6 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football

6 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football

3MM MICROFONT - A E G M

LIMIT OF 11 INCH SIZE

1.4 1.6 1.8 2.0 2.2 2.5 2.8 3.2 3.6 4.0 4.5 5.0

15 CM. (5.91 IN) A

2

12 CM. (4.72 IN) C

5 CM. (1.97 IN) B

8 CM. (3.15 IN) D

1.8 line pair/mm.

2.5 line pair/mm.

4 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9

4 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9

5 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray Voice Football Joll

5 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark

6 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-R

6 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-R

8 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question

8 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e

10 pt Typewriter - a e g m 1 6 8 9 % Zenith X-Ray Fo

3MM MICROFONT - A E G M 1 6 8 9 % ZENITH X-R

4 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-R

4 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray

5 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Que

5 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question W

6 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray Voice F

6 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1 6 8 9 % Zenith X-Ray Voice F

8 pt Geneva - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e

8 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ray Voice Football Jolly Mark Question Was a e g m 1

10 pt Typewriter - a e g m 1 6 8 9 % Zenith X-Ray Footba

3MM MICROFONT - A E G M 1 6 8 9 % ZENITH X-RAY F

ROTARY CAMERA TEST CHART

NMA MS112-1977

NATIONAL MICROGRAPHICS ASSOCIATION

8719 COLESVILLE ROAD
SILVER SPRING
MARYLAND 20910
(301) 587-8202

CERTIFICATION STAMP

10 pt Typewriter - a e g m 1 6 8 9 % Zenith X

8 pt Geneva - a e g m 1 6 8 9 % Zenith X

8 pt Pontiac - a e g m 1 6 8 9 % Zenith X-Ra

00111594

REGION-2
IWS-85.194

Walk Through Survey Report

Exposure to Natural, Esterified Estrogens

at

Hoffman-La Roche Inc.
Nutley, New Jersey 07110

Survey Date

August 29, 1978

Survey Conducted By

Dennis Zaebst
Shiro Tanaka
Marie Haring

Date of Report

January 11, 1980

Industry-wide Studies Branch
Division of Surveillance, Hazard Evaluations and Field Studies
National Institute for Occupational Safety and Health
Center for Disease Control
Cincinnati, Ohio

PLACE VISITED:	Hoffmann-La Roche Inc. Nutley, New Jersey 07110
DATE OF VISIT:	August 29, 1978
PERSON(S) MAKING VISIT:	Dennis Zaebst Shiro Tanaka Marie Haring
OFFICIAL TITLES OF PERSON(S) CONTACTED AT PLANT:	Assistant Manager, Safety and Industrial Hygiene Manufacturing Manager & Pharmaceutical Production Manager Manager of Compensation Assistant Manager of Compensation
UNION:	None
PURPOSE:	To conduct a preliminary investigation of Menrium^{R} manufacturing operations as part of the current NIOSH-IWSB study of occupational exposure to estrogens.

INTRODUCTION

Background

The National Institute for Occupational Safety and Health (NIOSH), Division of Surveillance, Hazard Evaluations, and Field Studies (DSHEFS), Industry-wide Studies Branch (IWSB), is currently conducting an investigation of health effects resulting from occupational exposure to estrogenic substances. This study, initiated in the fall of 1977, was prompted in part by epidemiological reports of chronic health effects found among users of oral contraceptives and by a joint CDC-NIOSH investigation of a manufacturer of oral contraceptive products, which found possible adverse health effects due to occupational exposure among its workers.

Occupational exposure to estrogens may occur in the manufacture of a variety of commercial preparations marketed by a large number of pharmaceutical manufacturers. Examples of such preparations are oral contraceptive tablets, tablets for estrogen replacement therapy, and a large variety of topical creams and injectable solutions or pellets.

This survey of Hoffmann-La Roche, Inc. in Nutley, New Jersey was conducted as one of a series of initial walk through surveys in a representative sample of firms manufacturing products containing synthetic and/or natural estrogens.

