

11 PP

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RECEIVED

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C-8 IN BLOOD - HISTORICAL

- 1978 Informed by 3M that C-8 is found in the blood of exposed workers and persists for a long time.
- 1979 C-8 found in blood of DuPont workers.
- 1980 Workers with blood C-8 found to have normal liver function.
- 1981 Birth defects scare - additional sampling.
- 1982 Blood program continues on voluntary basis - no trends noted.
- 1990 Formal review of blood data.
- 1993 Journal Of Occupational Medicine study of 3M workers.
- 1995 First 5-year "snapshot".

**BLOOD MONITORING**

**THIS IS THE ONLY MEASURE WE HAVE OF TOTAL EMPLOYEE EXPOSURE**

**PROBLEMS**

- **BIOPERSISTENCE MAKES DATA INTERPRETATION DIFFICULT**
- **SAMPLING IS INVASIVE**
- **LENGTHY ANALYSIS IS RUN BY ONLY ONE LAB**
- **NO AEL**

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WASHINGTON WORKS  
VOLUNTARY BLOOD TESTING

|            | <u>1993</u> | <u>1994</u> |
|------------|-------------|-------------|
| 0 - <1 ppm | 9           | 47          |
| 1 - <3 ppm | 2           | 5           |
| >3 ppm     | 2           | 1           |
| TOTAL      | 13          | 53          |

- No systematic comparison with air sampling is possible.
- C-8 specific GC analysis run by National Medical Services.
- Correlates well with new 3M analysis.

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1995 C-8 IN BLOOD "SNAPSHOT"

**PURPOSES**

Monitor the overall effectiveness of our C-8 industrial hygiene programs.

Create and maintain a continuous data base for epidemiologic surveillance of our exposed population.

Provide closure for issues raised by the 1990 data review.

Honor employee requests for voluntary testing.

**TEST POPULATIONS**

Employees in C-8 jobs (82 of 140)

Employees not in C-8 jobs with a previous result >3 ppm (9 of 12)

Pensioners with a high previous result (9 of 19)

Volunteers (18)

**RESULTS SUMMARY - OPERATORS**

| <b><u>JOB</u></b> | <b><u>DESCRIPTION</u></b> | <b><u>1995<br/>AVERAGE (n)</u></b> | <b><u>1989<br/>AVERAGE (n)</u></b> |
|-------------------|---------------------------|------------------------------------|------------------------------------|
| 08PE              | autoclave                 | 2.3 (7)                            | 3.0 (4), 7.0 (3)                   |
| 08PF              | polykettle                | 2.6 (6)                            | 2.5 (3), 8.5 (1)                   |
| 08PH              | dispersion                | 0.5 (2)                            | 1.0 (2), 7.5 (1)                   |
| 08PI              | FP finishing              | 2.0 (6)                            | 2.0 (6)                            |
| 08PJ              | FP packout                | 0.7 (7)                            |                                    |
| 08PH              | C-8 dryer recovery        | 1.7 (2)                            |                                    |
| 18PA              | FEP polykettle            | 2.3 (4)                            |                                    |
| 18PB              | FEP extruder/oven         | 1.5 (6)                            | 0.5 (3)                            |
| 18PC              | FEP wet finishing         | 3.0 (1)                            |                                    |
| 18PD              | FEP packout               | 0.1 (4)                            |                                    |
| 18PJ              | PFA/FEP bead              | 0.7 (2)                            |                                    |
| 18PK              | FEP safety/disp           | 2.1 (2)                            |                                    |

**RESULTS SUMMARY - MECHANICS**

|      |                 |         |
|------|-----------------|---------|
| 58NC | FP/disp/gran/TA | 1.4 (1) |
| 58MD | general shift   | 1.1 (8) |
| 58MG | process E&I     | 0.8 (7) |
| 68MA | general shift   | 1.1 (5) |
| 68MB | FEP E&I         | 0.9 (7) |

# HALF LIFE RESULTS FROM PENSIONERS

| <u>C8</u><br><u>DATE PPM</u> | <u>RET.</u><br><u>DATE</u> | <u>C8</u><br><u>DATE PPM</u> | <u>1/2 LIFE</u><br><u>(YEARS)</u> |
|------------------------------|----------------------------|------------------------------|-----------------------------------|
| 4/89 5.7                     | 4/91                       | 3/95 4.3                     | 9.7                               |
| 3/87 1.2                     | 6/92                       | 3/95 1.1                     | 22                                |
| 9/81 6.5                     | 4/85                       | 3/95 1.1                     | 3.9                               |
| 3/88 2.8                     | 12/92                      | 3/95 2.2                     | 6.5                               |
| 8/84 2.4                     | 4/85                       | 3/95 .72                     | 5.7*                              |
| 7/84 5.9                     | 12/81                      | 3/95 .94                     | 4.0*                              |
| 3/85 3.0                     | 4/85                       | 3/95 .14                     | 2.3*                              |
| 9/82 6.3                     | 12/82                      | 3/95 .57                     | 3.5*                              |
| 3/88 1.7                     | 12/93                      | 3/95 2.4                     | ---                               |

For \* results,            n = 4  
                              average = 3.9  
                              sigma = 1.4

using                     $\log \frac{n}{n_0} = \frac{-.301 t}{t_{1/2}}$

OTHER OBSERVATIONS

1. VOLUNTEERS

- a) One of 17 is above 1 PPM
- b) Average of other 16 is 0.4 PPM

2. ACTIVE EMPLOYEES WITH PREVIOUS HIGH RESULTS

|                | <u>Down</u> | <u>Same</u> | <u>Up</u> |
|----------------|-------------|-------------|-----------|
| in C-8 job     | 2           | 3           | 4         |
| not in C-8 job | 6           | 2           | 1         |

3. THREE EMPLOYEES OVER 3 PPM FOR THE FIRST TIME

TEST POPULATIONS

1. Employees in C-8 jobs (82 of 140)
2. Employees not in C-8 jobs with a previous result >3 ppm (9 of 12)
3. Pensioners with a high previous result (9 of 19)
4. Volunteers (18)

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### OTHER OBSERVATIONS

#### 1. HALFLIFE ESTIMATES FROM PENSIONERS

Average = 3.8 years  
Sigma = 1.2 years  
n = 4

#### 2. VOLUNTEERS

- a) One of 17 is above 1 PPM
- b) Average of other 16 is 0.4 PPM

#### 3. ACTIVE EMPLOYEES WITH PREVIOUS HIGH RESULTS

|                | <u>Down</u> | <u>Same</u> | <u>Up</u> |
|----------------|-------------|-------------|-----------|
| in C-8 job     | 2           | 3           | 4         |
| not in C-8 job | 6           | 2           | 1         |

#### 4. THREE EMPLOYEES OVER 3 PPM FOR THE FIRST TIME

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**PATH FORWARD**

**Finish Data Analysis**

**Employee Communication**

**Site Industrial Hygiene Efforts**

**Toxicology Work (Do we need a BEI?)**

**Continue Annual Voluntary Testing**

**Take Another Snapshot In 2000**