LAB PERSONNEL WHILE PERFORMING PRODUCT ANALYZES USING XYLENE. DURATION OF THE SAMPLES WAS FROM 10-60 MINUTES. NONE OF THE SAMPLES WERE ABOVE THE EVALUATION CRITERIA. ALL ANALYSIS USING XYLENE ARE REQUIRED TO BE PERFORMED UNDER A LAB FUME VENTILATION HOOD. PLEASE REFER TO TABLE 7 FOR MORE DETAILS.

JOB	# OF SAMPLES	DURATION (MINS)	AVG (PPM)	HIGH (PPM)
ASST. CHEMIST (GEL COUNT TEST)	3	10-60	<1.2	<1.4

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DEGREE OF EXPOSURE RATINGS

<u>DE</u>	<u>Description</u>
NEG	Within this job assignment*, the normal conditions of use and the physical properties of the material indicate that both inhalation and skin exposures are likely to be no more than negligible. Characterized by remote handling operations with the equipment isolated from the employees' work area. There is no equivalent exposure category on the T.I.M.E. system since the categories on the T.I.M.E. system serve primarily to determine appropriate handling precautions for known exposure situations. Typical job assignments which might be assigned a DE rating of 'NEG' include computer personnel and secretaries.
LOW	Within this job assignment, the normal conditions of use and the physical properties of the material indicate that both inhalation and skin exposure are likely to be no more than minor. Characterized by work around <u>closed systems</u>; sampling, laboratory work, packaging or dumping of materials with low to moderate volatility or dustiness with sufficient ventilation. The equivalent T.I.M.E. system category would be 'LOW'.
MOD	Within this job assignment, the normal conditions of use and the physical properties of the material indicate that there is a potential for moderate inhalation and/or skin exposures. Characterized by manual handling of materials such as sampling, packaging, filter changing or dumping of materials with low to moderate volatility or dustiness using potentially insufficient ventilation. This category may also include handling of materials with high volatility or dustiness if sufficient local exhaust ventilation is present. The equivalent T.I.M.E. system category would be 'MOD'.
HIGH	Within this job assignment, the normal conditions of use and the physical properties of the material indicate that there is a potential for high inhalation and/or skin exposures. Characterized by manual operations such as sampling, packaging or dumping of materials with high volatility or dustiness without sufficient local exhaust ventilation. Control is generally achieved through extensive use of protective equipment. The equivalent T.I.M.E. system category would be 'HIGH'.

*Job assignment is defined as a group of employees doing the same type of work which results in their having comparable exposures.

LH:sb
12/86

DO A 110751
CONFIDENTIAL

PRIORITY RATINGS

The priority rating is useful for representing and communicating the risks present in particular work situations. It is also helpful in establishing industrial hygiene priorities. The priority rating is based on two things: the conditions of use and physical properties (Degree of Exposure Rating), and the toxicity and warning properties of the material (Industrial Hygiene Guide if available). Within a given plant, the rating for a single chemical may be different for various job assignments because of the varying degree of exposure.

Industrial hygienists use the following six categories as guidelines for assigning the priority ratings.

<u>PR</u>	<u>Description</u>
5	The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a negligible potential for exposures to approach or exceed acceptable levels. No further exposure evaluation is needed.
4	The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a minor potential for exposures to approach or exceed acceptable levels. Only minimal monitoring may be needed to confirm this rating.
3	The degree of exposure rating, the toxicity of the material, and its warning properties are such that, for this job assignment under normal operating conditions, there is a moderate potential for exposures to approach or exceed acceptable levels. Employees' exposures should be monitored regularly or subjectively evaluated by a health professional.
2	The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a significant potential for exposures to approach or exceed acceptable levels. Periodic monitoring should be initiated and employees' exposure levels reevaluated on a regular basis.

- 1 The degree of exposure rating, the toxicity of the material, and the warning properties are such that, for this job assignment under normal operating conditions, there is a high potential for exposures to exceed acceptable levels.

Immediate action by plant supervision and industrial hygiene is necessary to evaluate and control employees' exposure levels. Periodic follow-up documentation is needed to ensure control measures are effective.

- T This "T" category is available to indicate that training has been conducted on certain chemicals which may be encountered on a nonroutine or emergency basis. No degree of exposure* is assigned with this "T" rating since exposures may never occur or may occur to an unpredictable degree. Situations which may be appropriate for a "T" priority rating include:

a. For Security, Fire and Emergency Response Groups

- Typically, training is conducted on selected chemicals which may be encountered in an emergency situation.

b. For Service Groups

- Training may be conducted on chemicals which are not part of a group's own inventory, but which have the potential for being encountered based on the type and location of the job being performed.

Note: A dash (-) is used under degree of exposure when a "T" is assigned as a priority rating.

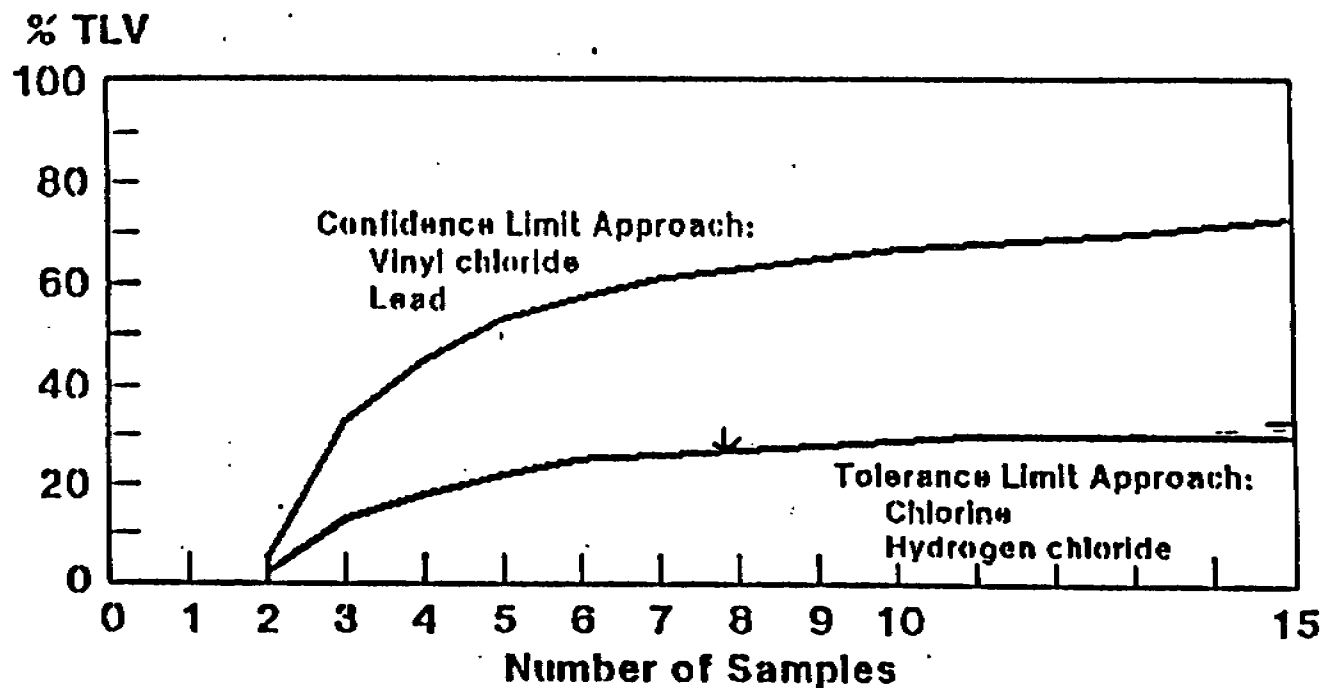
DO A 110753
CONFIDENTIAL

a80868,14

S. Norwood

STATISTICAL DECISION GUIDELINES

For acceptable workplace conditions when the estimated
geometric standard deviation is 2.5



DO A 110754
CONFIDENTIAL

PROCESS DESCRIPTION

The CPE Plant, Block 19 of the Louisiana Division, is the production facility of Tyrin* Brand CPE elastomers and resins. The following description is current as of March, 1986. A block flow diagram is shown in Figure 1.

