

ATTACHMENT 1

AFFIDAVIT OF JACQUES B. J. READ AND  
ATTACHMENT JOINT AFFIDAVIT OF ROGER H. MOORE  
AND ATTACHMENT SETTING OUT THE NRC STAFF'S  
ANALYSIS OF UPDATED INFORMATION  
INCLUDING THE YEAR 1978

8002120308

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

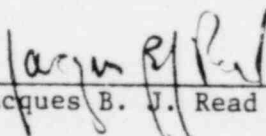
In the Matter of )  
 )  
METROPOLITAN EDISON COMPANY, ET AL. ) Docket No. 50-320  
 )  
(Three Mile Island Nuclear Station, )  
Unit 2) )

AFFIDAVIT OF JACQUES B. J. READ

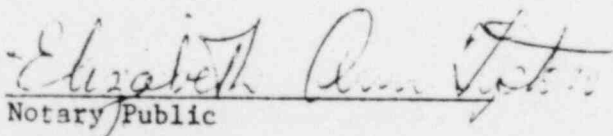
STATE OF MARYLAND )  
COUNTY OF MONTGOMERY) SS

I, Jacques B. J. Read, being duly sworn, depose and state:

1. I am a Chemist-Nuclear Engineer, Accident Analysis Branch, Division of Site Safety and Environmental Analysis, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.
2. I have previously testified in this proceeding and my Statement of Professional Qualifications is incorporated in the transcript (following Tr. 232).
3. I have prepared the attached document entitled "Analysis of Addition of 1978 Air Traffic and Accident Rates and Revisions to 1976 and 1977 Estimates to 'NRC Staff Testimony Regarding U.S. Air Carrier and Military Accident and Traffic Data' and 'Evaluation of Aircraft Crash Potential for Nuclear Power Plants'", and, if called upon, I would testify as set forth therein.

  
\_\_\_\_\_  
Jacques B. J. Read

Subscribed and sworn to before  
me this 4th day of February, 1980

  
\_\_\_\_\_  
Notary Public

My Commission expires: July 1, 1982

ANALYSIS OF ADDITION OF 1978 AIR TRAFFIC AND ACCIDENT RATES AND REVISIONS TO 1976 AND 1977 ESTIMATES TO "NRC STAFF TESTIMONY REGARDING U.S. AIR CARRIER AND MILITARY ACCIDENT AND TRAFFIC DATA" AND "EVALUATION OF AIRCRAFT CRASH POTENTIAL FOR NUCLEAR POWER PLANTS"

I.

Calendar year 1978 data has now been compiled by the Federal Aviation Administration (FAA), Civil Aeronautics Board (CAB), and National Transportation Safety Board (NTSB). Combined with information supplied by the Military Airlift Command (Attachment 1) and the Air Force Inspection and Safety Center (Attachment 2), these data are now sufficient to permit calendar year 1978 to be added to the tables of aircraft traffic and accidents previously submitted.

In addition, NRC and National Archives personnel have succeeded in recovering 1976 and 1977 air charter traffic information from the defective magnetic tapes, alluded to in my earlier testimony (following Tr. 242, at 26). Charter traffic for those years had been estimated, but is now in tables 19A, 19B and 20 as it was actually reported. The only notable difference between the previous estimates and actual traffic is that Capitol International Airlines had been estimated to average about one charter per month at Harrisburg International Airport (HIA), while in fact, during February 1977 they flew eight charters,<sup>1/</sup> in October 1977 three charters, and in November of 1977 they flew four charters. The original estimates of heavy aircraft charter operations in Table 20 were four operations too high in 1976, but, due primarily to the three unusual months noted, thirty-four operations too low in 1977.

1/ Each charter involves four operations.

Changes have occurred in the trends of air transport at Harrisburg International Airport:

- 1) Due to the "deregulation" of the air transport industry, a process begun in October, 1978, and still continuing, chartered passenger flights nationally have greatly diminished, and, during the first nine months of 1979, charter operations were about half of their volume in the corresponding 1978 period.
- 2) A significant fraction of the air cargo charters at Harrisburg International Airport were to deliver military hardware from the Cumberland Army Depot to the Iranian Royal Armed Forces. These flights terminated in early 1979.
- 3) The Pegasus International Travel Club, which owned the sole "heavy" aircraft stationed at Middletown, and which accounted for 38 yearly "heavy" operations, has gone bankrupt. The aircraft they owned has not flown during the past several months and resumption of operations from Harrisburg International Airport is questionable.