Authority

Studies of this nature are authorized under the Occupational Safety and Health Act of 1970, Public Law 91-596, December 29, 1970. Specifically, NIOSH has been designated responsibility for conducting field research studies in industry, to evaluate findings, and report on these findings. Section 20(a)7 states that NIOSH shall conduct and publish industry-wide studies of the effects of chronic or low level exposure to industrial materials, processes, and stresses on the potential for illness, disease, or loss of functional capacity in the aging adults. Section 20(b) further states that NIOSH is authorized to make inspections and question employers and employees as provided in Section 8 of this Act in order to carry out the functions and responsibilities under this Section. Section 20(c) further states the authority to enter into contracts, agreements, or other arrangements with appropriate public agencies or private organizations for purposes of conducting studies relating to responsibilities under the Act.

DESCRIPTION OF FACILITY

Hoffmann-La Roche, Inc., Nutley, New Jersey, originally founded in 1905, was established at its present location in 1929. The company has expanded over the years until it now occupies a 120 acre site comprising over 70 buildings. Roche operations at this site include basic and product oriented research, and production of bulk vitamins, diagnostics, medical electronics and many other lines. Only one product containing estrogens is produced at the Nutley, N.J. site. Menrium^{R}, containing natural, esterified estrogens, and Librium, is manufactured in three different strengths designated 5-2, 5-4 and 10-4. The 5-2 strength contains 6 mg. of esterified estrogen per tablet (equivalent to 0.2 mg of sodium estrone sulfate), and the 5-4 and 10-4 strengths contain twice as much of the esterified estrogen. The esterified estrogen used is a mixture of the sodium salts of sulfate esters of the estrogenic substances, principally estrone. Menrium production began at this Nutley, N.J. facility in 1966, and has continued to the present.

DESCRIPTION OF WORKFORCE AND RECORD KEEPING SYSTEM

Workforce

The total plant population in the production departments is approximately 1680 persons, of whom 1115 are male and 565 are female. Over the course of one year, approximately 10-12 different people are involved in Menrium production, all of whom are male. The following job classifications are involved in the Menrium production during the stages when the active ingredients are in use: pharmaceutical operators, sr. pharmaceutical operators, section leader II. (In the past, this process used to be a one person operation). Other job classifications involved in low exposure operations (after coating) include: machine operators, in-process inspector, section leader, production line worker and a decontamination worker.

Record System

Personnel records of active employees are held in the Records Room filed in alphabetical order, in pendaflex folders, stored in file cabinets. The folders contain the pre-employment physical card, and application for employment, personnel action forms (to record changes in salary or job status), medical restrictions and other forms documenting education, references, etc. The records contain at least the employee's name, address and social security number. The personnel folder does not contain a formalized work history. A cardex file is maintained showing a generalized job history, giving the beginning and ending dates within a job classification, but not the product(s) on which the employee worked.

The company did report that the employees who worked with Menrium tablets can be identified from the batch records. These records used to be stored only for eight years and then destroyed, however, they are now kept indefinitely.

Personnel records of terminated and deceased employees are held in the Records Room for one year and then transferred to Records Retention, where they are kept indefinitely. Before storage, the records are purged of the pre-employment physical card and personnel action forms. All records of employees terminated or deceased before 1964 are on microfilm, while those after 1964 are retained in hard copy.

DESCRIPTION OF MENRIUM MANUFACTURING PROCESS

The manufacture of Menrium[R] tablets is essentially a step wise process involving batch mixing of ingredients followed by compression of the finished granulation into tablets. The tablets are then sampled and submitted to quality control prior to coating, printing, and inspection. The released, coated tablets are then bottled in the packaging area. Each batch of Menrium tablets requires three to four days to manufacture, start to finish. The following paragraphs briefly outline the process.

Granulation

Menrium[R] tablets contain two different granulations which are prepared separately. The two granulations are then mixed together prior to compressing. The chlordiazepoxide (Librium) granulation is conducted outside of the isolated manufacturing area (I.M.A.). The I.M.A. is used to prepare the estrogen granulation, mix the two granulations, and to compress the final tablets. This area is also used for handling materials which are carcinogenic. The I.M.A. encloses several rooms which have a separate air supply (100% makeup, 25 changes per hour) and which are kept under negative pressure relative to the change room and the corridor outside. Air supply is tempered and supply and exhaust air are passed through HEPA filters. Entry is through a double set of doors, and exit is through an air shower. Alarm systems monitor pressure changes in the area. Further details of ventilation and controls in this area are given in Appendix 1 (supplied by company personnel).

