

THE ROLE OF INDUSTRIAL HYGIENE AT LHC 3

Protection of the worker is the main concern when assessing the Industrial Hygiene program here at LHC 3. In order to protect the worker, recognition of potential problems and their possible solutions is required. Exposure to benzene, 1,3 butadiene, the coldness of propylene, the heat of steam, and the high noise areas are some of the potential problems which exist.

LHC 3 is designed to operate under a guideline of 1 ppm benzene on a time weighted average. LHC 3 has a system of area air monitors for benzene and toluene. This system alarms whenever the benzene concentration exceeds 8 ppm. The daily monitor printouts are reviewed by the Safety Monitor and any reading of .5 ppm (STEL) is reported to the block Safety Operator and the block I. H. Contact. Data indicates that the levels of benzene exposure on a normal day to day operation schedule are well below the TLV and PEL as shown by the data collected on pages 5, 6 and 7. LHC 3 has a continuing educational program to train personnel in the latest information on hazards and their proper handling.

A data base of worker exposure has been gathered by the Industrial Hygiene Contact at LHC 3. This is especially true in the benzene area due to the new Benzene Standard which went into effect on December 10, 1987. This data helps in determining the level of respiratory and other protection needed when working in a benzene area.

There are twelve (12) different job assignment classifications at LHC 3. The average degree of exposure for each class and the number of persons in each class is as follows:

1. Office/Clerical (2) - Negligible
2. Extended Day Operations (5) - Moderate
3. Shift Supervisors (6) - Low
4. Operation Specialists (34) - Low
5. Senior Operation Specialists (31) - Moderate
6. Operation Technician (1) - Moderate
7. Chemists (7) - Moderate
8. Mfg. (12) - Low
9. Mfg. Mgr., Sup. Dir. (4) - Negligible
10. Material Controllers (2) - Negligible
11. Maintenance Contractors (13) - Low
12. Instrumentation (8) - Low

JOB CLASSIFICATION DESCRIPTIONS

OFFICE/CLERICAL :

The secretaries perform clerical tasks including monthly reports, scheduling of travel arrangements, typing of correspondence and all around office duties which take up 100% of their time. This time is spent in their respective offices or the PC room. Their exposure potential to plant chemicals or physical stress is negligible.

EXTENDED DAY OPERATIONS:

This group consists of coordinators and planners who schedule and sometimes carry out work performed in the field. The overall exposure potential is moderate.

1. Mechanical Operator - Oversees repairs of all rotating equipment.
2. Furnace Operator - Oversees scheduled maintenance of furnaces involving tube repair, brick replacement and instrumentation.
3. Utilities Operators - Oversee the periodic maintenance on safety relief devices, steam traps, refrigeration equipment and water treating equipment.
4. Job Planner - Schedules the maintenance and project jobs to be done in the field by pipefitters, welders, boilermakers, ironworkers, millwrights, insulators and painters.

SHIFT SUPERVISORS:

They supervise the day to day operation of the plant and track the performance of the people on their shift. Seventy percent of their time is spent in their offices working on training, job planning, performance evaluation, time cards and vacation planning. The remaining time is spent in the plant. Their potential exposure to chemicals and noise is low.

OPERATION SPECIALISTS:

Their main duties consist of running the plant from the control panel consoles in the main control room on twelve hour shifts for three out of four weeks during a month. During one week they may be out in the plant while working an eight hour maintenance shift. Their potential exposure to chemicals and noise is low.

SENIOR OPERATION SPECIALISTS:

The majority of their twelve hour day is spent in the plant performing scheduled checks on equipment and making any adjustments felt necessary by the inside operation specialist. They will also prepare systems and equipment for work which will be performed by contract workers. From time to time, they will work on equipment themselves. Their potential exposure to chemicals and noise is moderate.

OPERATION TECHNICIAN:

This operator handles the tank car loading for the plant. Most of his eight hour day is spent outside and his potential exposure to chemicals and noise is moderate.

CHEMISTS:

Their twelve hour day is spent running samples in the lab. These are mostly water and process liquid and vapor samples. Lab hoods and localized exhaust vents are stationed throughout their work area to minimize their potential exposure to chemicals which is moderate.

TECHNICAL MANUFACTURERS:

The plant engineers participate in directing the operations and improvements in particular plant processes. They spent five to ten percent of their time in the plant with the remainder being spent in the control room or their offices. Their potential exposure to chemicals and noise is low.

MANUFACTURING MANAGERS AND SUPERINTENDENT:

This group consists of the production supervisors in each area and the plant superintendent. A large part of their time is spent dealing with the economics of supply and demand for the plant's products and feed stock. They take an administrative role. Their potential exposure to chemicals and noise is negligible.

