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MAY 13 1974

GENERAL PLANT LAYOUT R. N. WHEELER, JR.

EMPLOYEES - INCLUDED

UNIT	PROCESS	GENERAL PLANT LAYOUT	EMPLOYEES - INCLUDED
UNIT A	Operating since 1967 Direct chlorination of ethylene Oxychlorination of ethylene VC Production - 335 million lbs per year	Outdoor facility. Control room located in separate, remote building	2 control room operators per shift and control room most of shift. 3 employees involved with work outside control room; tank car loading, inspection, minor repairs etc. Maintenance crew does not routinely stay in VC area but is present for other than minor problems.
UNIT B	Strauffer licensed process: Direct chlorination of ethylene. Oxychlorination of ethylene VC Production - 700 million lbs per year Operating since Oct., 1973	Outdoor facility. Control room located in separate, remote building under positive pressure.	1 shift foreman - control room 1 VC operator - furnaces; distill. prod. 1 EDC operator - Reactor, washers, distill. effluents. 1 Oxychloride operator - Chlor. reactor utilities, EDC recovery system. 2 Tank car loaders - 6-8 hrs./shift. Maintenance crew - same as Plant A.
UNIT C	B.F. Goodrich process: Direct chlorination of ethylene. Oxychlorination of ethylene VC Production - 290 million pounds per year Operating since 1968	Outdoor facility Control room located in separate, remote building under positive pressure.	1 shift foreman - control room 1 VC operator foreman - control room 3 VC operators + outside; samples, inspection, minor repairs 1 maint. foreman - control room 8 mechanics (day shift; 2 on night) - side.
UNIT D	Direct chlorination of ethylene VC Production - Not divulged/operating since 1957	Outdoor facility. Control room located in separate, remote building not under positive pressure. Analytical lab in adjacent room separated by common door and wall.	1 shift super - control room 2 operating specialists - inside and out 1 senior operating technician - takes and EDC product samples; inspections. 1 operating technician - outside; responsible for transfers from tank to tank; inspections. 2 tank car loaders - 24 hours/day 1 lab. technician - VC sample analysis
UNIT E	Chlorination of acetylene Mercuric chloride catalyst impregnated in petroleum coke. VC Production - 300 million lbs per year	Outdoor facility. Control room located in separate, remote building under positive pressure.	1 Foreman - control room 6 hrs; tours 2 hrs. 1 senior operator - control room 8 hrs 1 technician - control room 4 hrs; VC samples; inspections, other outside work - 4 hrs.

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UNIT TITLE	VC MANUFACTURING AIR MONITORING ACTIVITIES	PRODUCT SAMPLING METHODS	PRODUCT SAMPLE ANALYTICAL PROCEDURES
UNIT A	None at present. A previous survey of several outdoor areas showed "very low levels" Dry test meter - 3ft. ³ /hr. Gas chromatography. Recently purchased an infrared portable analyzer. Attempting to develop personal sampling techniques.		
UNIT B	Personal samples collected in plastic bags for TWA; 2.5 ml/min rate. Analysis by flame ionization GC. Future plans for continuous monitoring device(Wilks)	"Quick connect and disconnect" sampling bombs - 2 liters. Performed once each shift - takes about 1 minute.	
UNIT C	Detector tubes used to sample VC column before employee entry. Century OVA ordered. Flame ionization detector presently taking area samples.	Two-valve sampling bomb - 2 liters. Performed by same operator 2 - 4 times per shift - Takes about 1 minute for each sample. Bomb purged with VC at point of operation.	
UNIT D	Samples /Saran Method/ are taken in lab every 6 months. If levels are below 50 ppm, nothing done until sample every 3 mos. in future. 1967 survey showed control room & lab. exposures-9-60 ppm. 1970 survey showed exposures-1-20 ppm. (installed hoods in lab for sample analysis) 1973-Bien has analyzers. Bien has data on past monitoring. Presently attempting to obtain area levels for indications as to personal levels for future sampling.	SAME AS PLANT C EXCEPT 1 LITER BOMBS	Analysis performed under lab hoods - 2 not kept under hoods at all times. Lab separate room from control room but has common wall and door and same pressure. No food permitted in lab.
UNIT E	No previous monitoring. Present activities include area samples (grab; GC analysis) of control room (2 ppm), tank car loading area (found up to 1000 ppm but not at employees work station) and spot checking around pump seals. 25ppm was found at loading area work station while 7 tank cars were being loaded ("normally 2-3 ppm")	Same as plant C. Also, pH test is performed once each shift on crude VC using Brom Thymol blue indicator in a 25 ml flask and tapping VC process line. This is done once each shift and takes about one minute. This operation gives exposure but levels unknown.	Same as plant D except a separate room general lab is used exclusively for VC analysis with common door between those areas and common door between general lab and control room.

