Air Products and Chemicals, Inc. PUT IT IN WRITING

Date 5 April 1974

To Mr. T. L. Carey/Valley Forge Subject PVC VENTILATION STUDY

From J. D. Kramer/Calvert City

( ) Take Action ( ) For Your Approval ( ) For Your Info ( ) Discuss With Me
( ) For Your Comments ( ) As Requested ( ) File ( ) Note & Return

Attached is a report from Mr. McGinnis on the above. In the interest of time, "smoke" was created using cylinders of NH_3 and HCl. MSA smoke bombs are on order and should be received shortly.

The study was very worthwhile and indicates to me that our basic system is good, but we still have problem areas. There were two inlet air movers and heaters, one on the second level and one way above the top of the 19th reactor that were not operational when the study was made. As of this date these units are running. It is our intention to repeat the test with these units on and with some of the minor changes suggested in Mr. McGinnis' report.

J. D. Kramer sl

J. D. KRAMER

JDK:sl

cc: A. R. Adams/Valley Forge
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E. M. Spurlock/Valley Forge
M. H. Stermon
H. L. Watson/Valley Forge
R. W. McGinnis

Air Products and Chemicals INC.

PUT IT IN WRITING

Date 3 April 1974

To T. W. Herbig Subject PVC REACTOR BUILDING

From R. W. McGinnis VENTILATION

( ) Take Action ( ) For Your Approval ( ) For Your Info ( ) Discuss With Me
( ) For Your Comments ( ) As Requested ( ) File ( ) Note & Return

A smoke bomb ventilation study on the PVC reactor building pinpoints both the results of the recent improvements and the deficiencies still existing. Basically good ventilation is present for the first and third floor. The one grouping of stagnant air on the second floor mezzanine is expected to be alleviated with the startup of the corresponding 19th reactor intake fan, as is the slow moving air at the west side of the third floor.

Improvements for the first and third floor are relatively minor "tune up" types. The very slowmoving, multidirectional air of the second floor reactor section is more difficult to solve, and any improvement probably requires additional ventilation fans and possibly ducting of the intake air.

Three notations are made on the type of air movement: Pronounced, slight and stagnant. The three types were fairly easy to classify as follows:

1. Pronounced. This was generally associated with the path betweens an exhaust fan and either an intake fan or a wall opening.

2. Slight. Most other air movement was very slow and was often barely discernable.

3. Stagnant. The smoke appeared to hang around and not move in any direction.

Ventilation patterns are illustrated in the attached plot sketches. Pronounced air movement is represented by solid arrows, and slight air movement is represented by the dotted arrows. Stagnant areas are so designated. Intake fans for the 19th reactor were not yet activated for these smoke bomb tests. Figure 1 illustrates the present ventilation pattern of the third floor, figure 2 - the second floor, and figures 3 and 4 - the first floor.

Ventilation patterns are somewhat influenced by the presence of open doors and the prevailing wind, as is partly seen in figures 3 and 4. The wind during these tests came from either the east or the south.

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I recommend that the following action be done to improve ventilation distribution in the PVC reactor building.

A. First Floor

1. Eliminate the stagnant area at the west wall VCM pumps. Possible solutions are an intake louver or an intake fan on the west wall.

2. Provide intake air for the 19th reactor area - e.g. louvers, if sufficient air does not come through the second floor grating. The present spring and summer weather will encourage open doors on the south wall and sufficient incoming air. In the winter the intake air sweep through the 19th reactor ground floor and the south VCM pumps may not be adequate.

3. Adjust the incoming air louvers to better distribute the flow. The louvers should then preferentially be "locked" in place to prevent further adjustment by operators.

4. Plug all holes on the north wall to eliminate shortcirçuiting of the air.

B. Second Floor

1. Air movement on the mezzanine is expected to be improved by activation of the second floor 19th reactor heater intake fan.

2. Improving air movement in the reactor area probably will involve new fans, heaters, etc. I suggest that we re-examine the necessity of improving this ventilation in light of the upcoming OSHA regulations on VCM.