MATERIAL CONTROLLERS:

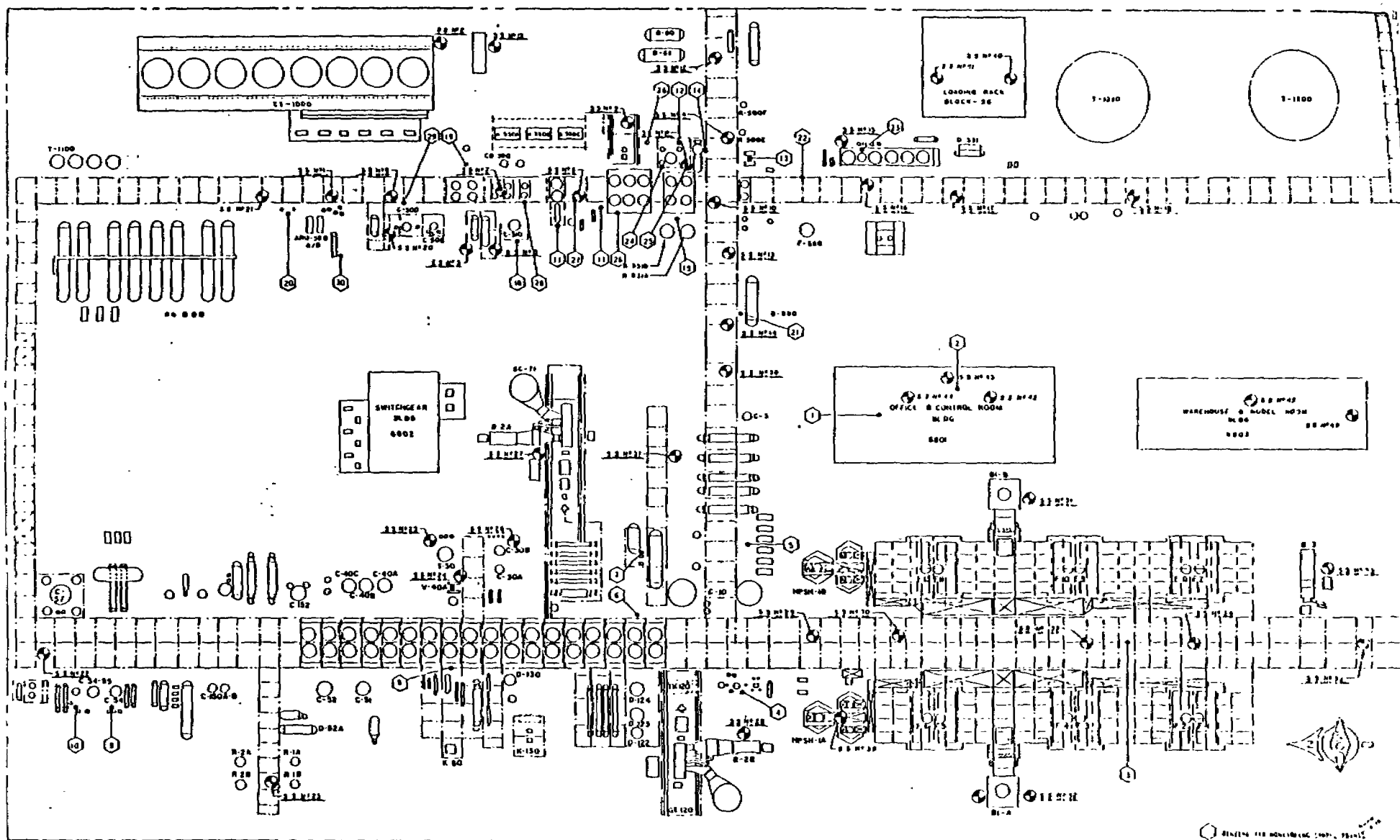
Their time is spent in their office and warehouse area overseeing the stocking of spare parts, securing of items needed by the engineers, and day to day supplies needed to keep the plant in operation. Their potential exposure to chemicals and noise is negligible.

MAINTENANCE CONTRACTORS:

This group consists of welders, pipefitters, boilermakers, millwrights, laborers, painters and insulators who do the majority of the manual and physical labor performed in the plant. Their potential exposure to chemicals and noise is low.

INSTRUMENTATION:

This group performs the installation, maintenance and modification of all instrumentation in the plant. About eighty percent of their eight hour day is spent in the plant with the remaining time spent in their shop. Their potential exposure to chemicals and noise is low.

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DATE 13-JAN-88

TIME 07:43:43

REPORT # 55

AX1030 (ST 1-10)

TAG		DATA	UNITS	DESCRIPTION	ALARMS
AX	1	0.0033	PPM	BENZENE IN CONTROL ROOM AIR	
AX	2	0.0081	PPM	TOLUENE IN CONTROL ROOM AIR	
- AX	3	0.0029	PPM	BENZENE IN LAB AIR	
AX	4	0.0017	PPM	TOLUENE IN LAB AIR	
AX	5	0.0032	PPM	BENZENE IN COMPUTER DEV. ROOM	
AX	6	0.0058	PPM	TOLUENE IN COMPUTER DEV. ROOM	
AX	7	0.0060	PPM	BENZENE AT P-18'S/P-19'S	
AX	8	0.0048	PPM	TOLUENE AT P-18'S/P-19'S	
AX	9	0.0015	PPM	BENZENE AT P-10'S	
AX	10	0.0068	PPM	TOLUENE AT P-10'S	
AX	11	0.0073	PPM	BENZENE AT AH-8	
AX	12	0.0104	PPM	TOLUENE AT AH-8	
AX	13	0.0018	PPM	BENZENE AT P-23'S	
AX	14	0.0053	PPM	TOLUENE AT P-23'S	
AX	15	0.0035	PPM	BENZENE AT AH-9	
AX	16	0.0077	PPM	TOLUENE AT AH-9	
AX	17	0.0014	PPM	BENZENE AT P-55 C/D	
AX	18	0.0071	PPM	TOLUENE AT P-55 C/D	
AX	19	0.0026	PPM	BENZENE AT P-55 A/B	
AX	20	0.0079	PPM	TOLUENE AT P-55 A/B	

