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C-8 COMMUNICATIONS MEETING

OUTLINE, TALK & CHARTS

C. E. STEINER
7/31/80

PERSONAL & CONFIDENTIAL

AP002552

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C-8 COMMUNICATIONS MEETING OUTLINE

C. E. Steiner

INTRODUCTION

- C-8's desirable process qualities
- Short C-8 history in TFE & FEP Manufacture

TOXICITY

- Oral toxicity - slightly toxic
 - Compare to other compounds
- Skin contact - slightly to moderately toxic
- Inhalation toxicity - highly toxic
 - Compare to other compounds
 - Concentrations found in area are lower

INITIAL BLOOD TESTS

- 3M Data
- Our Results

RECOGNIZING EXPECTED OPERATOR QUESTIONS - A transition

- Some disbelieve based on past experience
- Short history of chemicals in industry showing why we are careful

MEDICAL RECORD STUDIES

- No evidence of health problem
- Studies thorough

PROVISIONAL AEL

- AEL committee has set provisional AEL of 0.55 mpb
- Not yet firm AEL
- This very low number is to protect people who work with C-8 every day
- The low provisional AEL and goal to reduce blood fluorine is the reason we are making changes in equipment and procedures.

EQUIPMENT IMPROVEMENTS

- Goal to reduce exposure to solid C-8, airborne C-8 and C-8 solutions
- Ingredients addition hood and stack
- Eliminate Weighing Citric Acid in C-8 hood
- Raising Dryer Air supply Inlets
- Seal Dryer Leaks
- Additional Dryer Windows
- Increase Ventillation During Outages
- Removing C-8 from Dryer Exhausts

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PROTECTIVE EQUIPMENTClothing and Gloves

- Needs to be disposable to prevent secondary contamination.
- An EOD is being prepared to evaluate clothing.
- Different protection levels for 3 exposure classes

Breathing

- Equipment improvements will reduce airborne C-8 but high C-8 concentrations will still remain in some areas.
- Breathing air will be installed - ultimate solution.
- Comfo II air respirator with GMAH cartridge acceptable.

TESTINGPersonal Air Samples

- Will Resample.

Blood Samples

- Blood sampling will be resumed.
- Frequent sampling is not necessary.

Area Air Samples

- Will continue to define progress.
- Often exceed provisional AEL before improvements.

SUMMARY

- C-8 is toxic but can be handled safely.
 - People working with C-8 generally accumulate organic fluorine in the blood, and levels generally correlate with job exposure potential.
 - Although this has caused no health effects continued exposure is not tolerable.
 - Our basic goals are to reduce exposures to below the provisional AEL, and to reduce organic fluorine levels in blood of exposed workers and prevent accumulation in new workers.
 - This will require equipment changes that are being done.
 - It will also require use of disposable protective clothing and use of breathing air or respirators for certain jobs.
- One other ingredient is needed -- your cooperation in controlling this hazard.

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C-8 COMMUNICATION MEETING

The purpose of this meeting is to bring everyone up to date on our findings regarding C-8, our immediate program, and our long term plans.

Most of you know that C-8 is a fluorochemical surfactant that is used for producing fine powder, dispersion, granular and FEP. It has unique properties that allow it to wet Teflon's surface, shorten reaction cycle time, stabilize dispersions and provide sites for reactions. It has been used for Teflon® manufacture for over 25 years. Other chemicals have been tested but none match C-8's properties. Four years ago it was introduced in FEP manufacture where it was a manufacturing improvement.

Let's look over the highlights of the Technical history of C-8. In 1965 tests showed that C-8 was slightly toxic when swallowed. This was not surprising. There is a dose level where almost every chemical becomes poisonous, even water. (Chart 1). This chart shows the oral toxicity of C-8 relative to some common chemicals. These tests were done on animals, and represent what dose would kill 50% of the animals tested. I've scaled up the dose from test data to animal weights comparable to an operator's weight. You can see that C-8 is not as toxic as acetone. It has a lower toxicity like table salt.

C-8, like table salt, can also be absorbed through the skin where it is about as toxic as it is orally. But, based on this low toxicity, no change in our safety program was necessary.