The largest single contributor to "heavy" aircraft traffic for the period of available recorded data continues to be Trans World Airlines flight 415, which leaves Harrisburg each morning for Chicago, and then proceeds on to San Francisco. Due to the time differential, there is no return flight, and the equipment is brought to HIA as flight 116 from Chicago. This equipment

was usually a B707-100 prior to December 1974, and since has been either a B707-100 or one of a variety of B707 models. During 1978 and 1979, B707 models dominated, raising the number of "heavy" scheduled operations, as shown for 1978 in the revised Table 20. Since the actual equipment scheduled for use at HIA depends upon varying scheduling details of Trans World Airlines western U.S. route structure, the division between "heavy" and "light" scheduled flights have continued to change from year-to-year without apparent trend. As noted previously in Table 10 and Attachment A, flights 116 and 415 could weigh over 200,000 pounds, for example, if flown by a B707, 300-model series, with over 60,000 pounds of fuel and payload. Based on conversations with Trans World Airlines, I understand that TWA is in the process of retiring its Boeing 707 fleet, and expects to have completed this process sometime during 1981. Since the end of 1979, TWA flights 116 and 415 have been scheduled to be flown by Boeing 727-200 aircraft, and TWA forecasts the use of this equipment on these flights for the next several years. A review of several recent Official Airline Guides (North American Edition) confirms TWA's intention to serve these flights with Boeing 727 aircraft. "Heavy" aircraft operations at Harrisburg International Airport, therefore, are expected to decline from the relatively high value observed in 1978.

I have also reviewed available crash data for 1978 and, on this basis, have prepared Table 4 Addition, attached hereto. As indicated by Table 4 Addition, two crashes in 1978 involved heavy aircraft - a DC-10 in Los Angeles, California (crash no. 99) and a DC-8 in Portland, Oregon (crash no. 102). The former

occurred on the runway during the takeoff phase and, therefore, is not considered relevant for inclusion in the crash rate calculation for the TMI site. The latter crash, having occurred beyond the five mile area of concern in this proceeding, similarly is not felt to be appropriately factored into the crash rate calculation for TMI.

Since I have been able to obtain operations data for 1978, I have updated Table 8 as shown in Table 8 Addition, attached hereto. This Table reflects the number of scheduled, non-scheduled and total operations in 1978, the number of landing and takeoff crashes in each category and the number of accidents per million of each type of operation. This information is also provided for the 23-year period 1956-1978.

Table 9 Revised, also attached, contains a summary of accidents and operations based on Table 4 as revised and updated through Table 4 Addition.

Table 11 Addition, attached, sets forth 1978 operations for Harrisburg International Airport, broken down into Air Carrier, Air Taxi, General Aviation and Military operation.

The activities of certified route air carriers at HIA for CY 1977 has been updated for CY 1978 in Table 16A, and Table 20 has been updated in Table 20 Revised to include the new information for 1976 and 1977 and the updated information for 1978.

TABLE 4 ADDITION

| <u>Date</u> | <u>Location</u> | <u>Phase</u>     | <u>Aircraft</u> | <u>Fatality</u> | <u>Type Oper.</u> | <u>Range &amp; Bearing</u>       |             |
|-------------|-----------------|------------------|-----------------|-----------------|-------------------|----------------------------------|-------------|
|             |                 |                  |                 |                 |                   | <u><math>\frac{r}{mi}</math></u> | <u>deg.</u> |
| <u>1978</u> |                 |                  |                 |                 |                   |                                  |             |
| 98) 1/18    | Pueblo, CO      | T                | DCH-6           | F               | Training          | 0                                | 0           |
| 99) 3/1     | Los Angeles, CA | T                | DC-10           | F               | SP                | 0                                | 0           |
| 100) 5/8    | Pensacola, FL   | L                | B727            | F               | SP                | 3.0                              | 3R          |
| 101) 9/25   | San Diego, CA   | L <sup>(1)</sup> | B727            | F               | NS <sup>(2)</sup> | 3.1                              | 23R         |
| 102) 12/28  | Portland, OR    | L <sup>(3)</sup> | DC-8            | F               | SP                | 5.0 <sup>(4)</sup>               | 20R         |
|             |                 |                  |                 |                 |                   | 5.2                              | 16L         |
|             |                 |                  |                 |                 |                   | 6.0                              | 12L         |