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DATE 13-JAN-88

TIME 07:43:59

REPORT # 56

AX4014 (ST 1-10)

TAG	DATA	UNITS	DESCRIPTION	ALARMS
AX 21	0.0027	PPM	BENZENE AT AH-15	
AX 22	0.0054	PPM	TOLUENE AT AH-15	
AX 23	0.3219	PPM	BENZENE AT AH-17	
AX 24	0.1305	PPM	TOLUENE AT AH-17	
AX 25	0.0075	PPM	BENZENE AT P-521 A/B	
AX 26	0.0122	PPM	TOLUENE AT P-521 A/B	
AX 27	0.0137	PPM	BENZENE AT BENZENE PROD	
AX 28	0.0025	PPM	TOLUENE AT BENZENE PROD	
AX 29	0.0015	PPM	BENZENE AT CLAY BEDS	
AX 30	0.0016	PPM	TOLUENE AT CLAY BEDS	
AX 31	0.0162	PPM	BENZENE AT K-551	
AX 32	0.0161	PPM	TOLUENE AT K-551	
AX 33	0.0592	PPM	BENZENE AT E-536	
AX 34	0.0070	PPM	TOLUENE AT E-536	
AX 35	0.0000	PPM	BENZENE AT P-510G	
AX 36	0.0081	PPM	TOLUENE AT P-510G	
AX 37	0.0019	PPM	BENZENE AT S-594	
AX 38	0.0101	PPM	TOLUENE AT S-594	
AX 39	0.0000	PPM	BENZENE AT P-570	
AX 40	0.0092	PPM	TOLUENE AT P-570	

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DATE 13-JAN-88

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REPORT # 57

AX4015 (ST 1-10)

TAG		DATA	UNITS	DESCRIPTION	ALARMS
AX	41	0.0453	PPM	BENZENE AT P-501 A/B	
AX	42	0.1593	PPM	TOLUENE AT P-501 A/B	
AX	43	0.0634	PPM	BENZENE AT AH-18	
AX	44	0.1381	PPM	Toluene AT AH-18	
AX	45	0.0518	PPM	BENZENE AT P-520 A/B	
AX	46	0.1558	PPM	TOLUENE AT P-520 A/B	
AX	47	0.0579	PPM	BENZENE AT P-540 A/B	
AX	48	0.1665	PPM	TOLUENE AT P-540 A/B	
AX	49	0.0432	PPM	BENZENE AT P-540 E/F	
AX	50	0.1047	PPM	TOLUENE AT P-540 E/F	
AX	51	0.0816	PPM	BENZENE AT D-534	
AX	52	0.1969	PPM	TOLUENE AT D-534	
AX	53	0.0621	PPM	BENZENE AT P-530 C/D	
AX	54	0.1390	PPM	TOLUENE AT P-530 C/D	
AX	55	0.0493	PPM	BENZENE AT P-510 A/B	
AX	56	0.1773	PPM	TOLUENE AT P-510 A/B	
AX	57	0.0300	PPM	BENZENE AT P-500 C/D	
AX	58	0.1620	PPM	TOLUENE AT P-500 C/D	
AX	59	0.0435	PPM	BENZ. AT WASTE H2O PIT	
AX	60	0.1526	PPM	TOL. AT WASTE H2O PIT	

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LHC 3 ACCOMPLISHMENTS IN 1987

INDUSTRIAL HYGIENE TRAINING

Tank Farm and LHC 3 operations and maintenance personnel were trained in the consequences of overexposure to the block's hazardous chemicals. Hearing protection requirements and the monitoring program were reviewed. "Right to Know", Mouth bit, half faced dual cartridge respirator, 5 minute escape pack, and Scott Air Pack training was performed. Block personnel were informed that yearly respirator fit testing and documentation would begin in 1988.

HAZARD COMMUNICATION STANDARD

The requirements of the OSHA Hazard Communication Standard were reviewed with all plant personnel. A written program meeting the requirements of the OSHA Hazard Communication Standard was utilized. The reference manual contains policy statements, a hazardous chemical listing, a vessel content listing, and MSD sheets for chemicals found in the block. The standard, its effects on plant personnel, and the location and types of reference material was reviewed.

FORMATION OF BLOCK ENVIRONMENTAL COMMITTEE

In June of 1987, an Environmental Committee to address both environmental and industrial hygiene problems and their solutions was formed at LHC 3. The committee is open to all interested Dow block personnel. A computer program to track environmental and industrial hygiene suggestions was implemented.