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In 1969 it was found that C-8 was more toxic by inhalation, Chart 2. This second chart shows the approximate concentration that will kill test animals in a 4 hour period. This approximate lethal concentration for rats exceeds anything we have measured in the plant. The highest level ever measured in the plant is about 1/4 of that level -- and that a 1.1mpm leak at the feed end of No. 3 dryer which has been repaired. The other C-8 concentrations are generally about 1,000 to 10,000 times lower than this so people working in the area see no immediate effect. (.004-.04 mpm)

However, since 3M informed us in 1978 of organic fluorine being detected in the blood of their employees who worked with C-8, we have been reviewing and expanding our C-8 program. We have concluded that personnel routinely exposed to C-8 will absorb it in their body. Tests at Washington Works show that blood fluorine levels which indicate C-8 levels generally correlate with potential job exposure.

Repeated exposures can result in accumulation of C-8 in the blood. One of the things that we are studying with the blood samples is the rate that C-8 is eliminated from the body.

Some of the old timers remember when C-8 was treated with less respect and they wonder "Why is it suddenly harmful now?"

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Throughout the chemical industries over the last 50 years this story has been repeated with the same disbelief but often with more drastic consequences.

For example, carbon tetrachloride was used to clean auto parts and as a fire extinguisher for years, and now it is known to cause damage in some people and is used with care. The same story has been repeated several times for things like chloroform (which was used in cough suryp), methyl alcohol and other chemicals.

The difference between the ending of the C-8 story and the others is that Du Pont is reacting while C-8 levels in the blood are low and before any damage is done in the body.

The medical data show that no one has been injured by C-8 (Chart 4). The Medical Division after a thorough study has concluded that "...there is no conclusive evidence of an occupationally related health problem among workers exposed to C-8." All that was noted was a small increase in two liver enzyme levels. After 25 years of handling C-8 we see no damage among the workers. However, the potential is there -- C-8 has accumulated in the blood. Because of this accumulation we have decided to undertake programs to minimize accumulation of C-8 in the blood of new workers.

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The AEL Committee of Haskell Laboratories has set a provisional Allowable Exposure Limit or "AEL" at 0.55 mpb of C-8 in air. This very low proposal is based on a safety factor of 800 below the level where reversible liver effects were observed. An AEL is the same thing as a TLV or EGL -- it is a safe concentration in the air of a working environment.

In order to meet the expected low AEL, equipment changes are necessary to protect from solid, liquid and airborne C-8.

The next transparencies show the changes that have been made recently to protect against C-8 exposure. To date we have:

- Modified the Fine Powder/Dispersion ingredients addition hood to reduce C-8 emissions and bring the mixing operations into the hood. C-8 tools will also be stored in the hood where possible.
- Improved the C-8 addition hood exhaust stack. The hood exhaust stack was close to an H & V inlet on the roof.
- Removed operations that don't have to be done in the C-8 hood -- like citric acid weighing. This has reduced exposure of concentration to the operators.

The dryers have been improved also:

- Air supply inlets have been raised to remove C-8 rich air from the ceiling.

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- Seals of No. 3 dryer doors and seams have been improved.
- Inspection windows have been added to reduce need to open dryer doors.

We have also put guards inside the dryer that will permit using the exhaust fans to remove C-8 when dryers are being cleaned. This has reduced some C-8 concentrations, but more work is to be done; for example, we plan to cover injection pump tanks, seal openings in floor and vent oscillating feeder compartments, sealing No. 3 dryer fans.

The next chart shows the three different protection levels required for three exposure classes: Low dry exposure, high dry exposure and wet exposure. A disposable garments of the appropriate design, gloves and air protection are recommended for each of these exposure classes. Sample garments have been selected and an EOD will be run to evaluate this clothing. Tyvek® was selected over cloth or paper garments because it is light fairly resistant to tearing, a good filter and disposable. Disposability is required to prevent secondary contamination when laundering. During this EOD, sample garments will be tried and evaluated by operators and mechanics.

C-8 will permeate all glove materials over a period of time. New flock lined latex gloves will be used in jobs where C-8 exposure is likely. Even these gloves will be permeated by C-8 over a period of time, so these gloves will be disposed of after each shift.

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Breathing protection is very important to reducing C-8 exposures. Equipment improvements will reduce airborne C-8 in most areas but there will still be areas where exposure is possible. A COMFO II air respirator with a special GMAH cartridge is required as a minimum. Breathing air is better and will be available soon. The yellow 3M masks are not acceptable.

I've had some questions on future C-8 air samples and blood samples. We now have our baseline data and have mapped out the problem areas. The procedures are modified and equipment improved so C-8 exposures will be reduced.