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WORK
ACTIVITY:

VC MANUFACTURING

LABELING AND POSTING

SANITATION

PROTECTIVE CLOTHING

PLANT A

None observed which would be designed to inform employees

Shower facilities, lavatories, and locker available but use not required.
Any equipment issued such as gloves, goggles, hard hat or respirator is maintained, cleaned, etc. by the employee.
No restrictions on food storage or consumption.

Gloves are issued but use is not mandated. No other clothing issued. Coveralls available for vessel cleaning but use required.

PLANT B

SAME AS PLANT A

SAME AS PLANT A

SAME AS PLANT A

PLANT C

SAME AS PLANT A

SAME AS PLANT A

SAME AS PLANT A

PLANT D

SAME AS PLANT A

Same as plant A except food and eating is prohibited in VC lab areas.

SAME AS PLANT A

PLANT E

SAME AS PLANT A

SAME AS PLANT A

SAME AS PLANT A

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IDENTITY;	VC NUMBER	PROTECTIVE EQUIPMENT	EMPLOYEE TRAINING	MEDICAL PROGRAMS
PLANT A		Hard hats and goggles issued and use required but not enforced. Emergency chem.-cart. respirators issued to each employee who is then responsible for its maintenance. No routine operations are required to be performed with respirators. Gas masks available in control room & several stations in plant, including loading area, their condition is suspect.	Foreman attend safety meeting once a month and pass info. on to his crew (informally). No formal plant safety program for employees. Each foreman more or less is responsible for his own crew and establishes any rules as he sees fit on the job training appears to be the rule for the VC workers.	Preplacement required (general) Periodic (3-5 yrs.) offered. SMA-12 for each VC worker now offered. Future program not defined
PLANT B		Same as Plant A except no self-rescue respirators provided. Both demand and pressure-demand respirators are kept in control room and other stations.	Five week training program given to VC operators. After this each foreman is responsible for further training his crew might receive.	Preplacement required (general) Special periodic for VC workers offered (not sure if mandatory). Physician can suggest further tests for any employee (see discussion in hearing transcript)
PLANT C		Same as plant A except respirator is for VC column entry. Check respirators quarterly. For extremely high exposures a full rubber suit is available.	Informal - Foreman responsible for crew training. No formal training in respirator use - "...most of these people already know how to use respirators." No formal safety meetings for employees to pass on info. of new hazard data etc. Foreman are expected to hold crew meetings each month.	Preplacement required (general). Mandat. SMA-12 for all VC workers every 6 mos. Optional general periodic available each year. Nurse on duty during day shift; physician visits plant once a day.
PLANT D		Same as plant A except use of a chemical cartridge respirator is required for VC product sampling and breaking into VC equipment. Also, SCBA is available for emergency use at the point of entry into VC vessels and the employee entering the vessel is harnessed if any possibility of him passing out. Chemical cartridges will be replaced once a month. The 2 SCBA's and the 2 full face piece gas masks checked weekly and canisters replaced as recommended.	Special meetings held for employees when new data on hazards surfaces. Regular (frequency?) safety meetings also held.	Liver function and SMA-12 required for VC workers along with general complete. Recheck all abnormalities. Future program being considered (see letter 3-12-74-E)
PLANT E		Same as plant A - Has one self contained suit available.	Informal - on the job training mostly with foreman responsible for additional crew training.	Preplacement required (general) annual offered. Plan for future special mandatory exam for VC workers. Program not yet set. Nurse on duty during day shift only.