3. Remove the old north wall louvers and cover with transite to eliminate any shortcircuiting.

C. Third Floor

1. The 19th reactor intake air heater is expected to improve air movement in the west quarter of the reactor floor.

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2. One duct of the present west (or center) intake air heater should be redirected to sweep the center of the room. The control panel area is expected to be amply swept by air coming from the 19th reactor, and the duct presently serving this area can be redirected.

3. Adjust the louvers on the two intake air heater ducts to evenly sweep the third floor as much as possible. This includes redirecting the upward air movement (of the 20 foot elevation above floor). We may possibly lose some effectiveness of an emergency air sweep driving a massive release, but will gain in industrial hygiene ventilation. This louver should then be locked in place to prevent operator tampering.

4. Cover the north wall holes left by the former exhaust fans to eliminate shortcircuiting.

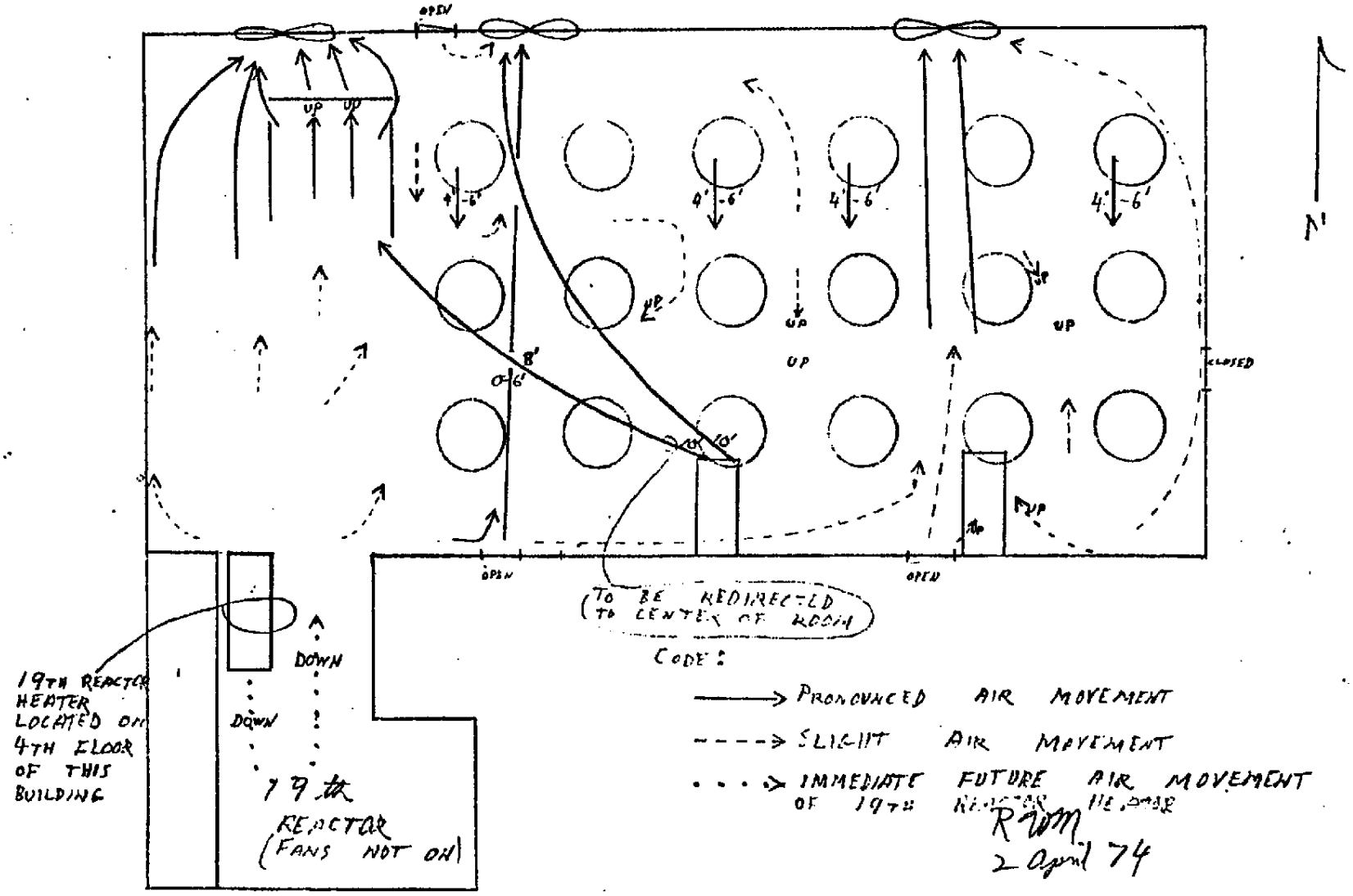
5. Check the effectiveness of the present roof mounted emergency fan with a smoke bomb test.