CPE PRODUCTION PROCESS:

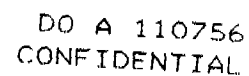
Chlorinated polyethylene (CPE) is produced in the reaction of high density polyethylene (HDPE) and chlorine in an aqueous slurry. The operation is remotely controlled, except for sampling, and semi-continuous - the reaction and neutralization steps are batch processes, and the drying and bagging steps are essentially continuous processes.

HDPE is produced in the polyethylene "B" production plant, and is transferred through a pipeline to several storage silos in the CPE Plant. Chlorine is obtained via pipeline from a chlorine production facility within the Division.

HDPE, in an aqueous slurry, is fed to a reactor along with additives. The slurry is chlorinated in a batch process. After dewatering, the acidic resin is transferred to a neutralizer, where caustic is added. The neutral resin is fed to the dryers continuously and an anti-blocking agent (talc) is introduced. The dryer resin is then blended for product consistency and finally packaged in bags for shipment.

*Trademark of the Dow Chemical Company

PROCESS FLOW DIAGRAM



ASSIGNED	K. S. NELSON	
BOOKED	<i>P. C. C. C. C.</i>	3/15
INDEXED		
APPROVED		
NOTED		
FILED		

0 000 000 000 000 000		REVISION		01 0115 000		REVISION	
C		D		E			

APPENDIX 6

JOB DESCRIPTION

Position Title Operations O.T. Incumbent _____
Department CPE Plant Location Louisiana
Supervisor Shift Supervisor Title _____
Date June 30, 1980 Prepared By F. D. Bauder

JOB SUMMARY: (why does this job exist - briefly describe general purpose of this j b)

Under the direction of the shift supervisor, assists the S.O.T. and O.S. where necessary and performs certain routine operations and minor maintenance.

SPECIFIC DUTIES: (describe the duties you personally perform beginning with the most important. State the frequency, i.e. daily, weekly, monthly and percent of time on each.)

The following duties are performed daily:

1. Catches neutralizer, fluid bed dryer, and blender samples and runs analysis to assist operations.
2. Maintains wetting agent and anti-block areas.
3. Reblends out-of-specification CPE.
4. Maintains good housekeeping throughout the plant.
5. Maintains all air filter systems including pulseaire cages and socks.
6. Assists in preventive and operational maintenance.

DO A 110757
CONFIDENTIAL

KNOW-HOW: (skills required)

Training/experience:

Receives training from other operations O.T.'s and shift supervisors. Minimum training is 3 weeks.

Human Relations:

Must be able to communicate well with the shift supervisor to inform him of any operational problems.

PROBLEM-SOLVING:

Complexity of Duties: (describe the most difficult or complex part of this job)

Recognizing and reporting operational or maintenance problems in the plant.

Thinking Environment: (to what extent does this job require analysis, evaluative decision-making? To what extent are these thinking requirements affected by established standards or routines?)

Job duties are according to established standards and routines.

ACCOUNTABILITY: Freedom to Act and Impact

Assignment, Review & Approval of Work: (Who assigns your work, what instructions are provided, who reviews and approves your work?)

Receives supervision and direction from shift supervisor who reviews and approves his work, however, individual job direction can come from the O.S. or S.O.T.

WORKING CONDITIONS:

Physical Effort Required:

Performing operational or breakdown maintenance may require some heavy lifting. The operator routinely lifts bags up to 55 pounds in weight in maintaining the anti-block area and reblending out-of-specification CPE.

Office Environment:

Not an office job.

SAFETY CONDITIONS:

Works around numerous pieces of rotating equipment. In the course of maintaining the anti-block areas come in contact with dusts which require the wearing of protective dust masks. When sampling neutralizers is in the presence of hot water, hot acid, or hot caustic mixtures which require proper training and appropriate caution.

JOB DESCRIPTION

Position Title Senior Operations Technician Incumbent
Department CPE Plant Location Louisiana
Supervisor Shift Supervisor Title _____
Date June 30, 1980 Prepared By R. D. Bauder

JOB SUMMARY: (why does this job exist - briefly describe general purpose of this job)

Under the direction of the shift supervisor operates the drying and blending systems, coordinates packaging, operates the plant air system, and performs routine operational and breakdown maintenance to insure smooth, efficient plant operation.

SPECIFIC DUTIES: (describe the duties you personally perform beginning with the most important. State the frequency, i.e. daily, weekly, monthly and percent of time on each.)

The following duties are performed on a daily basis:

1. Coordinates with the operations specialist on hold tank operation to maintain a uniform feed slurry for the drying system.
2. Operates the fluid bed dryer and associated equipment to maintain a maximum dry resin output consistent with the rest of the plant's operation.
3. Loads blenders with resin from the drying and reblend systems to insure availability of prime resin to be packaged on days.
4. Transfers resin from the blenders to the packaging area to provide maximum bagging rates.
5. Makes "rounds" to check the operation of equipment.
6. Performs breakdown maintenance to keep the plant operational.

DO A 110760
CONFIDENTIAL

KNOW-HOW: (skills required)

Training/experience:

Receives training from other S.O.T.'s, O.S.'s, and shift supervisors. Minimum training is 3 weeks. The operator should have a basic understanding of the equipment and procedures in the drying/packaging area in order to perform maintenance and make operational adjustments.

Human Relations:

The operator must communicate well with the shift supervisor to inform him of problems. He must relate well with other operators in order to have smooth plant operations.

PROBLEM-SOLVING:

Complexity of Duties: (describe the most difficult or complex part of this job)

Matching drying rate to reactor output to maximize plant capacity. This involves operational changes on the control of the fluid bed dryer and efficient scheduling of blender capacity.

Thinking Environment: (to what extent does this job require analysis, evaluation, decision-making? To what extent are these thinking requirements affected by established standards or routines?)

Routine operation of the plant is according to established standards and routines. The operator must be able to recognize problems in the plant and take initial steps for correction.

ACCOUNTABILITY: Freedom to Act and Impact

Assignment, Review & Approval of Work: (Who assigns your work, what instructions are provided, who reviews and approves your work?)

Work assignment is provided by the shift supervisor who reviews and approves work. Instruction is according to routine with any special work requiring more detailed instruction.

WORKING CONDITIONS:

Physical Effort Required:

Performing operational or breakdown maintenance may require some heavy lifting.

Office Environment:

Not an office job.

SAFETY CONDITIONS:

The S.O.T. work around numerous pieces of rotating equipment. The operation of the air compressor system requires work in a noisy environment where ear protection is required.

DO A 110762
CONFIDENTIAL

JOB DESCRIPTION

Position Title Operations Specialist Incumbent _____
Department CPE Plant Location _____
Supervisor Shift Supervisor Title _____
Date June 16, 1980 Prepared By R. D. Bauder

JOB SUMMARY: (why does this job exist - briefly describe general purpose of this job)

Under the direction of the shift supervisor operates the premix area, reactors, and neutralizers to produce some 25 different grades of CPE. He coordinates all plant functions for maximum safe operation, provides training for the development of younger operators, and performs operational and breakdown maintenance.