All ingredients for the estrogen granulation are weighed on locally exhausted scales located in the I.M.A. The weighed ingredients are then loaded into a mixer under local exhaust and are then wet mixed. The wet granulation is then dropped through a cloth sleeve into a dryer bowl. The dryer bowl is then moved to the fluid bed dryer where the granulation is dried. Dryer exhaust air also passes through HEPA filters before discharge outside the building.

The dried granulation is then manually loaded into a large V-blender, where it is dry mixed in equal quantities with the chlordiazepoxide granulation. After mixing, the combined granulation is dropped through a mobile fitz mill into fiber drums lined with plastic bags. Local exhaust is also used at the bottom of the mill where the granulation drops into the drums.

Tablet Compression and Coating

The blended granulations are then transferred to the compressing room (also inside the I.M.A.). The fiber drums are power lifted above the press and are sealed to the press inlet hopper. The granulation is then metered from

the hopper to the press. Formed tablets exit the press through evacuated deduster tubes and drop into plastic lined drums. The operator of the press remains in the room at all times to monitor the equipment and process. Quality assurance personnel also enter the room at intervals to sample the tablets. These personnel wear the same equipment and follow the same entry and exit procedures as manufacturing personnel.

The compressed tablets are sampled and submitted to quality control for release prior to coating, printing, and inspection. Coating is done in a room outside the I.M.A. by manually loading the compressed tablets into a series of locally exhausted watering basins. The appropriate coating materials are added manually and the tablets are allowed to cycle until even coating is achieved at each step. The coating process takes 1-2 days per batch to omplete.

Packaging

Menrium tablets are packaged in bottles sizes of 100 to 500 tablets. The product is run on either of two bottling lines located in one of the two packaging areas. The coated tablets are manually loaded into the bottle filling machine hopper (locally exhausted), and are counted automatically as the bottles are filled. The filled bottles then are conveyed down a line where they are plugged with cotton inserts, labeled, and inspected The bottled tablets are then placed in a quarantine area until released by quality control, and are then sent to a warehouse (distribution center).

Approximately 11-12 people are involved on either the first or second shift when a batch is packaged. Since the tablets are fully coated at this point, no special occupational health precautions are taken (such as work practices or personal protective equipment). Exposure to estrogens at this point should not occur barring mishandling or crushing of coated tablets.

DESCRIPTION OF MEDICAL, SAFETY, AND INDUSTRIAL HYGIENE PROGRAMS

Safety and Industrial Hygiene Programs

Hoffmann-La Roche has a formal safety and health program headed by the Manager, Safety and Industrial Hygiene, who is assisted by the Assistant Manager, Safety and Industrial Hygiene (primary responsibility: industrial hygiene) and the Assistant Manager, Safety and Industrial Hygiene (primary responsibility: safety and fire protection). There are also numerous safety committees with inspection and oversight responsibilities composed of all levels of management and production personnel. These committees conduct routine inspections in various areas and recommend inprovements or corrections to management. The Safety and Industrial Hygiene Department also conducts routine safety audits, and also responds to possible problem areas by conducting sampling and analysis as necessary for dusts, fumes, fibers etc., and by conducting noise and radiation surveys. It is currently (at the time of the survey) conducting a scheduled monitoring program to evaluate all areas for exposure to organic vapors. However, no evaluations of exposure to the estrogenic materials in the production of Menrium have been conducted in the past.

In the production of Menrium, specific requirements for work practices and personal protective equipment have been devised. Procedural requirements for personnel entering or working in the I.M.A. are given in Appendix 2 (supplied by company personnel). Personal protective equipment required before entry to the area (and thus for granulation or compression of estrogen containing products) includes disposable full body coveralls and shoe covers made of spunbonded polyolefin material (Tyvek^{R}), overshoes, gloves (cloth or rubber latex), and an air supplied hood (3M Co. system W-275). All equipment or clothing leaving the area is either disposed of or decontaminated prior to re-use. However, at lunch or on breaks, the coveralls and air hood are usually left in the change room and are re-used until the end of the shift or until work is completed in the area. Upon completion of work in the area, water and an alkaline detergent solution are used to clean all equipment, floors, and walls. This is done by the operator(s).