Roy McGinnis
R. W. McGinnis

RWM:sc

VENTILATION PATTERN - 3RD FLOOR

FIGURE 1

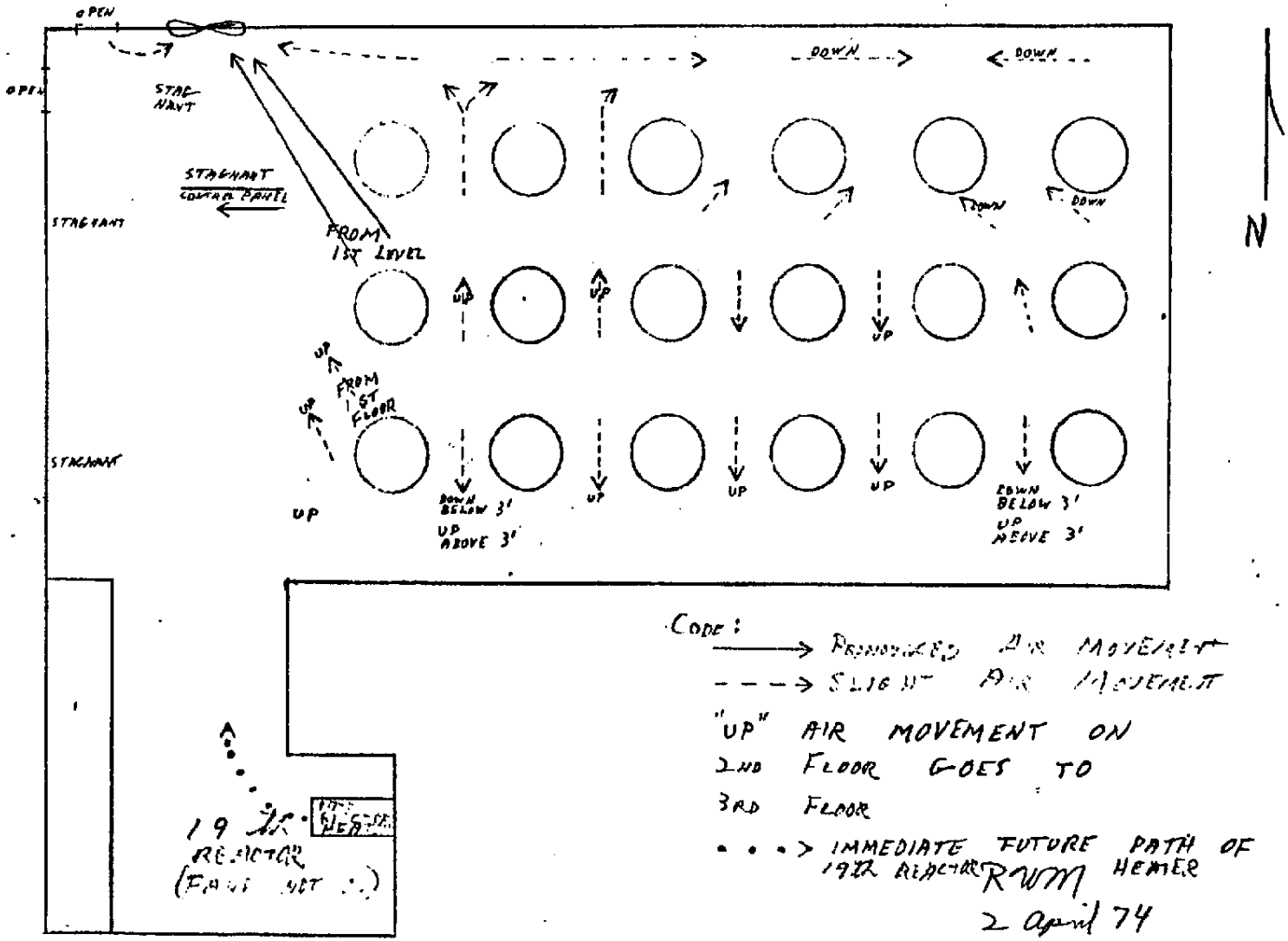


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VENTILATION PATTERN — 2ND FLOOR

FIGURE 2



CODE:

→ PREDOMINANT AIR MOVEMENT