SPECIFIC DUTIES: (describe the duties you personally perform beginning with the most important. State the frequency, i.e. daily, weekly, monthly and percent of time on each.)

The following duties are performed daily:

Coordinates the receipt of polyethylene and caustic from supplier plants.

Sets up and maintains prescribed run conditions for loading and operating the reactors.

Based on lab analysis of resin properties, consults with the shift supervisor to make changes in reactor conditions.

Uses the PDP-8 and PDP-14 to "trouble-shoot" and correct process hang-ups.

Examines reactor samples for reactor glass damage and resin particle growth. Inspects reactors for chlorine leaks and symptoms of damage.

Moves CPE slurry from the reactor across acid Sweco's through the wash column and into the neutralizers balancing acid decanting efficiency and move-over time.

Operates the neutralizers to provide cool, neutral, low sodium resin for the drying system.

Works with the S.O.T. to maximize overall plant capacity and provide back-up knowledge for the drying system.

Directs the activities of the O.T.'s to assist in smooth plant operation.

Trains new operators.

Acts as lead man for maintenance activities.

Relieves the shift supervisor in his absence with full responsibility for the plant's operation and operator safety.

DO A 110763
CONFIDENTIAL

KNOW-HOW: (skills required)

Training/experience:

The operator should have a working knowledge of all areas of the plant in order to provide training and back-up knowledge for the S.O.T. and O.T.'s and to relieve them safely and efficiently in their absence. Minimum formal training for operations is 3 weeks. Minimum training before relieving the shift supervisor is 4-6 months.

Human Relations:

The operator must have good human relations skills to effectively communicate with and direct the activities of lower classification operators for smooth plant operations.

PROBLEM-SOLVING:

Complexity of Duties: (describe the most difficult or complex part of this job.

Reactor starts for maximum smooth plant operation. Reactor program changes to keep CPE resin properties in specification. Changes for safe operation when problems prevent normal operations.

Thinking Environment: (to what extent does this job require analysis, evaluation decision-making? To what extent are these thinking requirements affected by established standards or routine

Routine operation of the plant is according to established standards and routines.

Upset or emergency situations require immediate analysis and decision making.

ACCOUNTABILITY: Freedom to Act and Impact

Assignment, Review & Approval of Work: (Who assigns your work, what instructions are provided, who reviews and approves your work?)

Work assignment is provided by the shift supervisor who reviews and approves work.

When relieving the shift supervisor work assignment is provided by the plant Production Supervisor who reviews the work. Operational adjustments are made independently without prior approval of supervisor within established guidelines.

WORKING CONDITIONS:

Physical Effort Required:

Performing operational or breakdown maintenance may require some heavy lifting.

Office Environment:

Not an office job.

SAFETY CONDITIONS:

A working knowledge of every piece of equipment and all chemicals used in the plant is an absolute necessity for smooth and safe plant operation. During an upset condition, the operator under the direction of the shift supervisor will modify operations or perform an orderly shutdown and evacuation to insure a maximum in personnel and equipment safety.

ADDITIONAL INFORMATION: (Add any information not requested and/or stated in previous sections that would help to understand this job.)

The CPE shift composition under the supervision of the shift supervisor is:

2 - O.S.
1 - S.O.T.
2 - O.T.

One O.S. is responsible for operations and the other is used for relief of all classifications including shift supervisor. The outside or relief O.S. serves as lead man on maintenance and is a "trouble-shooter" in all areas of the plant. The operations and relief O.S.'s rotate on a bi-weekly basis.

APPENDIX 7

CPE PLANT
PERSONNEL ROSTER

NAME	CLASSIFICATION	MASTER #
Antoine, Ervin	O. S. #1	432502
Ashford, Jim	Technical	430434
Augustus, Richard	O. T.	434133
Bahr, Wayne	Technical	144753
Barta, Lorraine	Clerical	433859
Barbin, Herbert	Asst. Chemist	433617
Barrios, Cy	Superintendent	430875
Bauder, Bob	Technical	431876
Boudreaux, Henry	O. T.	434291
Bowman, Larry	Material Controller	433657
Callendar, Lawrence	Asst. Chemist	433998
Carles, Francis	O. S. #2	433371
Craven, Pat	O. S. #2	432789
Danehower, Debbie	S. O. T. #1	434134
Dessell, Freddie	Shift Supervisor	431980
Dufour, Cliff	S. O. T. #1	434205
Filleccia, Russ	Environment Specialist	431496
Garza, Linda	Warehouse	433501
Hartford, Michael	Warehouse	433971
Heersema, Mark	Technical	434602
Hanegan, Tim	O. S. #1	433416
Jeanpierre, Lester	Asst. Chemist	432267
Johnson, Wayne	S. O. T. #1	433363
Kuhlmeier, Ray	Production Supervisor	069866
LeBlanc, Gary	S. O. T. #1	433344
LeBlanc, Bobby	O. S. #2	432579
LeBlanc, I. J.	Maintenance O. S.	433502
Miles, Bruce	Technical	433957
Morales, Randy	O. S. #2	433227
Morel, J. W.	O. S. #1	432495
Morse, Jonnie	Asst. Chemist	433999
Peavy, Ace	Training Supervisor	431175
Pero, Randy	Asst. Chemist	434040
Porto, Phil	S. O. T. #2	433644
Regira, Mark	S. O. T. #2	434002
Roberts, Lee	S. O. T. #2	433425
Simmers, Zack	S. O. T. #2	434217
Smith, Charles	Maintenance Coordinator	431354
Sparkman, Louis	Shift Supervisor	430999
Stehr, Betty	Sr. Asst. Chemist	433378
Thurston, Curtis	Warehouse	202502
Williams, Ralph	O. T.	432698
Williams, Ron	O. S. #1	432505
Woolfley, Chris	Technical	432846

DO A 110767
CONFIDENTIAL

TABLE 1. EMPLOYEE'S POTENTIAL TIME-WEIGHTED AVERAGE EXPOSURES^a TO NOISE
AT THE CHLORINATED POLYETHYLENE PLANT, LOUISIANA DIVISION, 1987.

SAMPLING DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	POTENTIAL NOISE EXPOSURE; PERCENT OF ALLOWABLE DOSE ^c
	EXPOSURE GUIDELINE ^b			100%
380	08737-6	LABORER-TRUCKLOAD	433-94-3211 ^d	55%
386	08737-7	LABORER-BAGGING	438-11-4061 ^d	51%
287	08737-5	ENVIRO-SPECIALIST	431496	21%
438	08737-1	MAINT-COORDINATOR	431354	29%
437	08737-2	OUTSIDE O.S.	432505	19%
439	08737-3	OUTSIDE S.O.T.	433644	30%
392	08737-0	OUTSIDE O.T.	432789	20%

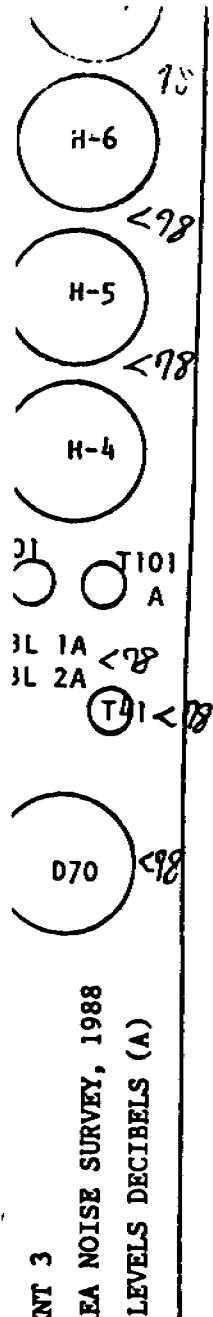
- a. ALL EXPOSURE DATA LISTED REPRESENTS POTENTIAL EXPOSURE ONLY, DUE TO THE REQUIREMENT OF HEARING PROTECTION USAGE IN PLANT AREAS WITH NOISE LEVELS 90 DECIBELS (A) OR ABOVE.
- b. EXPOSURE GUIDELINE USED IS THE OSHA PERMISSABLE EXPOSURE LIMIT OF 90 DECIBELS (A) FOR AN EIGHT HOUR AVERAGE.
- c. NOISE EXPOSURE DATA IS EXPRESSED AS A PERCENTAGE OF THE OSHA PERMISSABLE EXPOSURE LIMIT. TO EXPRESS DATA IN TERMS OF THE LOUISIANA DIVISION NOISE STANDARD, MULTIPLY THE NUMBERS BY TWO.
- d. HEBERT BROTHERS EMPLOYEE