Medical Programs

The company's medical department is staffed by a Medical Director, Assistant Medical Director, 3 staff physicians, 10 nurses, 3 laboratory technologists, 1 x-ray technologist, a paramedic and 5 office personnel. Pre-employment and annual medical examinations are done on all employees and consist of history, physical, vision test, audiogram, spirometry, SMA-12, CBC, urinalysis, thyroid function test (T_4), and EKG. For employees over 40 years of age, sygmoidoscopy (optional), and tonometry are also done. These records are kept for thirty years after termination for chemists, production workers, maintenance workers, and research personnel, and seven years for clerical workers.

For production of Menrium, only two operators are involved for three days, four times a year. About one month after the Menrium production, particular questions are asked of these workers with regard to the signs or symptoms of hyperestrogenism and physical examination is conducted. Instructions on the hazard of handling estrogens is given by the production supervisor. So far, no cases have been detected.

In March, 1978, analyses of estrone, estriol, and estradiol in blood of thirteen workers was done to establish a baseline. This was done in-house using RIA kits. The results on seven men were available showing values more or less within the range listed in the kit insert. There were a few values somewhat outside (both below and above) this range, but their significance is not known at this time.

Currently (as of August 1978), their protocol for employees who work with estrogens is the following:

1. Evaluation of their medical history to rule out diseases which would disqualify an employee from working with estrogen.

2. Pre-exposure estrogen serum level.

3. Post exposure serum level and medical evaluation.

DESCRIPTION OF PAST EXPOSURES

No air sampling or other industrial hygiene data are available to describe current exposures of personnel to estrogens or to compare past exposures to current exposures. In earlier years, the area used for Menrium manufacturing consisted of a single room with an airlock. Currently, additional rooms have been added and an alarm system installed to monitor pressure changes in each room. Disposable clothing and air supplied hoods have always been used when employees were working with uncoated active estrogen material. Based on the information supplied, it is not possible to determine whether past exposures to estrogen were different from current exposures.

INSPECTION OF PLANT

Work practices, personal protective equipment, operating procedures, engineering controls (e.g. local exhaust, materials handling methods), and housekeeping in the areas currently used for manufacture of Menrium all appear to be appropriate. Due to the low volume and infrequency of Menrium manufacturing (approximately 4 times per year or every three months) as well as the relatively good environmental conditions under which it is manufactured, the hazards of exposure to estrogen appear to be relatively low. However, there is a potential for some exposure at various stages of the granulation and compression process, particularly during weighing, manual transfers, or loading of dry powders of either the active estrogen raw material or blended intermediates, during quality control sampling and analysis, or during cleanup of the work areas. There is also a low potential for inhalation or skin contact exposure to operators during the coating process. Although personal protective equipment and work practices should serve to minimize these exposures, no environmental measurements (i.e. air or wipe sampling) have been conducted to measure actual or potential exposures at this plant. It would be advisable for this plant to document potential or actual exposures of employees to estrogens at all stages of Menrium manufacturing, particularly in view of the likelihood of promulgation of an estrogen standard in the future.

CONCLUSIONS

1. This plant has produced a natural, esterified estrogen containing product (Menrium) since 1966. Approximately 7-10 males work in the area of potentially high exposure. In light of the fact that there are very few people who ever worked in the Menrium production area and that there is less than 15 years duration of exposure and of time since first exposure (Latency), this facility is not recommended as a site for a mortality study. It is also not recommended for a reproductive study as there are no women exposed to the estrogen in the potentially high exposure area. Women handle the tablet during packaging operations; however, the tablet is coated and packaging is an almost totally automated process.

2. An evaluation of exposure of employees to the esterified estrogen during the manufacture of Menrium would be feasible. However, in

view of the infrequency of manufacturing of Menrium and a small number of workers involved, it is considered not very productive to conduct an in-depth industrial hygiene/medical study of estrogen exposure at this plant.

APPENDIX I

AIR FLOW AND CONTROLS IN ISOLATED MANUFACTURING AREA

AIR IS SUPPLIED INTO THIS AREA BY 2 PUMPS LOCATED ON FIRST FLOOR OF BLDG. 59 IN THE MACHINE ROOM. THE AIR IS 100% OUTSIDE AIR AND CHANGES APPROXIMATELY 25 TIMES AN HOUR. HOT AND COLD AIR IS FED INTO MIXING BOXES LOCATED IN THE CEILING ABOVE THE OUTER CORRIDOR.