TANK SEAL PROBLEM

The floating roof seal on the process water storage tank (T-1660) was studied and sample coupons of sealant material were placed in the tank to determine the best method of repair. Venting hydrocarbons which contaminated the tank may pose an odor and exposure problem. The tank will have to be taken out of service and cleaned before the seals can be replaced. This work is scheduled for the first half of 1988.

NOISE REDUCTION AND MONITORING

The yearly noise level survey of LHC 3 was performed. A summary of the noise surveys for the past three years is included. No new noise reduction plans were initiated in 1987 although some new hearing protection muffs with an improved NRR were tried and adopted for use not only in the block but division wide.

LHC 3 NOISE SURVEY

Louisiana Division

	1986	1987	1988
INSIDE CONTROL ROOM	65	72	74
EAST OF CONTROL RM.	81	81	84
N.E. OF CONTROL RM.	88	89	92
WAREHOUSE	73	74	74
WEST OF V-1400A	98	--	91
WEST OF T-1200	75	89	82
WEST OF T-1210	83	88	87
BETWEEN T-1200 & T-1210	73	72	79
D-531 DECK	83	81	86
WEST OF E-531	87	80	88
BZ Rx DECK	82	82-86	86
BX Rx GROUND	86	82-102	88
NORTH OF R-500F	82	84	96
NORTH OF D-580	88	89	98
FIN FAN DECK	91	88-93	90
COOPER DECK	94	89-93	91
S.W. OF CT-1000	85	87	85
N.W. OF CT-1000	85	84	86
SOUTH OF C3H6 STORAGE	88	88	86
SPARE PARTS YARD	83	81	81
S.E. OF MOTOR CONTROL CENTER	92	85	91
S.E. OF C-54	87	91	88
EAST OF C-55	87	86	86
S.E. OF C-150'S	83	86	91
EAST OF C-52	108	101	92
SOUTH OF R-1A	79	78	84
S.W. OF D-130	95	95	102
K-71 GROUND	98-114	106-115	116
K-71 DECK	102-109	101-111	109
K-120 GROUND	98-112	99-112	116
K-120 DECK	99-108	101-112	112
SOUTH OF E-9'S	92	86	92
EAST OF C-3	92	95	92
SUPERHEATER DECK (NOT VENTING)	96-102	96-104	104
HPSH DECK VENTING	---	---	---
LPSH DECK VENTING	98-102	96-102	---
FURNACE WALKWAY	89-92	89-93	92
WEST OF B-3	102	108	106
S.E. OF B-3	85	85	85
S.E. OF B-1B	81	82	82
E-1230 MUFFLER	114	119	96

ALL NOISE LEVELS ARE GIVEN IN DECIBLES. DIVISION POLICY REQUIRES THE USE OF HEARING PROTECTION IN AREAS WITH A DECIBEL RATING OF 85 OR MORE.

NEW BENZENE STANDARD

In October of 1987, the new Benzene Standard which went into effect on December 10, 1987 was reviewed with the Louisiana Division Industrial Hygienist. Dow and contract personnel were informed of the new guidelines. More benzene monitoring was done using 3M 3500 organic vapor badges to give us a better idea of how to deal with routine and non-routine potential benzene exposure situations. Special warning signs and caution tape were ordered to use in these situations. Results of some of the monitoring are included in this report on pages 12 and 13. Training of personnel and its documentation was carried out.

1,3 BUTADIENE MONITORING

Due to the high vapor pressure (low boiling point) of 1,3 butadiene, it was found advisable to start using the 3M 3520 organic vapor badges with a back up section to assure proper monitoring results in areas where 1,3 butadiene was known to be present. Results of some of the monitoring are included in this report on page 11.

CITRIKLEEN REACTIVE CHEMICALS STUDY

In December of 1987, a reactive chemicals study involving a new heavy duty cleaner-degreaser known as CITRIKLEEN was begun to determine if it would be a suitable substitute for chlorothene which was widely used in the block. In January of 1988, CITRIKLEEN use was begun at LHC 3.

February 5, 1988.

C-55 AREA: SWINGING SPECTACLE BLINDS AND PREPARING SYSTEM FOR MAINTENANCE

On November 18, 1987, the C-55 column was prepared for maintenance. Monitoring was performed on the contract and operations personnel involved. The results were as follows:

DOW PERSONNEL	TIME	(TWA) PPM EXPOSURE	
		BENZENE	BUTADIENE
Tom Hunt (Resp)	140 min.	3.0	1.5
CONTRACT PERSONNEL			
Ronnie Sagona	180 min.	.2	.7
Jim Marino	120 min.	.4	.2
Jerry Dubois	90 min.	.4	.4
Randy Pitre (Resp)	140 min.	4.0	1.0
Alvin Brown (B. Air)	140 min.	12.3	11.3
Gerald Taylor (Resp)	140 min.	.6	.4
Rip Theriot (B. Air)	140 min.	13.0	9.1

The two contract personnel with the highest readings were involved in swinging the spectacle blinds to isolate the column. Breathing air was worn by these two in anticipation of the high levels of benzene and butadiene that were present. The two contract personnel who wore respirators did so in anticipation of some exposure potential but not at the higher levels. The Dow person was involved in various tasks in getting the system ready for the contract personnel.