Blood sampling will probably be done on an annual basis in the future to define the real improvements in C-8 control.

Let me summarize the items covered:

- C-8 is toxic, but it can be used and controlled below the proposed toxic limit.
- In the past, people working with C-8 have accumulated organic fluorine in the blood and levels generally correlate with job exposure potential.
- Although this has caused no health effects, continued exposure should be minimized with controls.
- Our objective is to reduce exposures to below the provisional AEL, and to reduce organic fluorine levels in blood of exposed workers and to limit accumulation in new workers.

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- This will require equipment changes that are partially complete
- It will also require use of disposable protective clothing and use of breathing air or respirators for certain jobs.
- One other ingredient is needed -- Total Division cooperation in controlling this material.

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CHART 1ORAL TOXICITY

(DOSES LETHAL TO ABOUT 50% OF ANIMALS)

	<u>Oz./150 LB. ANIMAL</u>	
ACETONE	0.2	(DOG)
C-8	1.0	(DOG)
TABLE SALT	7.2	(RAT)
METHYLENE CHLORIDE	7.2	(RAT)

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CHART 2INHALATION TOXICITY

(APPROXIMATE LETHAL CONCENTRATIONS FOR 4-HOUR EXPOSURES WITH RATS)

	<u>MPM*</u>
C-8	41
METHANOL	300

* MPM = MOLES PER MILLION -- SAME AS PARTS PER MILLION
BY VOLUME.

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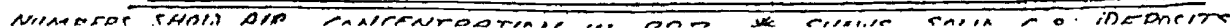