FOOTNOTES:

- (1) Officially labelled as "in-flight", aircraft was overflying the airport on its downwind leg when it collided with an aircraft climbing out from a cross-wind runway. Aircraft was headed away from airport at time of collision.
- (2) Pacific Southwest Airlines (PSA) was not CAB-certified at the time since its routes were within a single state. PSA was officially a "Commercial Operator of Large Aircraft". To be consistent with other earlier table entries, this crash is counted as "NS", although this flight was indeed scheduled. PSA has since been certified.
- (3) Officially labelled as "inflight". This aircraft exhausted its fuel in a holding pattern while about 20 miles from its intended airport and glided closer.
- (4) The aircraft is considered to have executed a forced landing in an open field. The cockpit voice recorder and radio communication transcript clearly indicate that a runway landing was recognized as impossible. The landing was largely successful in that 156 occupants were uninjured, and all fatalities and serious injuries occurred to occupants near the point of penetration of a tree encountered late in the landing roll. The range and bearing of all runways near the final location of the landed aircraft are given. The nearest is the 4600 foot single runway of Troutdale airport, the farthest is the 11,000 foot runway at Portland International Airport which the aircraft would normally have used. The point of initial ground contact was approximately 1500 feet farther from all runways. This DC-8-61 weighed about 180,000 lbs at the time of the accident.

Based upon the above information, we do not consider this accident to be a crash within 5 miles of the intended runway.

TABLE 8 ADDITION

| <u>YEAR</u>             | <u>TYPE</u> | <u>MILLIONS OF OPERATIONS</u> | <u>TABLE 4 REVISED ACCIDENTS</u> |                  | <u>ACCIDENTS PER MILLION OF EACH TYPE OF OPERATION</u> |                  |
|-------------------------|-------------|-------------------------------|----------------------------------|------------------|--|------------------|
|                         |             |                               | <u>LANDINGS</u>                  | <u>TAKE OFFS</u> | <u>LANDINGS</u>  | <u>TAKE OFFS</u> |
| 1978                    | S           | 9.03                          | 1                                | 1                | .22  | .22              |
|                         | N           | .21                           | 1                                | 0                | 9.5  | 0                |
|                         | T           | 9.24                          | 2                                | 1                | .43  | .22              |
| 23 YEAR TOTAL           |             |                               |                                  |                  |  |                  |
| 1956<br>through<br>1978 | S           | 181.6                         | 43                               | 20               | .47  | .22              |



TABLE 9 REVISED

SUMMARY OF ACCIDENTS AND OPERATIONS FROM UPDATED TABLE 4 REVISED

|                      | Off Runway       | On Runway        | Total              | Operations(10 <sup>6</sup> ) |
|----------------------|------------------|------------------|--------------------|------------------------------|
| <u>Scheduled</u>     |                  |                  |                    |                              |
| landing              | 26 <sup>1)</sup> | 15 <sup>1)</sup> | 41 <sup>1)</sup>   | 90.9                         |
| take off             | 11 <sup>1)</sup> | 8 <sup>1)</sup>  | 19 <sup>1)</sup>   | 90.9                         |
| <u>Non-scheduled</u> |                  |                  |                    |                              |
| landing              | 14 <sup>2)</sup> | 2 <sup>3)</sup>  | 16 <sup>2)3)</sup> | 2.47                         |
| take off             | 2 <sup>2)</sup>  | 5 <sup>3)</sup>  | 7 <sup>2)3)</sup>  | 2.47                         |

- 1) Does not include 4 NA accidents, which are included in Table 8.
- 2) Does not include 2 take off and 2 landing accidents in training.
- 3) Does not include 5 take off and 5 landing accidents in training.