The results of this monitoring indicate that the proper procedures are being followed in preparing this system for maintenance. Data previously gathered had provided information in determining what levels of protection would be worn by the various people involved.

Dane L. D'Armond
Industrial Hygiene Contact
LHC 3

T-1702A SAMPLING & GAUGING AND T-1704C SAMPLING

T-1702A is a benzene holding tank located in Block 110 which is routinely sampled and gauged. 3M badge monitoring was performed on the sampling and gauging which took place on November 26, 1987 and December 6, 1987. The results were as follows:

DOW PERSONNEL	TIME	BENZENE (TWA) PPM EXPOSURE
Carl Williams	15 min.	.60 (11-26-87)
Carl Williams	15 min.	5.8 (12-6-87)

T-1704C is a butadiene holding tank located in Block 110 which is routinely sampled. 3M badge monitoring was performed on the sampling which took place on November 26, 1987. The results were as follows:

DOW PERSONNEL	TIME	BUTADIENE (TWA) PPM EXPOSURE
Carl Williams	15 min.	20.2 (11-26-87)

The results of these samples indicated that respirators need to be worn while gauging and sampling of these tanks is carried out. Follow up monitoring is being done in these same jobs to determine if respirators will continue to be worn or if any other action is warranted.

Dane L. D'Armond
Industrial Hygiene Contact
LHC 3

February 5, 1988.

BENZENE AND 1,3 BUTADIENE SAMPLE COLLECTION AND LAB ANALYSES

On December 1st and 2nd, 1987, monitoring was done using 3M 3500 badges on persons who collected and ran the analyses on benzene in Block 6B. The outside SOT's collected the benzene samples in their normal way utilizing sampling devices which had been installed to keep exposure potential to a minimum.

Monitoring was also done while the outside SOT's collected the ethylene samples which contain 1,3 butadiene.

The lab personnel injected the samples into the analyzers using safe work practices which are a part of normal operations.

The results were as follows:

DOW PERSONNEL	TIME	(TWA) PPM EXPOSURE	
		BENZENE	BUTADIENE
Buster Danehower	15 min.	1.7	
Keith Graves	21 min.	.4	
Keith Graves	21 min.	.4	
Keith Graves	22 min.	3.2	1.0
Keith Graves	25 min.	.4	.9
Randy Looney	15 min.	1.2	
Linda Johnson (Lab)	15 min.	1.2	4.5
Lab Office	15 min.	1.2	
Johnny Davis	15 min.		53.0
Frank Auster	6 min.		377.0
Frank Auster	24 min.		18.0
Frank Auster	22 min.	2.0	15.8
Lynn Viator (Lab)	25 min.	4.5	2.7
Lynn Viator (Lab)	20 min.	*MDL	3.9

*MKDL stands for Method Determination Limited - Bz = .001 mg/ml

One of the lab persons had a 4.5 ppm benzene reading while running the lab sample. This is close to the STEL limit of 5 ppm for a 15 minute TWA. Follow up monitoring on this lab procedure will be done.

The outside SOT's were within the STEL limit of 5 ppm for a 15 minute TWA sampling period for benzene.

Due to the high levels of 1,3 butadiene monitored while the samples were being collected, the outside SOT's WILL BE REQUIRED to wear half-face dual cartridge respirators when performing this task until further badge monitoring can be done.

The personnel involved in this monitoring will be informed of the results and proper follow up action will be performed.

Dane L. D'Armond
Industrial Hygiene Contact
LHC 3

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FUTURE INDUSTRIAL HYGIENE PLANS FOR LHC 3

LHC 3 will continue to inform its plant personnel on the consequences of exposure to chemicals in the block and provide the necessary reference material. New and better training material will be utilized as it becomes available.

More exposure monitoring will be done in the areas of gauging and tank sampling as well as routine process sample catching and lab analysis of these samples.

Yearly respirator fit testing and documentation will be performed in the block.

A review of our protective clothing policy will be done and changes will be forthcoming if warranted.