DO A 110768
CONFIDENTIAL

TABLE 2. EMPLOYEE'S POTENTIAL TIME-WEIGHTED AVERAGE EXPOSURES^a TO NOISE AT THE CHLORINATED POLYETHYLENE PLANT, LOUISIANA DIVISION, 1988.

SAMPLING DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	POTENTIAL NOISE EXPOSURE; PERCENT OF ALLOWABLE DOSE ^c
EXPOSURE GUIDELINE ^b				100%
427	09123-1	LABORER-TRUCKLOAD ^d	433-94-3201	14%
450	09123-2	LABORER-TRUCKLOAD ^d	437-40-3384	21%
449	09123-3	LABORER-TRUCKLOAD ^d	433-94-3211	33%
445	09123-4	O.S. - BAGGING	433616	37%
427	09123-5	OUTSIDE O.S.	434291	84%
427	09123-6	OUTSIDE S.O.S.	432579	31%

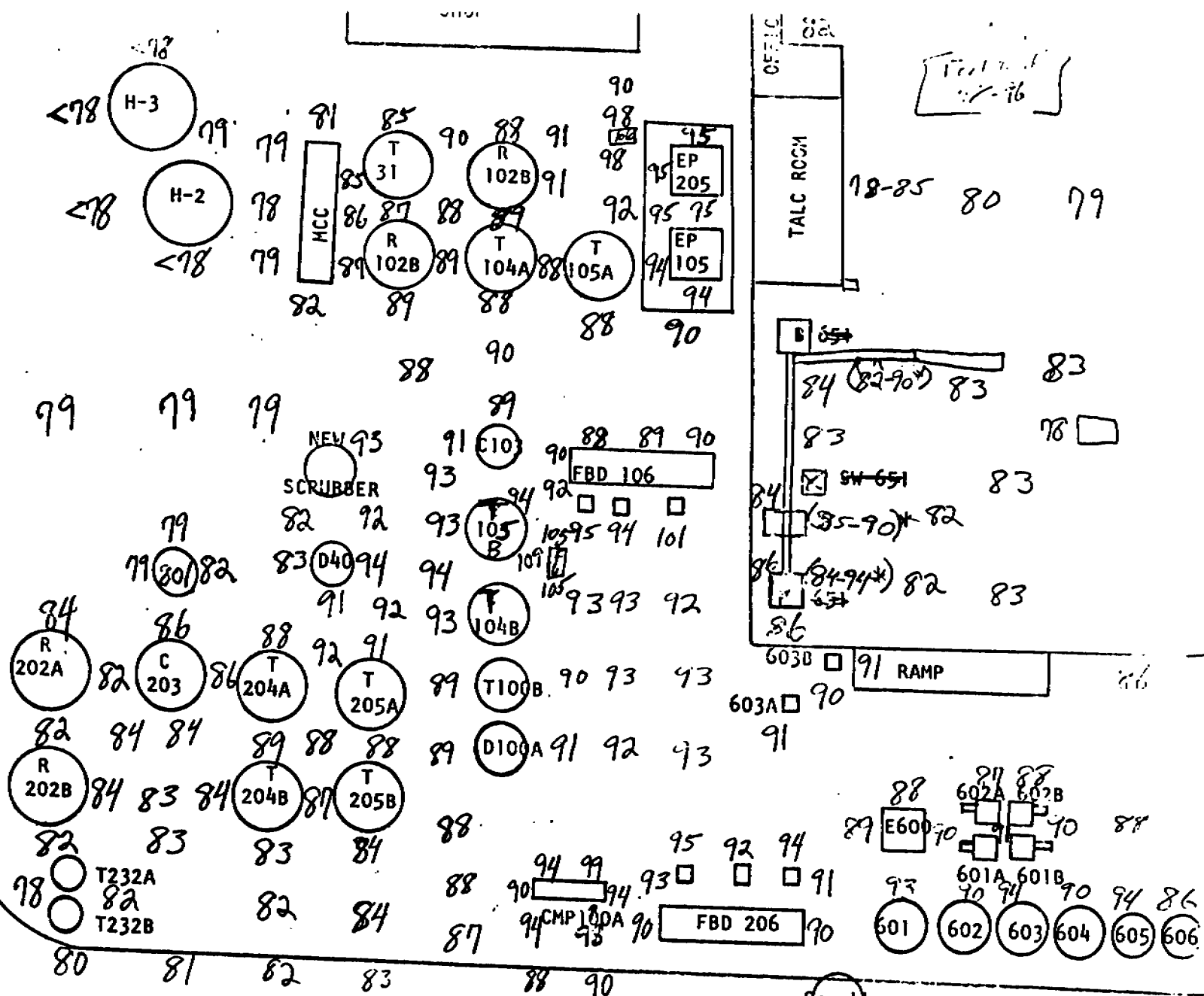
- a. ALL EXPOSURE DATA LISTED REPRESENTS POTENTIAL EXPOSURE ONLY, DUE TO THE REQUIREMENT OF HEARING PROTECTION USAGE IN PLANT AREAS WITH NOISE LEVELS 90 DECIBELS (A) OR ABOVE.
- b. EXPOSURE GUIDELINE USED IS THE OSHA PERMISSABLE EXPOSURE LIMIT OF 90 DECIBELS (A) FOR AN EIGHT HOUR AVERAGE.
- c. NOISE EXPOSURE DATA IS EXPRESSED AS A PERCENTAGE OF THE OSHA PERMISSABLE EXPOSURE LIMIT. TO EXPRESS DATA IN TERMS OF THE LOUISIANA DIVISION NOISE STANDARD, MULTIPLY THE NUMBERS BY TWO.
- d. HEBERT BROTHERS EMPLOYEE.



