Challenge segregation claim Challenge (b)(4) Challenge (b)(5) NTSB 15

APPENDIX: V

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DESCRIPTION OF DOCUMENT: Computer program written by NTSB staff to simulate the flight path of aircraft

Prior to joining the Safety Board, a member of the NTSB staff created a computer program to simulate the flight path of aircraft. While at the NTSB, the employee was assigned to the TWA flight 800 accident investigation team. As a part of this team, one of his assignments was to derive the flight path of the aircraft after it lost its forward fuselage.

The NTSB employee modified his existing program for this task. This program is not an off-the-shelf system. The staff member did not intend it for public use, so it is written in a format that is intuitive to him. Except for limited comments, at the time of the TWA flight 800 investigation, there was no instruction book or on-line guide for using the program. There is no hardcopy of the

simulation program, or the programming code. The simulation program combines the staff member's knowledge of mathematics and physics with mathematical models that describe the forces acting on the specific aircraft type at issue (proprietary data provided by the aircraft manufacturer) to derive the motion that results from these forces. The motion is given as estimates of velocity, position and orientation of the aircraft.

The mathematical formulations necessary for the simulation program are written in computer code, and are not separate from the remainder of the code. There currently is no standardization for simulation code, so the NTSB staff employee created the code for the formulas in a way that is intuitive to him. He cannot segregate these formulas from the program without translating the relevant parts of the code into recognized mathematical terms and extracting them from the program, thus creating a new record.

The data used in the computer program are either presented in reports in the public docket, or withheld because they have been determined to be proprietary (mathematical models that describe the forces acting on the specific aircraft type at issue). The program cannot operate without these embedded data, and these embedded

data also cannot be segregated from the program without creating a new record.

To run a specific simulation, a starting condition (airspeed, position, altitude, etc.) must be established. In the case of TWA flight 800, this information was obtained from the Flight Data Recorder (FDR) and radar data, which were the primary means of identifying the motion of the aircraft up to the center wing tank explosion and loss of the forward fuselage. The flight path simulation data derived the flight path following the loss of the forward fuselage. The Airplane Performance Study, a report describing the collection and valuation of the radar data, and the Flight Data Recorder Group Chairman Factual Report are available in the public docket and through the NTSB's website. (See Crider Declaration). The simulation also requires information on the specific configuration (such as flap setting and landing gear position) of the flight, as well as the particular aircraft's weight and center of gravity. The program also requires some basis for guiding the aircraft. In the case of TWA flight 800, this information was obtained from radar data. (See Crider Declaration).

Boeing provided the aerodynamic, mass properties and engine characteristics of the Model 747-100 aircraft in two configurations: the baseline and a hypothetical aircraft missing its front fuselage. This included data such as the thrust produced by the engines, and data to determine the coefficient of drag (the force that opposes the plane's forward movement, the opposite to thrust), the coefficient of lift (the force perpendicular to airflow that allows the plane to rise, the opposite force to gravity), and the coefficient of pitching moment (the "force" that pitches the nose up or down), which are specific to the design of the Boeing 747 aircraft. This is the proprietary information Boeing provided for the TWA flight 800 investigation. The program cannot operate without these data; thus the program is not segregable from the proprietary data.

These data provided by Boeing and employed to develop the study of the main wreckage flight path is considered by Boeing to be commercial information, the release of which would disclose to the public, including the competitors of Boeing, operational information regarding the Boeing fleet of 747 aircraft. The data contained in this program were derived and used by Boeing in other contexts to optimize the performance of its aircraft, which, as a fundamental

activity of any aircraft manufacturer, requires innumerable staff-hours and other resources. It is the understanding of the NTSB that the information contained in this document is not of the type that is customarily released by Boeing to the public. (See Declaration of Richard S. Breuhaus of The Boeing Company). According to previous input from Boeing, the release under the Freedom of Information Act (FOIA) of Boeing performance data such as that found in this document would permit a competitor to acquire valuable and highly sensitive engineering data without requiring the competitor to expend the time and money that Boeing invested in developing the data. (See Breuhaus Declaration). Given the voluntary provision of these commercial and confidential data given to the NTSB by Boeing, the fact that the data are not customarily released to the public by Boeing, and the fact that the data were not identified by the NTSB as commercial information that, for the protection of public safety, was required to be published in a report or the public docket of the NTSB, the data contained in this record were found to be confidential and exempt from release ~~under~~ the FOIA and were withheld pursuant to exemption (b)(4).

As a further consideration, public disclosure of the withheld technical data, to the extent that such release

may cause substantial harm to Boeing's competitive position, would also be likely to make Boeing reluctant to share its commercial and proprietary technical data with the NTSB in the future, which, in turn, would impair the NTSB's ability to have direct access to the technical data that is required for proper analysis and investigation in aviation accidents. Restriction of access to these data would significantly impair the NTSB's ability to complete its accident investigation work. (See Declarations of Dennis Crider and Richard S. Breuhaus of The Boeing Company). Thus, the information provided by The Boeing Company, and as imbedded within the simulation program, is being withheld pursuant to exemption (b)(4).

Further, the program has been withheld pursuant to exemption (b)(5), because the program is used to provide information which, along with other information, is utilized by the agency's decision makers in determining probable cause(s) of the accident and the safety recommendations that follow from that cause. Using this program, the flight path of the accident aircraft can be simulated, and this program may be adjusted and adapted to analyze differing versions of aerodynamic data and physical attributes of aircraft. Understanding the flight path

following the catastrophic event was expected to aid the Safety Board with the understanding of the cause(s) of the catastrophic event. Thus, the program is predecisional and deliberative in nature.

The (b)(5) exemption for the protection of deliberative process materials has always encompassed the preliminary findings and recommendations made to the decisional authority so as not to cause harm to the quality of the agency's decision-making process, and thereby the decision. The harm arising from the release of this information is that, without the protection provided by the exemption, full and frank discussion of options and opinions so vital to the decision-makers would be impossible. (See Declaration of Dennis Crider). In this instance, NTSB staff is using its engineering and professional knowledge and skills to pursue different possibilities related to the flight path of the accident aircraft. For example, as illustrated in the Main Wreckage Flight Path Study (Exhibit VII), NTSB staff explored two approaches: a flight path that rolled to the left followed by a roll to the right, or a flight path that only rolled to the left. The NTSB staff member initially presents his results to his supervisors, then the results are documented in a series of reports. In this instance, they are: Main Wreckage Path Study, a

publicly available document, has been accessible as a part of the TWA 800 public docket through the NTSB's web site at www.ntsb.gov since August of 2000. The Study is Exhibit 22C of the public docket for TWA 800. Related materials in the public docket include Exhibit 22D (Errata from the study); Exhibit 22E (Addendum I to the study); and Exhibit 22 F (Addendum II to the study). These reports are also contained in this Vaughn Index as Exhibits VI - X to the Crider Declaration. These reports are presented to the Safety Board as they determine the probable cause(s) of the accident and determine their recommendations to avoid a similar event. The five-member Safety Board is the ultimate decision-maker as to the probable cause(s) of an accident, and the safety recommendations that follow from that cause, including such options as altering maintenance of systems, training of personnel, or construction of systems so as to prevent future accidents.

Taking into consideration the predecisional and deliberative nature of this record, the program was properly withheld pursuant to exemption (b)(5) of the FOIA.