ALL ROOMS IN THE PRODUCTION AREA ARE UNDER NEGATIVE PRESSURE. AIR ENTERING THE ROOMS PASSES THROUGH A HEPA FILTER AND ENTERS EACH ROOM THROUGH OPENINGS IN METAL PANELS IN THE CEILING. TEMPERATURE IN ROOMS IS MAINTAINED BETWEEN 68^{0} AND 72^{0}; AND RELATIVE HUMIDITY BELOW 30%.

EXHAUST AIR FLOWS THROUGH DUCTS ON WALLS OF THE ROOMS AND OUT THROUGH A HEPA FILTER BEFORE BEING RELEASED INTO THE ATMOSPHERE BY AN EXHAUST FAN.

EXHAUST FANS AND DUST COLLECTOR ARE MOUNTED ON THE ROOF OF THE SECOND FLOOR OUTSIDE THE AREA.

THE DUST COLLECTOR ON THE ROOF HAS A "BAG IN" AND "BAG OUT" SYSTEM. AFTER THE AIR TRAVELS THROUGH THE DUST COLLECTOR, IT GOES THROUGH A HEPA FILTER BEFORE BEING DISCHARGED INTO THE ATMOSPHERE.

TO REMOVE HEPA FILTERS FROM DUST COLLECTOR UNIT, PUT A POLY BAG OVER LIP OF THE COLLECTOR AND REMOVE FILTER OUT INTO BAG. SEAL BAG AND PUT NEW HEPA FILTER IN THE UNIT.

IF A FAILURE OCCURS IN ONE OF THESE UNITS, A WARNING LIGHT AND BUZZER WILL SOUND ON THE CONTROL PANEL, AND THE UNIT WILL SHUT OFF.

BLAST GATES IN ALL AREAS MUST BE OPEN AT ALL TIMES. THE ROOM PRESSURE IS DESIGNED WITH THEM OPEN.

IF THE HUMIDITY GOES OVER 30% OR UNDER 20%, A LIGHT WILL LIGHT ON THE CONTROL PANEL.

THE AIR SHOWER HAS A TIMER ON IT THAT SHUTS THE AIR OFF AND UNLOCKS THE DOORS OF THE SHOWER. IN CASE OF EMERGENCY, THERE IS AN EMERGENCY RELEASE BUTTON IN THE SHOWER STALL THAT SHUTS THE AIR OFF AND UNLOCKS THE DOORS.

THE HEPA FILTER IS LOCATED ABOVE THE AIR SHOWER STALL. ACCESS TO THIS FILTER IS THROUGH A PANEL ABOVE ENTRANCE DOOR TO THE SHOWER. THIS FILTER IS NOT MONITORED AND SHOULD BE CHANGED PERIODICALLY.

ABOVE THE LYDON DRYER IN THE GRANULATION AREA IS ANOTHER HEPA FILTER THAT IS UNMONITORED; THAT ALSO HAS TO BE CHANGED PERIODICALLY. THIS COLLECTS DUST PARTICLES FROM THE EXHAUST AIR OF THE DRYER.

ON THE WALL IN THE CORRIDOR ARE THE INSTRUMENT PANELS FOR THIS AREA.

STATION NUMBERS ONE THROUGH FIVE (1-5) ARE FOR CHANGE ROOM, FILLING ROOM, INSPECTION ROOM, COMPRESSING ROOM, AND BLENDING ROOM RESPECTIVELY. THESE UNITS HAVE 2 GAUGES ON THEM. THE TOP GAUGE MEASURES C.F.M. OF AIR BEING

EXHAUSTED FROM ROOMS. THE BOTTOM GAUGE INDICATES THE DAMPER POSITION.

UNIT #6 IS FOR THE GRANULATION ROOM. THIS MEASURES NEGATIVE PRESSURE, POSITION OF DAMPER, AND CONTROL OF EXHAUST AIR FLOW FROM THE ROOM. THIS PANEL HAS AN ALARM ON IT WHICH LIGHTS UP AND A BUZZER THAT SOUNDS WHEN THE SYSTEM FAILS.