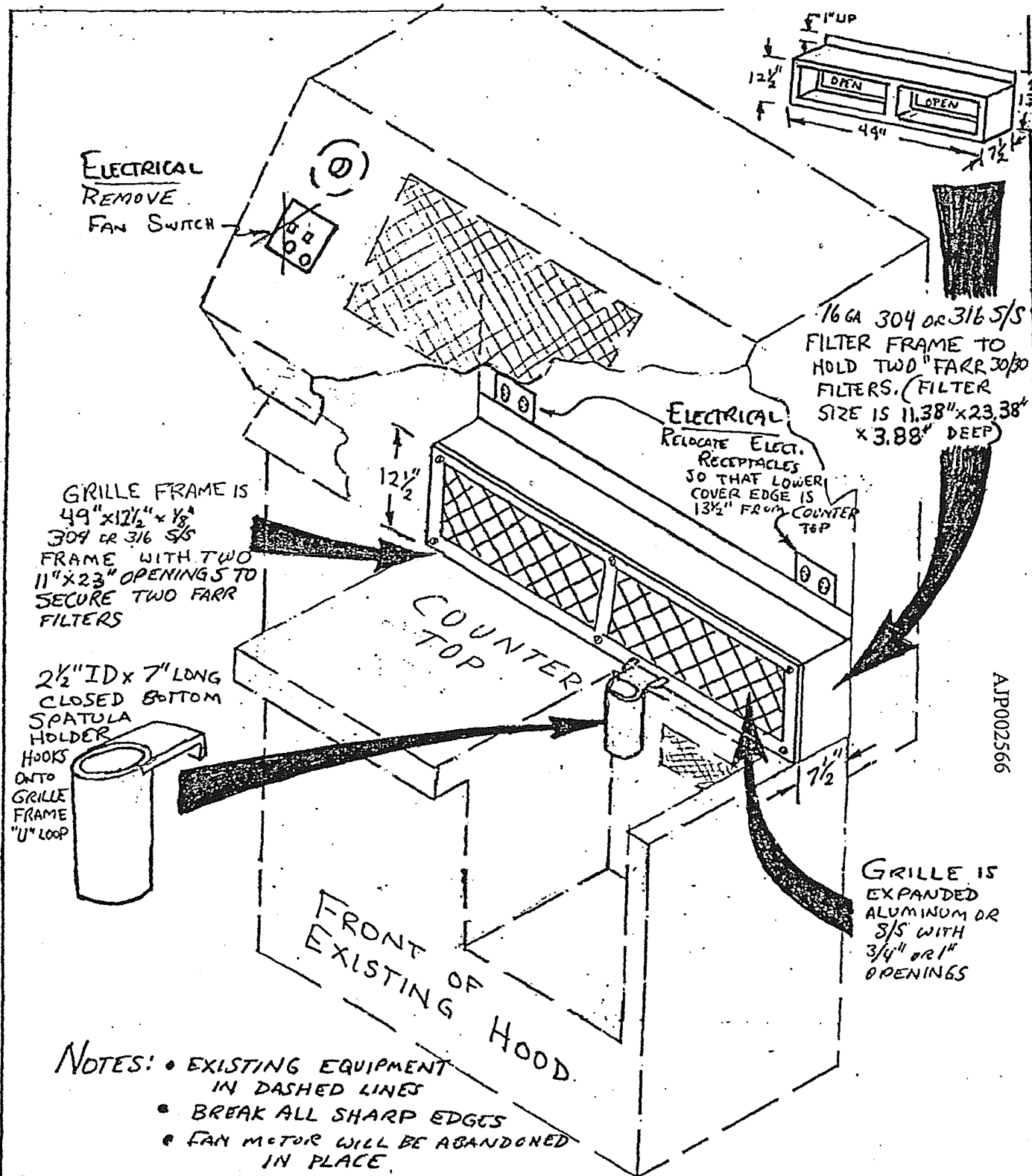
CHART 4MEDICAL STUDIES

- MEDICAL DIVISION 1/25/80 STATEMENT BASED ON LIVER ENZYME STUDY -- " THERE IS NO CONCLUSIVE EVIDENCE OF AN OCCUPATIONALLY RELATED HEALTH PROBLEM AMONG WORKERS EXPOSED TO C-8."
- 3M MEDICAL DIRECTOR IN 3/14/80 MEETING WITH DU PONT STATED THAT THEY HAVE NOT IDENTIFIED ANY SIGNIFICANT INDUSTRIAL DISEASE RELATED TO C-8 EXPOSURE.
- NO EVIDENCE OF HEALTH PROBLEMS IN MORE THAN 25 YEARS USE OF C-8. HANDLING PRACTICES IN EARLIER YEARS HAD GREATER EXPOSURE POTENTIAL THAN RECENT OPERATIONS.

CONCLUSION

- NO CONCLUSIVE EVIDENCE OF HEALTH PROBLEMS RELATED TO C-8 EXPOSURE.

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ELECTRICAL & SHEETMETAL WORK ON
INGREDIENTS ADDITION HOOD
2ND FLOOR B162