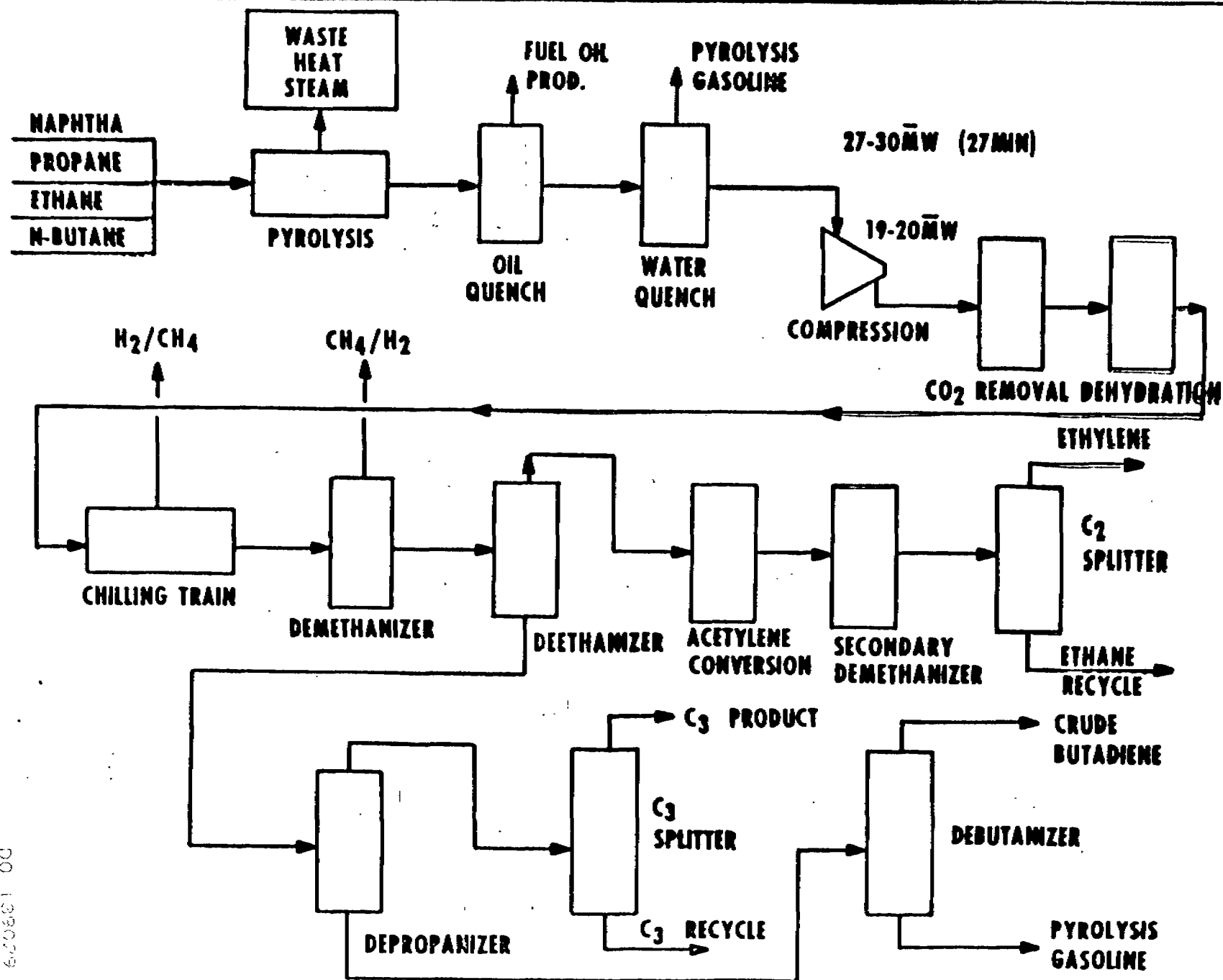
The way in which process systems are prepared for maintenance will be reviewed to see if potential exposure levels can be reduced.

An audit of our floating roof tanks will be carried out to stay abreast of potential exposure problems that may arise from faulty seals or support legs.

The fugitive emission program will continue in established areas of the plant as well as new areas as they come on line.

Routine cleaning of warehouse areas containing asbestos gaskets will be implemented and documented.