- - - → SLIGHT AIR MOVEMENT

"UP" AIR MOVEMENT ON 2ND FLOOR GOES TO 3RD FLOOR

• • • → IMMEDIATE FUTURE PATH OF 1972 REACTOR RWM HEMER

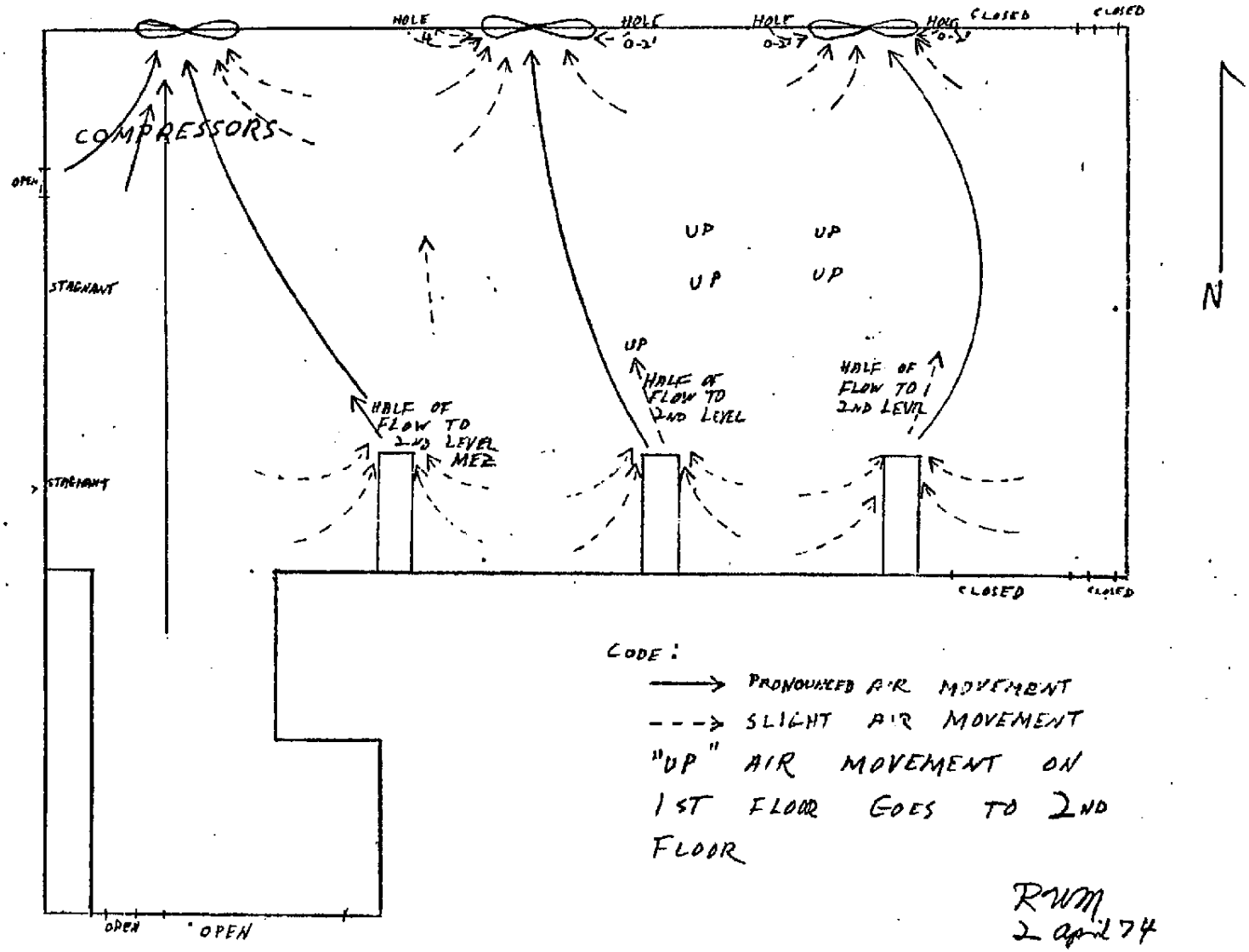
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FIGURE 3