DWN. BY

C.E. STEINER

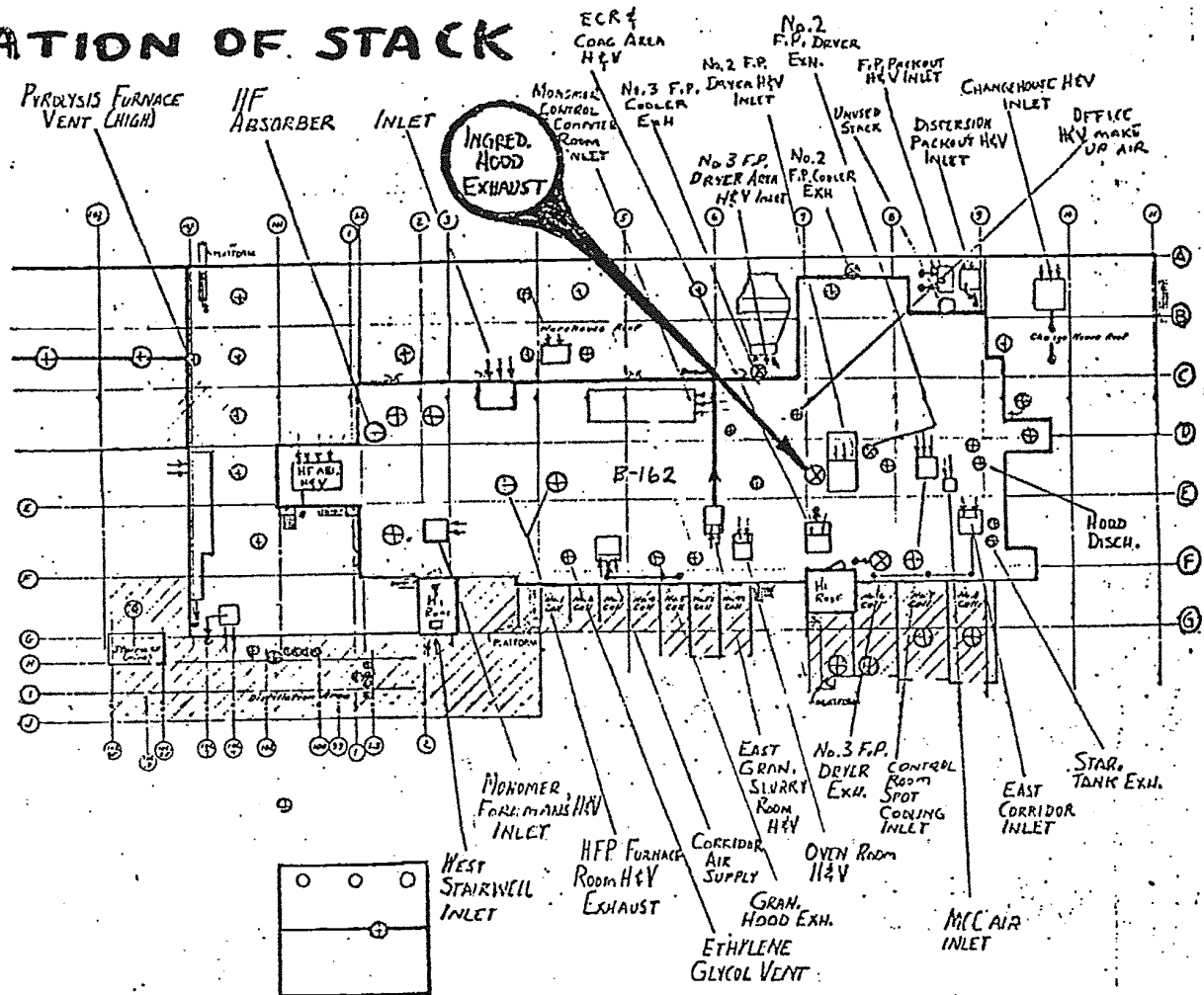
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