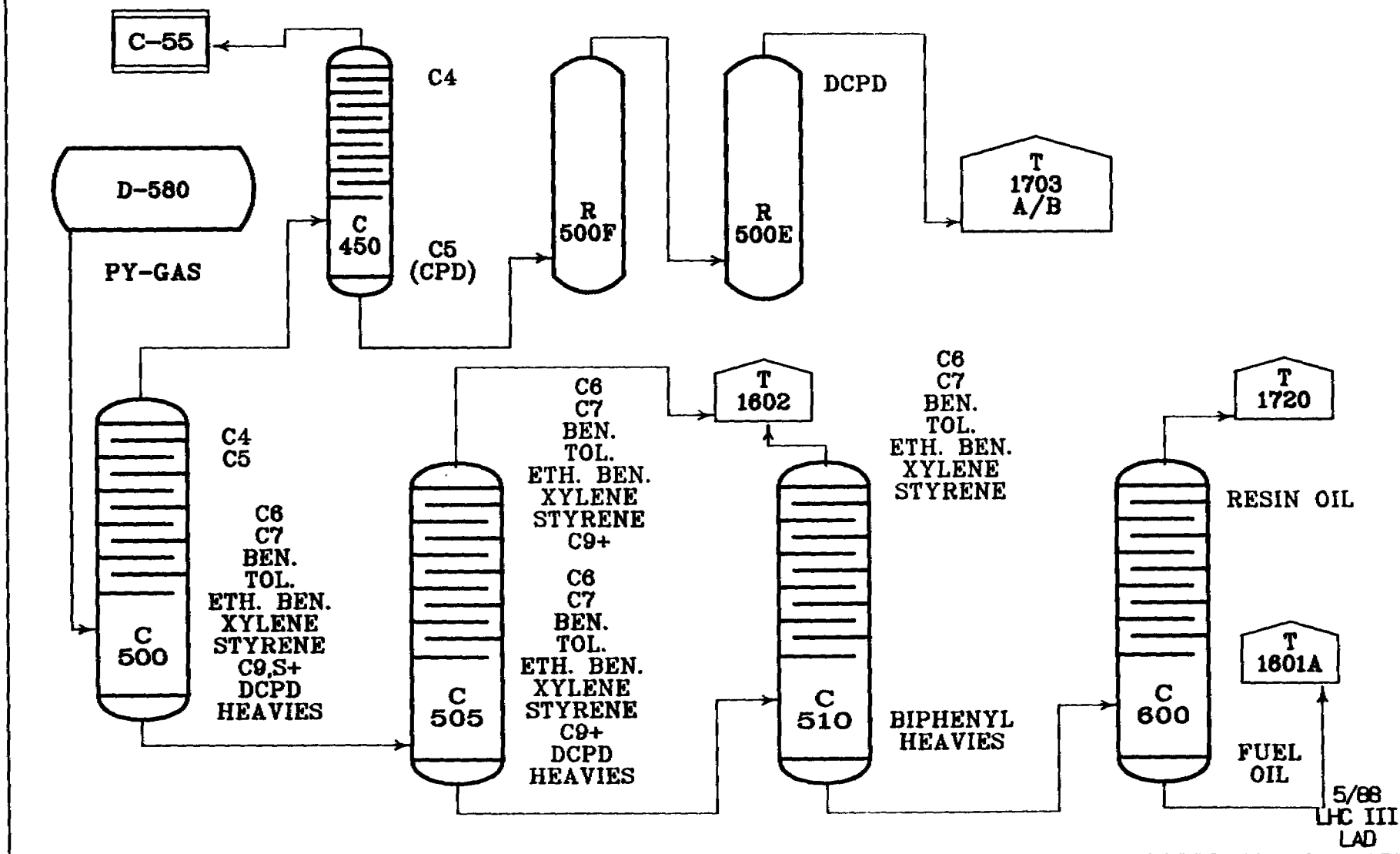
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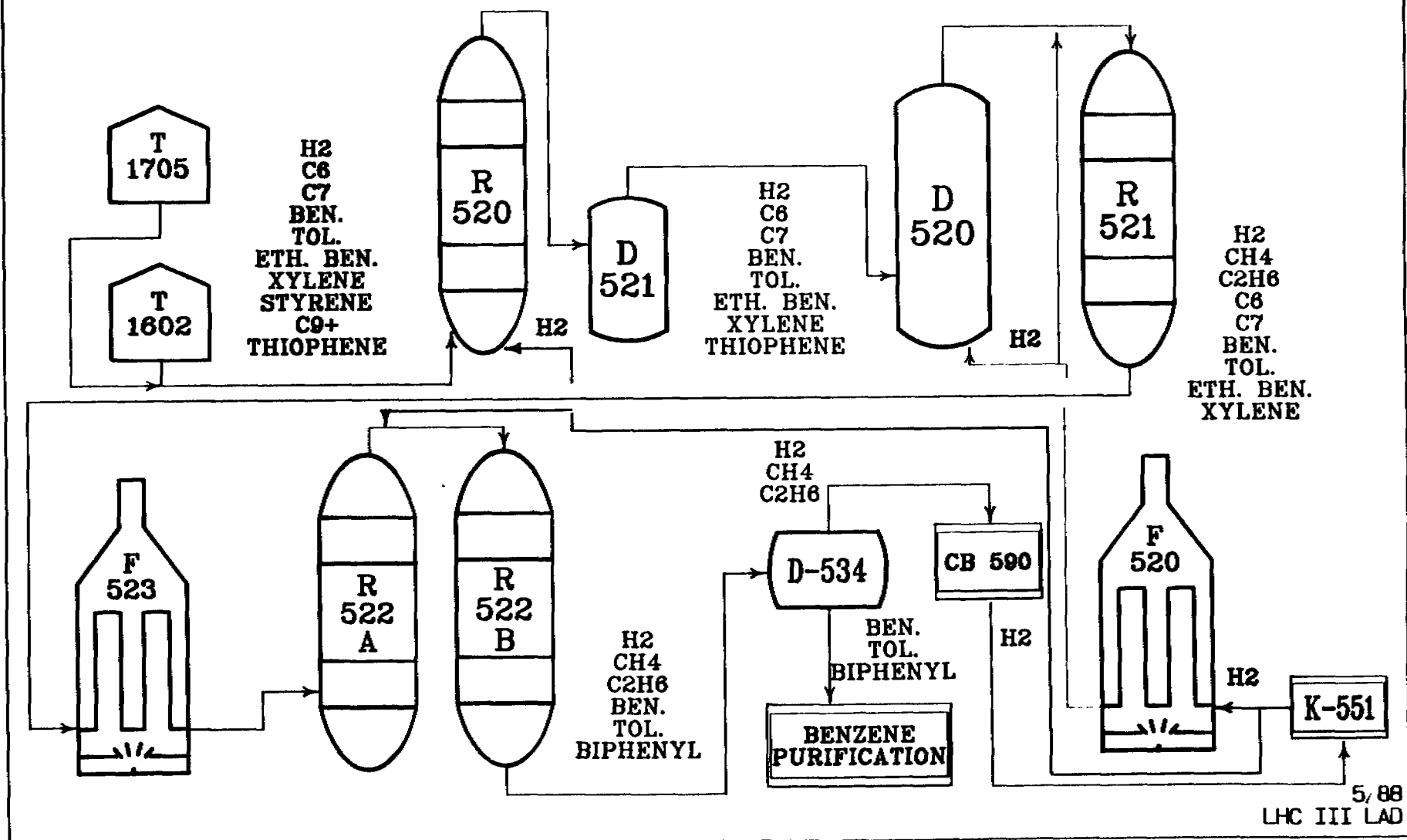
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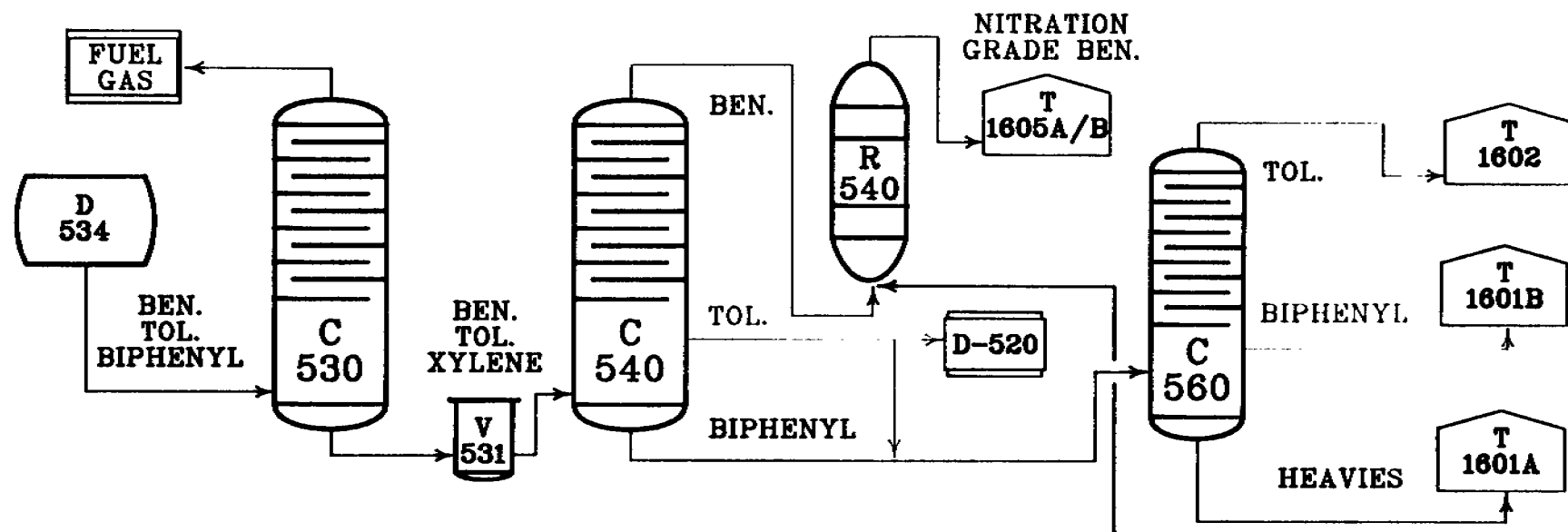