UNIT #7 IS THE DUST COLLECTOR PANEL WHICH HAS AN AIRFLOW CONTROLLER OUTPUT DAMPER GAUGE AND A C.F.M. GAUGE FOR MEASURING EXHAUST AIR FLOW.

THE DUST COLLECTOR SHAKER BUTTON IS NEXT TO THIS UNIT. THIS WILL START SHAKERS AND SHUT OFF THE DUST COLLECTION SYSTEM FOR APPROX. 5 MINUTES, AFTER WHICH THE SYSTEM GOES ON AUTOMATICALLY.

THE LARGE PANEL HAS LIGHTS AND BUZZERS FOR MONITORING THE FOLLOWING:

PUMP #1 AND PUMP #2 (LOCATED IN MACHINE ROOM ON FIRST FLOOR)

NO FLOW ALARM (WHEN AIR FLOW INTO THE AREA IS NOT ADEQUATE)

SUPPLY FAN ALARM

DUST COLLECTOR ALARM

BREATHING AIR ALARM

LOW HUMIDITY

HIGH HUMIDITY

ALARM SILENCER BUTTON

DUST COLLECTOR FILTER GAUGE AND EFI FILTER GAUGE (HEPA FILTER) THAT INDICATES WHEN FILTERS ARE DIRTY.

1 INCH PRESSURE - CLEAN

2 INCH PRESSURE - DIRTY

APPENDIX 2

"PERSONNEL PROTECTION - ISOLATED MANUFACTURING AREA"

THE FOLLOWING PROCEDURES ARE TO BE FOLLOWED BY ALL PERSONNEL ENTERING THE ISOLATED MANUFACTURING AREA WHILE MANUFACTURING IS TAKING PLACE.

1. ENTER AREA ONLY THROUGH CHANGE ROOM.
2. PRIOR TO ENTERING THE GENERAL MANUFACTURING AREA THROUGH THE TWO DOORS, PUT ON A PROTECTIVE COVERALL, OVERSHOES, GLOVES, AND AIR RESPIRATOR HOOD.
3. UPON EXITING THE GENERAL MANUFACTURING AREA, LEAVE BY WALKING THROUGH THE AIR-SHOWER AFTER WALKING OVER THE TACKY MAT.

   ENTER THE AIR-SHOWER ROOM CLOSING DOOR BEHIND YOU, THE AIR-SHOWER IS TIMED AND THE EXIT DOOR WILL UNLOCK AFTER A TIMED INTERVAL AT WHICH TIME EXIT CAN BE MADE.
4. REMOVE AIR RESPIRATOR HOOD, PROTECTIVE COVERALL, OVERSHOES, AND GLOVES. WASH HANDS THOROUGHLY BEFORE LEAVING THE CHANGE ROOM. DISCARD COVERALLS, OVERSHOES AND GLOVES IN THE CONTAINER SUPPLIED FOR DISPOSAL OF CONTAMINATED MATERIAL.
5. TRANSFER ALL MATERIALS INTO THE ROOMS OR OUT OF THE ROOMS THROUGH THE DOUBLE DOORS LEADING FROM THE HALLWAY TO THE GENERAL MANUFACTURING AREA. ONE OPERATOR MUST PASS THE MATERIAL THROUGH THE DOOR AND ANOTHER OPERATOR RECEIVE THE MATERIAL. PERSONNEL ARE ABSOLUTELY PROHIBITED FROM USING THESE DOORS AS AN ENTRANCE OR EXIT FROM THE GENERAL MANUFACTURING AREA.

"PERSONNEL PROTECTION - ISOLATED MANUFACTURING AREA" (CONTINUED)

6. EQUIPMENT USED IN THE ISOLATED MANUFACTURING AREA MUST NOT LEAVE THE AREA WITHOUT ADEQUATE CLEANING AND APPROVAL OF THE MANAGER, CAPSULE-TABLET PRODUCTION; AND THE SUPERVISOR, QUALITY CONTROL AUDITING.

7. TACKY MATS ARE PROVIDED AND USED AT EXITS TO REMOVE MATERIAL ADHERING TO SHOES.

8. UPON LEAVING ISOLATED MANUFACTURING AREA ALL EMPLOYEES MUST SHOWER IMMEDIATELY AND CHANGE UNIFORM.