<78

<78

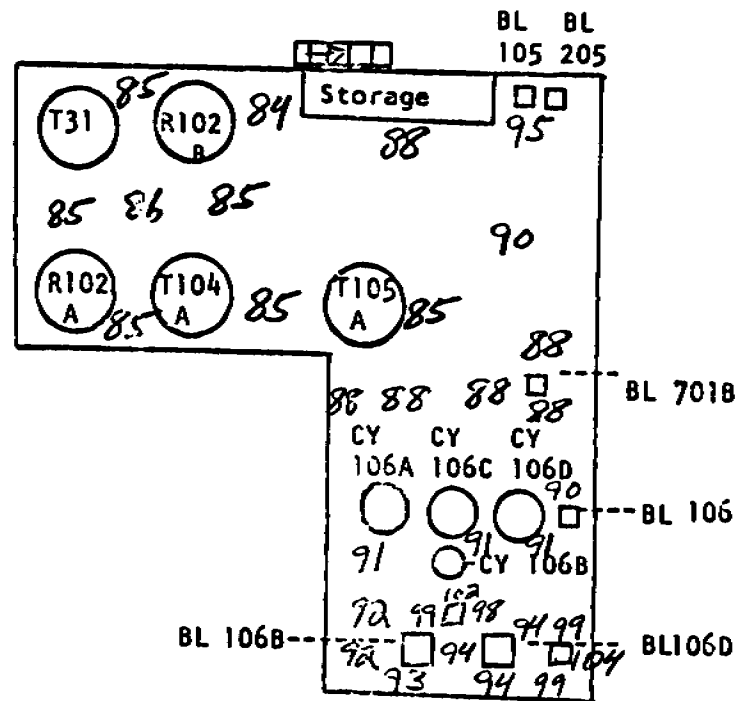
CONTROL ROOM



(1) Airline - Main
* mostly 70

CPE AREA NOISE SURVEY, 1988
NOISE LEVELS DECIBELS (A)

TRAIN 1 - UPSTAIRS



DO A 110771
CONFIDENTIAL

CPE AREA NOISE SURVEY, 1988
NOISE LEVELS DECIBELS (A)

TRAIN 11 - SECOND DECK
AREA NOISE LEVELS - (dba)

DO A 110772
CONFIDENTIAL

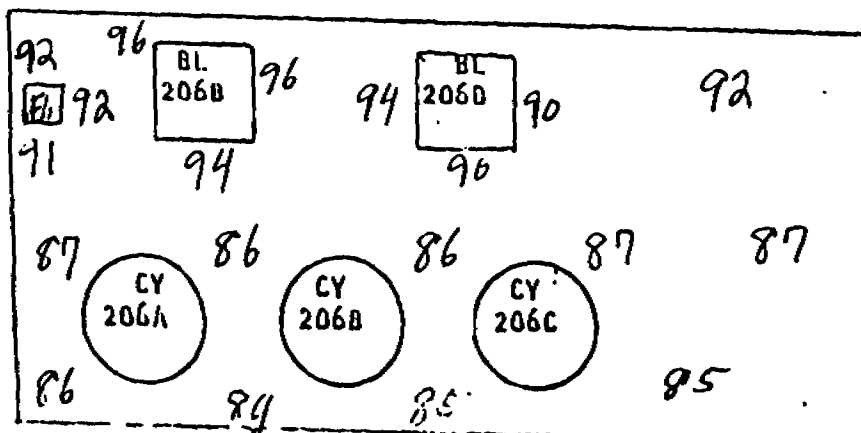
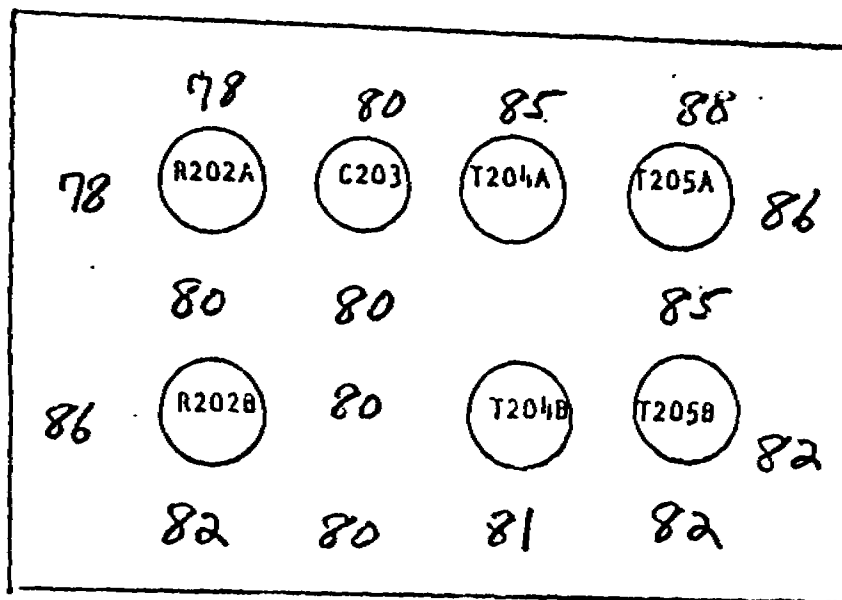


TABLE 3. EMPLOYEE'S POTENTIAL INSTANTANEOUS AND TIME-WEIGHTED AVERAGE EXPOSURES^a TO CHLORINE AT THE CPE PLANT, LOUISIANA DIVISION, 1987.

SAMPLING DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	INSTANTANEOUS ^b (PPM)	TIME- WEIGHTED AVERAGE (PPM)
EXPOSURE GUIDELINE ^c			1.0 CEILING LIMIT		
349	08736-7	OUTSIDE O.S.	432502	< 0.1 ^e	< 0.1 ^e
334	08736-4	OUTSIDE O.S.	432789	< 0.1 ^e	< 0.1 ^e
355	08736-2	OUTSIDE O.S.	433371	0.3	< 0.1 ^e
372	08736-3	OUTSIDE O.S.	433363	< 0.1 ^e	< 0.1 ^e
331	08736-5	OUTSIDE S.O.T.	434002	0.5	< 0.1 ^e
375	08736-6	OUTSIDE S.O.T.	434134	2.6	< 0.1 ^e
350	08736-8	OUTSIDE S.O.T.	433644	2.1	< 0.1 ^e
360	08736-1	OUTSIDE S.O.T.	433425	1.1	< 0.1 ^e
244	08736-9	FLOCCULATOR ^d	-----	< 0.1 ^e	< 0.1 ^e
242	08736-10	CLARIFIER ^d	-----	< 0.1 ^e	< 0.1 ^e
242	08736-11	FLUME ^d	-----	1.1	< 0.1 ^e
263	08736-12	FLUME ^d	-----	1.2	< 0.2 ^e

a. DATA REPRESENTS POTENTIAL EXPOSURES ONLY DUE TO THE REQUIREMENTS OF RESPIRATOR USAGE IN ALL AREAS OF THE PLANT THAT EXCEEDS 1 PPM CHLORINE.

b. INSTANTANEOUS DATA REPRESENTS THE HIGHEST 30 SECOND AVERAGE CHLORINE CONCENTRATION THAT WAS DETECTED.

c. EXPOSURE GUIDELINE IS THE OSHA PERMISSABLE EXPOSURE LIMIT .