BENZENE REACTOR AREA

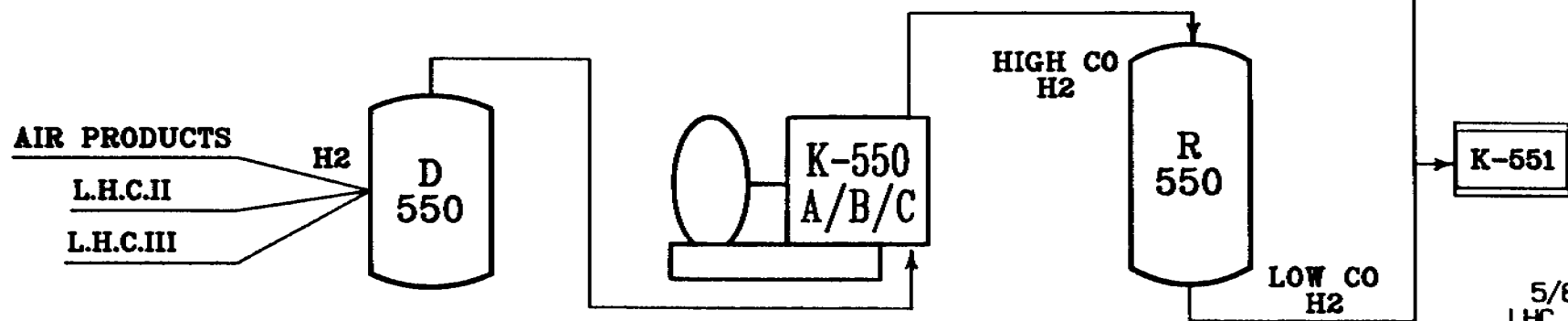


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BENZENE PURIFICATION



METHANATOR REACTOR



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