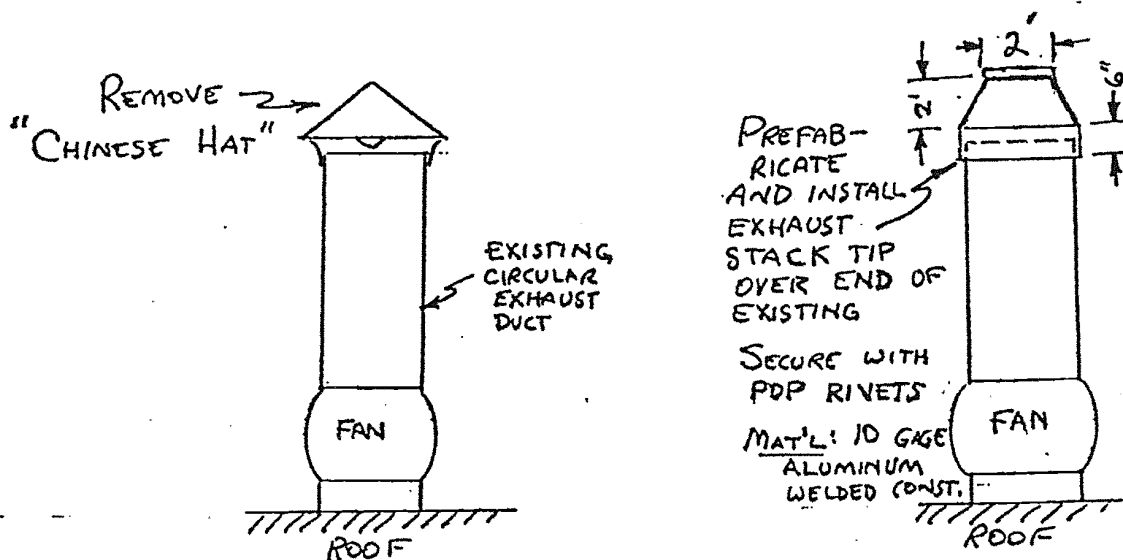
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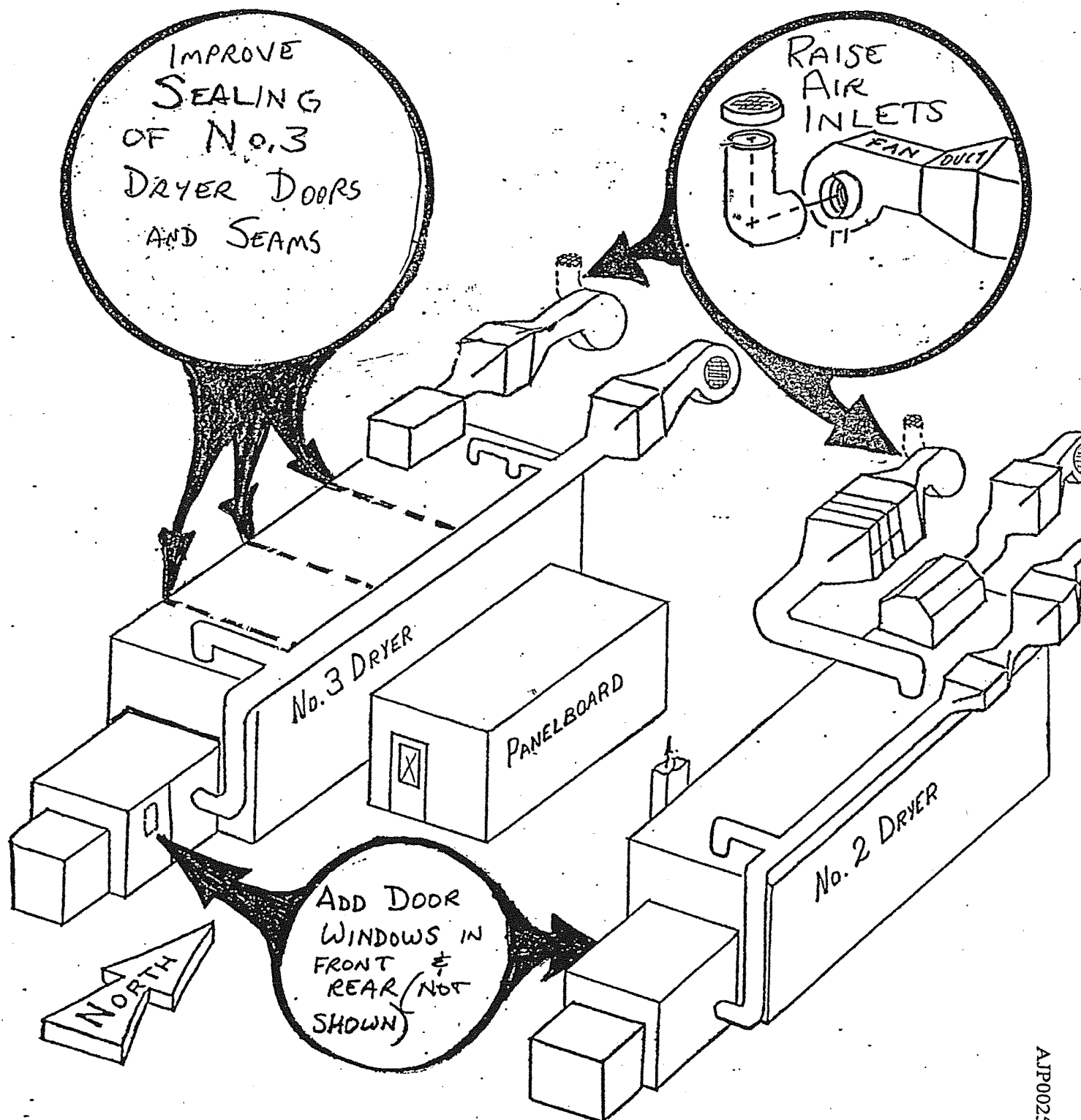
LOCATION OF STACK