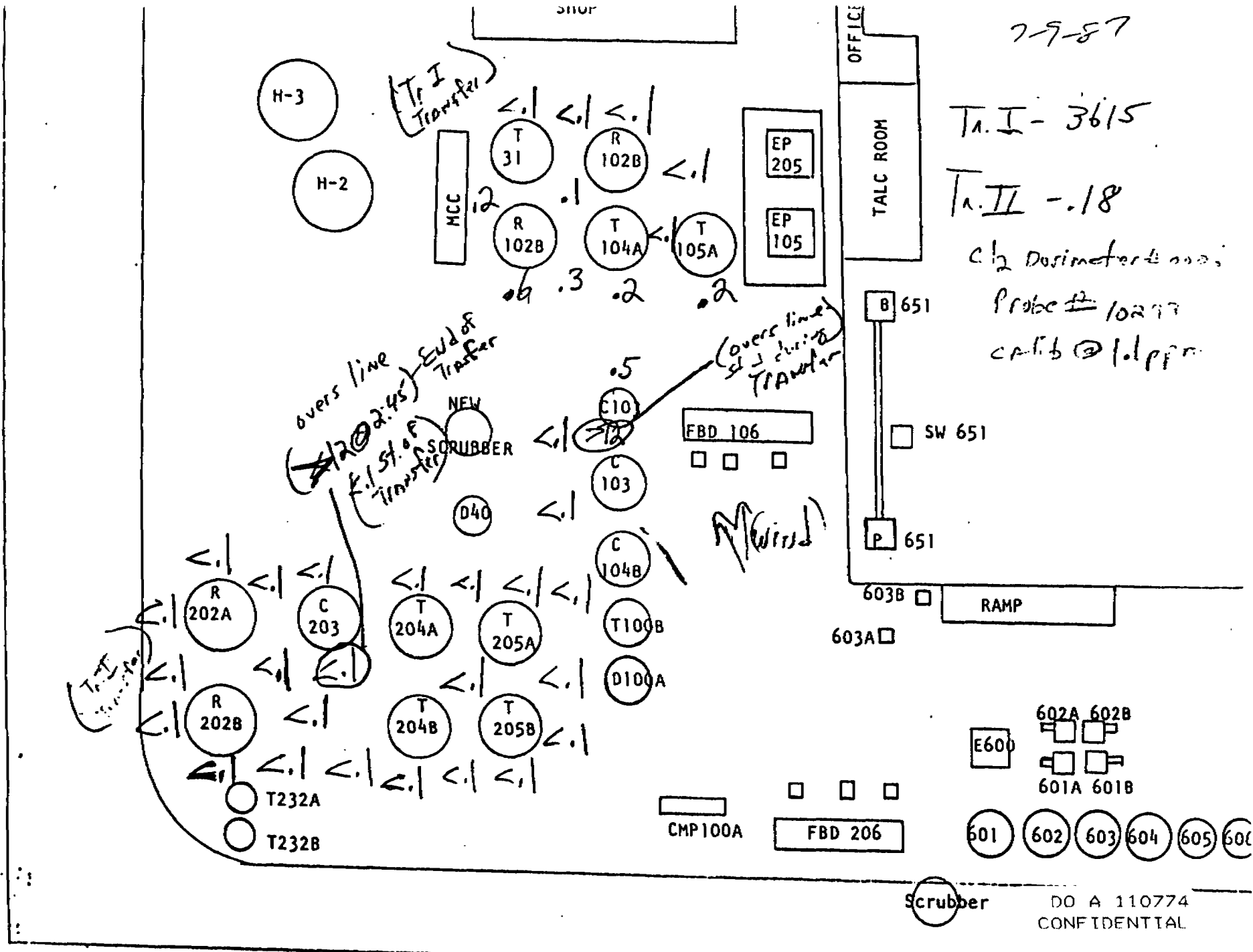
d. SAMPLE WAS TAKEN FROM THE TOP OPENINGS OF THIS EQUIPMENT.

e. BELOW THE LIMITS OF DETECTION.

ATTACHMENT 7

CPE AREA CHLORINE SURVEY, 1987
PPM (VOL, VOL)

CONTROL ROOM



7-9-87

T.I. - 3615

T.I. II - .18

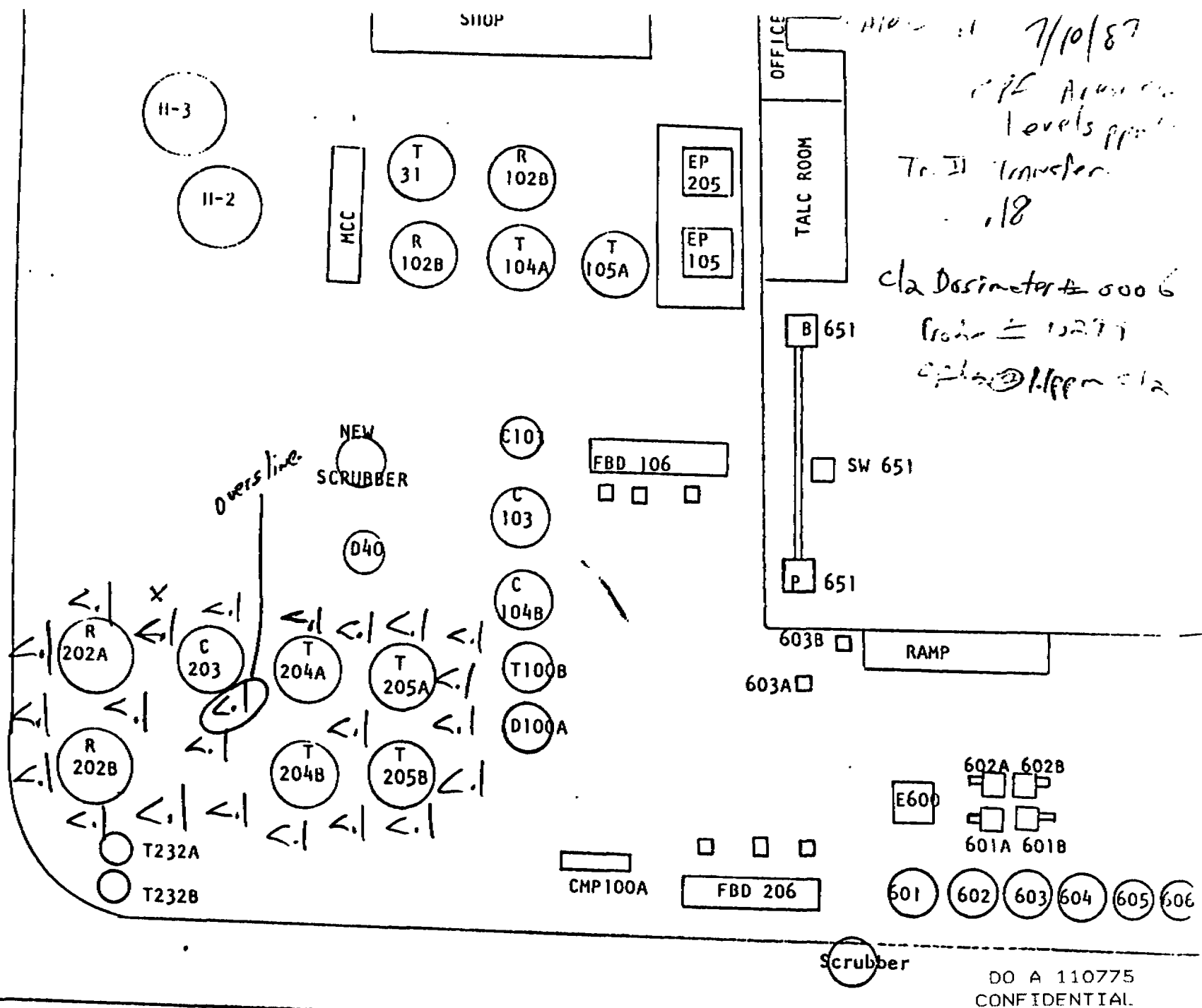
Cl₂ Dosimeter to 1000;
Probe # 10277
Calib @ 1.1 ppm

ppm (vol, vol) CPE Area Cl₂ 7/9/87

DO A 110774
CONFIDENTIAL

PPM(VOL, VOL)