VENTILATION PATTERN - 1ST FLOOR

(NORTHEAST OVERHEAD DOOR CLOSED)



CODE:

⟶ PRONOUNCED AIR MOVEMENT

- - - ⟶ SLIGHT AIR MOVEMENT

"UP" AIR MOVEMENT ON 1ST FLOOR GOES TO 2ND FLOOR

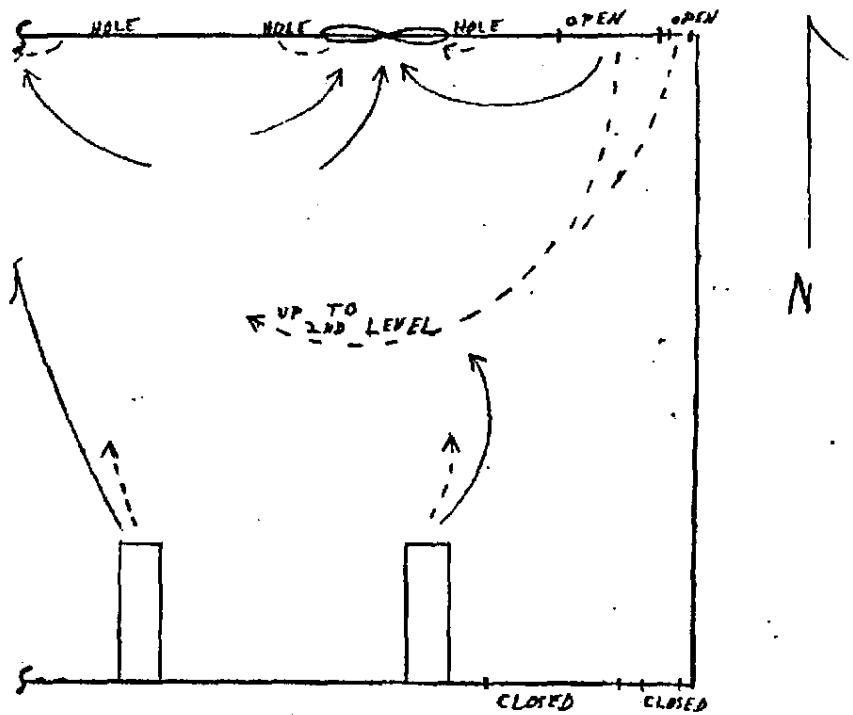
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FIGURE 4

VENTILATION PATTERN - 1ST FLOOR EAST SIDE

(NORTHEAST OVERHEAD DOORS OPEN - EAST WIND)



CODE:

⟶ PRONOUNCED AIR MOVEMENT

- - - -⟶ SLIGHT AIR MOVEMENT

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