B-162 TEFLON ROOF ARRANGEMENT

• MODIFICATIONS TO STACK



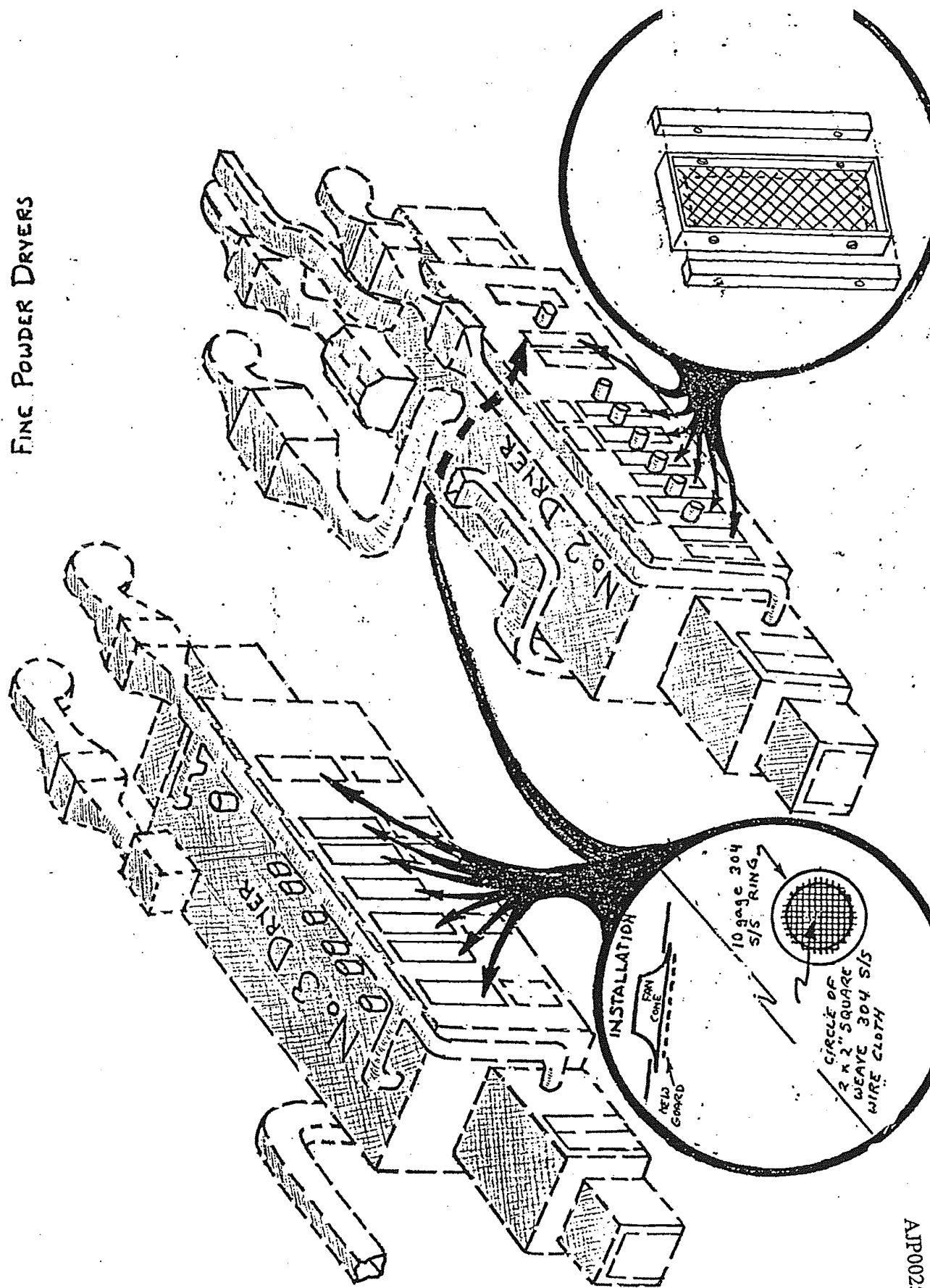


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FAN GUARDS

FINE POWDER DRYERS



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C-8 EXPOSURE CLASS
AND PROTECTIVE CLOTHING SUMMARY

<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>
<u>DRY LOW EXPOSURE</u>	<u>DRY HIGH EXPOSURE</u>	<u>WET EXPOSURE</u>
<ul style="list-style-type: none">• Disposable TYVEK® coat or smock• Disposable latex gloves (or orange rubber gloves if yellow latex is unavailable)	<ul style="list-style-type: none">• Disposable TYVEK® coveralls with hood or cap• Disposable latex gloves• Black rubber boots	<ul style="list-style-type: none">• Disposable coated TYVEK® coveralls with hood or coated smock and coated pants• Disposable latex gloves• Black rubber boots

- NOTE: Breathing air or COMFO II respirator with GMAH cartridge is also recommended for all exposures, but are not included as part of this test.

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SUMMARY

- C-8 IS TOXIC
- PEOPLE ACCUMULATE C-8
- NO HEALTH EFFECTS AT PRESENT LOW LEVELS
- GOALS:
 - TO REDUCE EXPOSURE BELOW AEL
 - TO REDUCE ORGANIC FLUORINE IN BLOOD
- REQUIRES:
 - EQUIPMENT CHANGES
 - DISPOSABLE PROTECTIVE CLOTHING AND GLOVES
 - BREATHING AIR OR COMFO II
 - COOPERATION

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