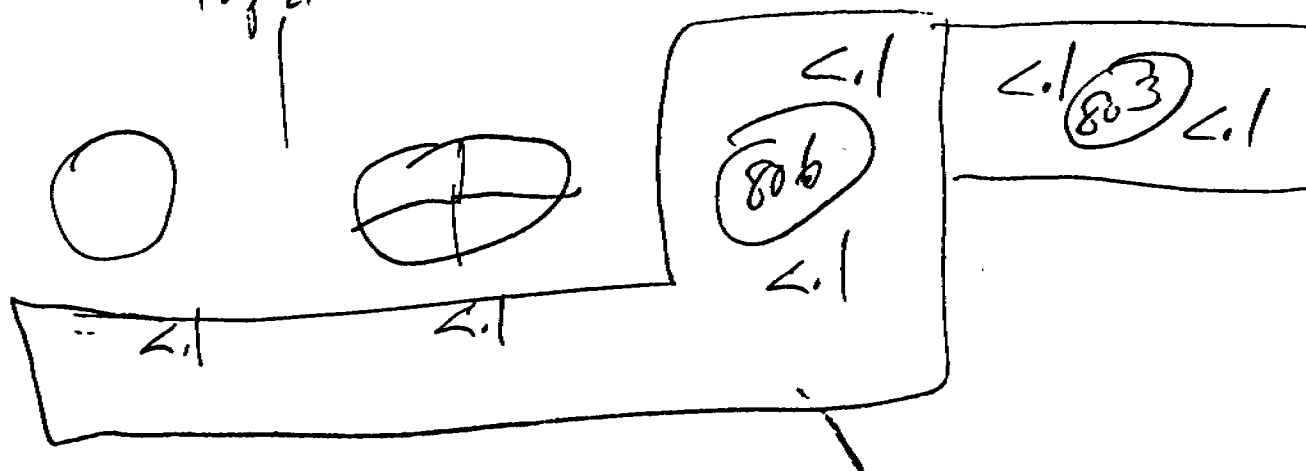
CONTROL ROOM



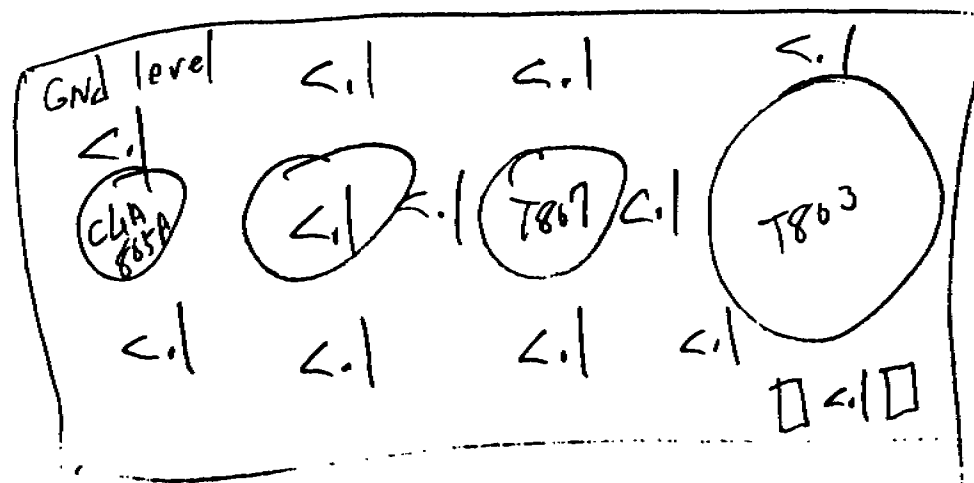
CPE AREA CHLORINE SURVEY, 1987 (NEW ENVIROMENTAL SECTION)
PPM (VOL., VOL.)

New section

Top deck



2nd Deck - <.1 ppm

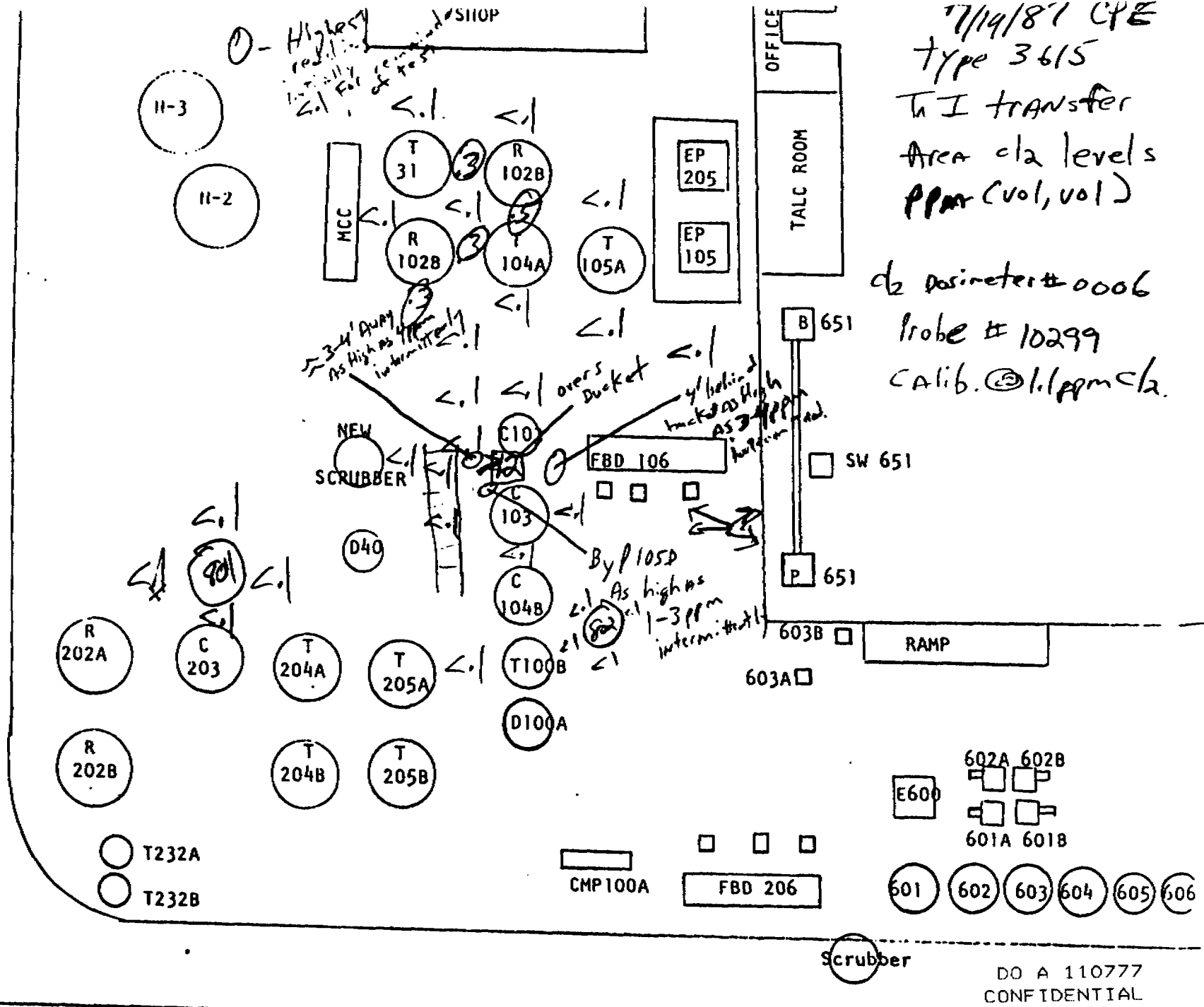


DO A 110776
CONFIDENTIAL

ATTACHMENT 10
CPE AREA CHLORINE SURVEY, 1987

PPM (VOL, VOL)

CONTROL ROOM



PPM (VOL., VOL.)