TABLE 11 ADDITION

|      | <u>ITINERANT</u> |           |           |            | <u>LOCAL</u> |            | <u>TOTAL</u> |
|------|------------------|-----------|-----------|------------|--------------|------------|--------------|
|      | <u>AC</u>        | <u>AT</u> | <u>GA</u> | <u>MIL</u> | <u>GA</u>    | <u>MIL</u> |              |
| 1978 | 13846            | 16531     | 25512     | 4519       | 33064        | 8985       | 102,457      |

TABLE 16A

AIRPORT ACTIVITIES OF CERTIFIED ROUTE  
AIR CARRIERS AT HARRISBURG

CALENDER YEAR 1978

| <u>CARRIER</u>   | <u>CARRIER</u> | <u>DEPARTURES</u>             |                      |
|------------------|----------------|-------------------------------|----------------------|
|                  |                | <u>SCHEDULED</u>              | <u>NON-SCHEDULED</u> |
| Allegheny        | CV580          | 8                             | 0                    |
|                  | BAC-111-200    | 133                           | 2                    |
|                  | DC-9-30        | 1480                          | 10                   |
|                  | DC-9-50        | 1116                          | 10                   |
|                  | MO-298         | 2082                          | 0                    |
|                  | B727-100       | 329                           | 15                   |
| Trans-World      | DC-9-10        | 2                             | 0                    |
|                  | B727-100       | 242                           | 0                    |
|                  | B727-100C/QC   | 64                            | 0                    |
|                  | B727-200       | 486                           | 0                    |
|                  | B707-100B      | 227                           | 0                    |
|                  | B707-300       | 6                             | 1                    |
|                  | B707-300B      | 3                             | 0                    |
|                  | B707-300C      | 3                             | 0                    |
| Total Operations | =              | 12458                         |                      |
| B707 Operations  | =              | 480 (excluding ferry flights) |                      |

TABLE 19A

CHARTER DEPARTURES AND ARRIVALS AT HARRISBURG  
INTERNATIONAL AIRPORT, 1 APRIL THROUGH 31 DECEMBER, 1976

| <u>AIRCRAFT</u> | <u>NO. OF CHARTER STOPS</u>                  |   | <u>TOTAL (1)<br/>U.S.</u> |
|-----------------|--|---|---------------------------|
|                 | <u>U.S. CERTIFIED ROUTE<br/>AIR CARRIERS</u> | <u>U.S. SUPPLEMENTAL<br/>AIR CARRIERS</u> |                           |
| CV440           | 2  | 0   | 2                         |
| CV580           | 3  | 0   | 3                         |
| CV600           | 3  | 0   | 3                         |
| FH-227          | 10   | 0   | 10                        |
| L-188           | 0  | 13  | 13                        |
| BAC-1-11        | 5  | 0   | 5                         |
| B737-200        | 4  | 0   | 4                         |
| DC-9-30         | 21   | 0   | 21                        |
| DC-9-50         | 23   | 0   | 23                        |
| B727-100        | 20   | 0   | 20                        |
| Total "light"   | <u>91</u>                                    | <u>13</u>                                 | <u>104</u>                |
| B-707-300       | 40   | 0   | 40                        |
| B720            | 0  | 2   | 2                         |
| DC-8-30         | 0  | 9   | 9                         |
| DC-8-50         | 15   | 0   | 15                        |
| DC-8-61         | 4  | 10  | 14                        |
| DC-8-63         | 4  | 15  | 19                        |
| Total "heavy"   | <u>63</u>                                    | <u>36</u>                                 | <u>99</u>                 |

Note: (1) In addition a Canadian carrier, East Provincial Air, flew two round trips from Halifax, Nova Scotia, to Harrisburg to bring in and then out 58 passengers. The aircraft was of foreign manufacture, and is assumed "light." Hence, there were 212, i.e.,  $(104 + 2) \times 2$ , "light" operations and 198, i.e.,  $99 \times 2$ , "heavy" operations during the nine month period.