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OBSERVED ACTIVITY:	VC MANUFACTURING	ENGINEERING CONTROLS	WORK PRACTICES	HOUSEKEEPING
POINT A			VC leaks detected by sight and smell. No routine inspection program for leaks. Minor leaks repaired when convenient. No enforcement of good work practice procedures. Tank car loader calls into control room every 2 hrs. Vessels purged with boiling water and soap, checked for O ₂ and explosive atm. prior to entry.	Work areas generally orderly but some equipment badly corroded. Immediate action on leaks and spills not evident. Some guard rails in processing areas & loading deck missing - appeared under repair.
POINT B	Air conditioned control room under positive pressure. However, incoming air did not appear treated for VC removal. MSA combustible gas alarm in control room.		Regular maintenance only on day shift. Complete plant inspection visually every 6 mos. X-Ray inspection if felt needed. Leak repair and vessel entry procedures appeared to exist but did not appear to be strictly enforced. Emergency procedures in written form exist. Housekeeping good.	New facility. Equipment condition good and work areas in good shape.
POINT C	Air conditioned control room under positive pressure. Incoming air did not appear treated for VC removal.		Detected leaks are reported to foreman for instruction on how and when to repair. Employees carry emergency chemical cart, half face piece respirators. Written procedures for all VC activities (i.e. loading, vessel entry, emergencies) given to all employees. Strict adherence or complete knowledge of these procedures by employees is doubtful.	Similar to Point A.
POINT D	Gas detectors located throughout plant.		Completion of checklist is required prior to vessel entry. (i.e. soap & water wash, purge with air, 2 check, expl. check etc.). Employees carry emergency respirators at all times. Chem. cart, resp., monogoggles required for VC sampling and eqpt. teardown. SCBA, harness available for vessel entry. O ₂ checked and explosive atm. Written operating and emergency procedures available. Visual inspection of VC facility monthly. Operation shutdown and leak repair appeared to be dependent on magnitude of leak and operational convenience.	Similar to Point A except process equipment in better shape.
POINT E	Air conditioned control room under positive pressure.		Stand upwind of any VC leak (same for A,B,C,&D) Supplied air respirators used for all vessel entry. Written operating and emergency procedures booklet available to employees who want them.	Poor housekeeping. Leaks evident. Much of this plant's equipment was badly corroded with numerous leaks in process equipment.

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PLANT	VC MANUFACTURING PRODUCT/IMPURITIES/BY-PRODUCTS	EXPOSURE AREAS	MAJOR DEFICIENCIES
PLANT A		Tank car loading operation VC product sampling operation Repair of leaks, VC equipment tear down and maintenance VC vessel entry	1. Employee training. 2. Enforcement of good work practice (i.e. use of gloves, goggles) 3. Preventative maintenance 4. Repair of minor leaks before they become major
PLANT B	Methyl Chloride Chloro form Trichlorethylene 1,1,2 Trichlorethane other chlorinated hydrocarbons. HCL	Tank car loading operation VC product sampling operation Repair of leaks, VC equipment tear down and maintenance VC vessel entry.	5. Enforcement of written work procedure 6. Medical and monitoring activities 7. Sanitation and care of protective clothing and equipment. 8. Lack of personal hygiene among employees.
PLANT C	Propylene - 3ppm Acetylene - 2ppm Methyl chloride - 100ppm HCL	Tank car loading operation VC product sampling operation Repair of leaks, VC equipment tear down and maintenance VC vessel entry.	9. General lack of knowledge of VC workers actual exposures 10. Most safety rules are designed to prevent fires and prevent production loss.
PLANT D	HCL	Tank car loading operation VC product sampling operation. VC product sample analysis operation and lab area Control room adjacent to lab. Repairs; equipment tear down; vessel entry.	11. General lack of concern for employee health relative to VC does the lack of conclusive evidence as to health hazard or to lack of a law or regulation.
PLANT E	Butadiene 2-6ppm Methyl acetylene propadiene methyl chloride 2-chloropropene	Same as Plant D	