CONTROL ROOM

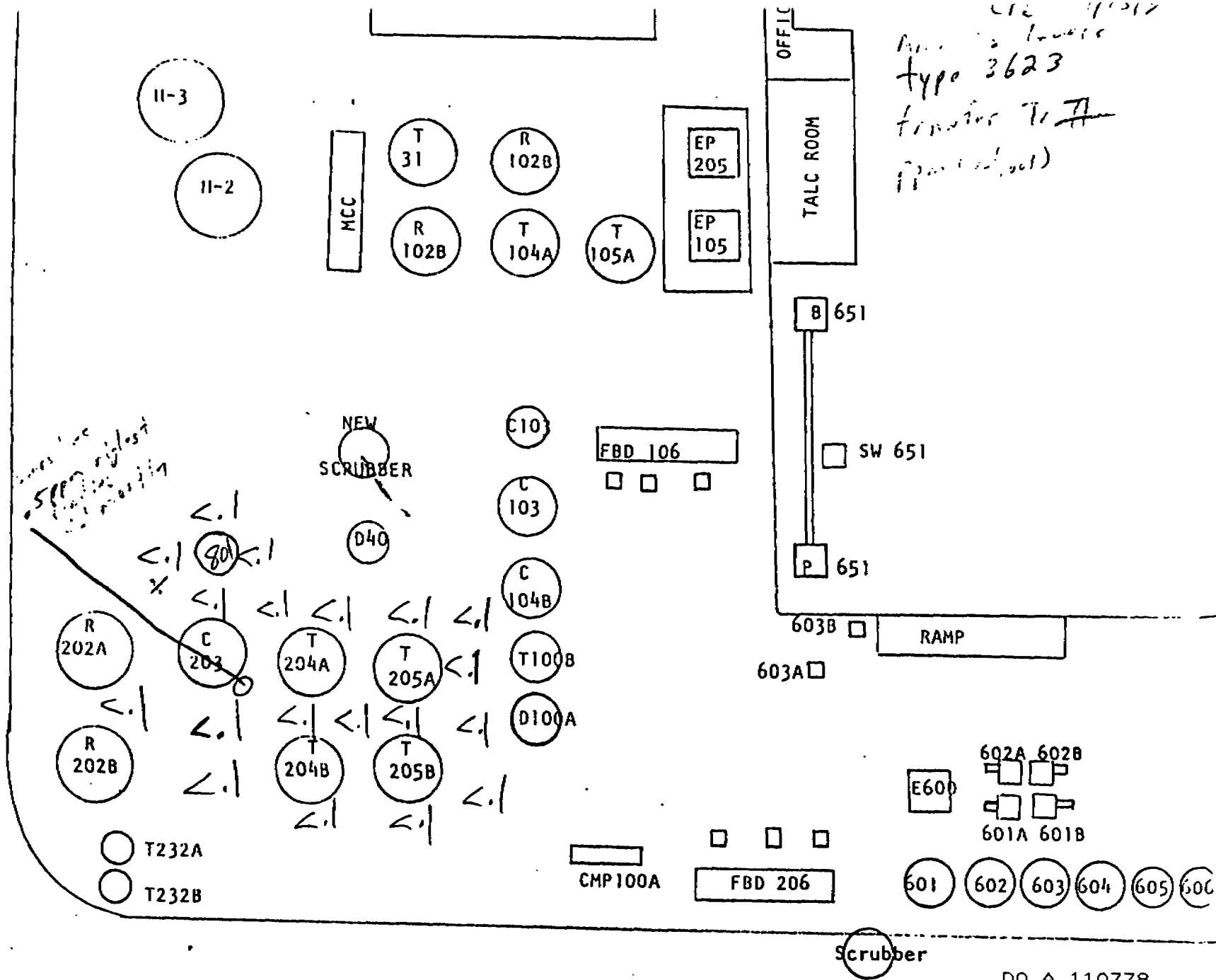


TABLE 4. EMPLOYEE'S POTENTIAL INSTANTANEOUS AND TIME-WEIGHTED AVERAGE EXPOSURES^a TO CHLORINE AT THE CPE PLANT, LOUISIANA DIVISION, 1988.

SAMPLING DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	INSTANTANEOUS ^b (PPM)	TIME- WEIGHTED AVERAGE (PPM)
EXPOSURE GUIDELINE ^c			1.0 CEILING LIMIT		
365	09174-1	OUTSIDE O.S.	433971	0.4	< 0.1 ^d
357	09174-4	OUTSIDE O.S.	433644	< 0.1 ^d	< 0.1 ^d
353	09174-6	OUTSIDE O.S.	433360	11.1	< 0.1 ^d
350	09174-5	OUTSIDE S.O.S.	433371	4.3	< 0.1 ^d
351	09174-2	OUTSIDE S.O.S.	433227	< 0.1 ^d	< 0.1 ^d
355	09174-3	OUTSIDE S.O.S.	433344	< 0.1 ^d	< 0.1 ^d

- a. DATA REPRESENTS POTENTIAL EXPOSURES ONLY DUE TO THE REQUIREMENTS OF RESPIRATOR USAGE IN ALL AREAS OF THE PLANT THAT EXCEEDS 1 PPM CHLORINE.
- b. INSTANTANEOUS DATA REPRESENTS THE HIGHEST 30 SECOND AVERAGE CHLORINE CONCENTRATION THAT WAS DETECTED.
- c. EXPOSURE GUIDELINE IS THE OSHA PERMISSABLE EXPOSURE LIMIT.
- d. BELOW THE LIMITS OF DETECTION.

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TABLE 5. EMPLOYEE'S POTENTIAL TIME-WEIGHTED AVERAGE EXPOSURES^a TO
RESPIRABLE TALC AT THE CPE PLANT, LOUISIANA DIVISION, 1987.

SAMPLE DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	TIME-WEIGHTED AVERAGE (MG/M3)
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EXPOSURE GUIDELINE ^b			2 MG/M3 RESPIRABLE DU	
26	08738	O.T.-LOADING TALC	434291	0.1
9	08739	O.T.-LOADING TALC	433971	0.1

- a. DUE TO THE DUST RESPIRATOR USAGE REQUIREMENTS OF THIS JOB, THE DATA REPRESENTS POTENTIAL EXPOSURE ONLY.
- b. EXPOSURE GUIDELINE IS THE ACGIH'S TLV-TWA FOR RESPIRABLE TALC CONTAINING NO ASBESTOS FIBERS.

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TABLE 6. EMPLOYEE'S TIME-WEIGHTED AVERAGE EXPOSURES TO TETRAHYDROFURAN
AT THE CPE PLANT, LOUISIANA DIVISION, 1987.

SAMPLING DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	TIME-WEIGHTED AVERAGE (PPM)
EXPOSURE GUIDELINE ^a				200 PPM TLV-TWA ^b 250 PPM TLV-STEL
5	06673	ASST. CHEMIST (CHLORIDES TEST)	433998	27.0
350	07814	ASST. CHEMIST	434040	0.2 ^c
350	07815	ASST CHEMIST	433998	0.2 ^c
416	07861	ASST. CHEMIST	434040	25.0

a. AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENIST.

b. SHORT TERM EXPOSURE LIMIT - 15 MINUTES.

c. BELOW THE LIMITS OF DETECTION.

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TABLE 7. EMPLOYEE'S TIME-WEIGHTED AVERAGE EXPOSURES TO XYLENE
AT THE CPE PLANT, LOUISIANA DIVISION, 1987.

SAMPLING DURATION (MINUTES)	SAMPLE NUMBER	JOB	EMPLOYEE NUMBER	TIME-WEIGHTED AVERAGE (PPM)
EXPOSURE GUIDELINE ^a				100 PPM TLV-TWA 150 PPM TLV-STEL ^b
10	07821	ASST. CHEMIST (GEL COUNT TEST)	433998	<1.1 ^c
60	07820	ASST CHEMIST (GEL COUNT TEST)	433998	<1.1 ^c
46	07822	ASST CHEMIST (GEL COUNT TEST)	433998	<1.4 ^c

a. AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENIST.

b. SHORT TERM EXPOSURE LIMIT- 15 MINUTES.

c. BELOW THE LIMITS OF DETECTION.

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