TABLE 19B

CHARTER DEPARTURES AND ARRIVALS AT HARRISBURG  
INTERNATIONAL AIRPORT, 1 JANUARY THROUGH 31 DECEMBER, 1977

| <u>AIRCRAFT</u> | <u>NO. OF CHARTER STOPS</u>                  |   | <u>TOTAL (1)<br/>U.S.</u> |
|-----------------|--|---|---------------------------|
|                 | <u>U.S. CERTIFIED ROUTE<br/>AIR CARRIERS</u> | <u>U.S. SUPPLEMENTAL<br/>AIR CARRIERS</u> |                           |
| CV440           | 9  | 0   | 9                         |
| CV580           | 4  | 0   | 4                         |
| CV600           | 14   | 0   | 14                        |
| FH227           | 2  | 0   | 2                         |
| L-188           | 0  | 2   | 2                         |
| BAC-1-11        | 6  | 0   | 6                         |
| B737-200        | 2  | 0   | 2                         |
| DC-9-10         | 1  | 0   | 1                         |
| DC-9-30         | 45   | 0   | 45                        |
| DC-9-50         | 10   | 0   | 10                        |
| B727-100        | 14   | 0   | 14                        |
| Total "light"   | <u>107</u>                                   | <u>2</u>                                  | <u>109</u>                |
| B707-300        | 32   | 0   | 32                        |
| DC-8-20         | 1  | 0   | 1                         |
| DC-8-30         | 0  | 18  | 18                        |
| DC-8-50         | 9  | 12  | 21                        |
| DC-8-61         | 9  | 30  | 39                        |
| DC-8-62         | 8  | 0   | 8                         |
| DC-8-63         | 5  | 14  | 19                        |
| L-1011          | <u>2</u>                                     | <u>0</u>                                  | <u>2</u>                  |
| Total "heavy"   | <u>66</u>                                    | <u>74</u>                                 | <u>141</u>                |

Note: (1) In addition, Canadian carriers flew four round trips from Toronto, and ALM Antillies Airlines flew two round trips from Aruba, Netherlands Antillies, none of these flights having enough passengers to require or suggest a "heavy" aircraft. Also, Japan Airlines made one stop with the cargo version of the DC-8-50. Hence, there were 230, i.e.,  $(109 = 6) \times 2$ , "light" operations and 284, i.e.,  $(141 + 1) \times 2$ , "heavy" operations.

TABLE 20 REVISED  
OPERATIONS AT HARRISBURG INTERNATIONAL AIRPORT

|   | <u>1978</u>    | <u>1977</u>    | <u>1976</u>        |
|---|----------------|----------------|--------------------|
| <u>AIR CARRIER REVENUE OPERATIONS</u>     |                |                |                    |
| <u>Scheduled</u>                          |                |                |                    |
| Heavy                                     | 482            | 206            | 190                |
| Light                                     | 11978          | 10776          | 9876               |
| <u>Non-Scheduled</u>                      |                |                |                    |
| H   | 232            | 284            | 266 <sup>(1)</sup> |
| L   | 160            | 230            | 284                |
| <u>AIR CARRIER NON-REVENUE OPERATIONS</u> |                |                |                    |
| H   | 58             | 58             | 58                 |
| L   | 936            | 1121           | 228                |
| <u>AIR TAXI-COMMUTER AIRLINES</u>         |                |                |                    |
| L   | 16531          | 17235          | 12382              |
| <u>MILITARY-ITINERANT</u>                 |                |                |                    |
| H   | 38             | 82             | 166                |
| L   | 4481           | 4368           | 3824               |
| <u>MILITARY-LOCAL</u>                     |                |                |                    |
| L   | 8985           | 8542           | 7372               |
| <u>GENERAL AVIATION-ITINERANT</u>         |                |                |                    |
| L   | 25512          | 24138          | 22783              |
| <u>GENERAL AVIATION-LOCAL</u>             |                |                |                    |
| L   | 33064          | 37250          | 25224              |
| <u>TOTAL</u>                              |                |                |                    |
| H   | 810            | 630            | 680                |
| L   | <u>101,647</u> | <u>103,656</u> | <u>81,973</u>      |
|   | 102,457        | 104,286        | 82,653             |

TABLE 20(REVISED)(Cont.)

Note (1)

ESTIMATION OF TRAFFIC FOR JANUARY-MARCH, 1976

| <u>Numbers of Charters/Month</u>                                  | <u>1977</u> | <u>1976</u> |
|---|-------------|-------------|
| Jan.  | 20          | N/A         |
| Feb.  | 27          | N/A         |
| Mar.  | 16          | N/A         |
| Apr.  | 10          | 19          |
| May   | 31          | 29          |
| June  | 19          | 18          |
| July  | 13          | 21          |
| Aug.  | 23          | 13          |
| Sept.   | 23          | 20          |
| Oct.  | 27          | 28          |
| Nov.  | 24          | 19          |
| Dec.  | <u>17</u>   | <u>25</u>   |
| Total, first quarter  | 63          | N/A         |
| Total, last three quarters  | 187         | 192         |
| $\frac{\text{First quarter}}{\text{last three quarters}} = 0.337$ |             |             |

Therefore, assume for 1976 that full year traffic is 1.34 times traffic in last three quarters.