ADVISORY CIRCULAR

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Advisory Circular

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Subject: CRITERIA FOR OPERATIONAL APPROVAL OF AIRBORNE WIND SHEAR ALERTING AND FLIGHT GUIDANCE SYSTEMS

1. PURPOSE. This advisory circular establishes an acceptable means, but not the only means, of obtaining operational approval of an airborne wind shear alerting and flight guidance system. It describes acceptable simulation test criteria, wind field modeling data, and minimum performance parameters for evaluating candidate systems.

2. FOCUS. The criteria contained in this advisory circular are applicable to operators holding operating certificates issued under Parts 121, 125, and 135 of the Federal Aviation Regulations.

3. BACKGROUND.

a. Since July 1973 there have been 10 U.S. air carrier accidents attributed to encounters with severe low-level wind shear during terminal area flight operations. From 1964 to 1976 there were 25 transport category airplane takeoff or approach-and-landing accidents in which low-level wind shear was a possible causal factor. Investigative studies concerning some of these accidents, as well as other efforts designed to characterize wind shear and document its influence on pilot/aircraft performance and control, have increased awareness of the potential hazard posed by low-level wind shear in the airport terminal area.

b. The Federal Aviation Administration (FAA) research and

development investigations into wind shear causation and potential solutions have taken a threefold approach to the problem: (1) development and implementation of improved forecasting techniques and procedures for predicting and reporting low-level wind shear in the terminal area, (2) placement of wind shear detection equipment on the ground and transmitting the information to the pilot, (3) installation of airborne wind shear alerting and flight guidance equipment, or

detection and avoidance equipment, to provide the pilot with "real time" information if a wind shear phenomena is encountered. Implementation of improved forecasting techniques and ground-based low-level wind shear detection equipment affords the flightcrew the advantage of environmental awareness on which sound operational decisions can be predicated. Utilization of airborne devices will enhance safety to even a greater margin over that which is provided by forecasting techniques, and the ground-based detection equipment by affording the pilot early, reliable recognition of the wind shear phenomena, and providing a means by which the pilot can utilize all remaining performance capability, if required, to safely exit any shear inadvertently encountered. In combination, this approach to solving the wind shear hazard in the terminal area will provide flightcrews with both preflight information and inflight information to help them cope with the low-level wind shear phenomena.

4. DEFINITIONS. The following definitions are applicable to this advisory circular.

a. Airborne Wind Shear Alerting System. A device or system which identifies the presence of wind shear once the phenomena is encountered. An alerting device of this type does not provide guidance information to the pilot to satisfy the criteria for alerting and flight guidance systems.

b. Airborne Wind Shear Alerting and Flight Guidance System. A device or system which identifies the presence of a severe wind shear phenomena and provides the pilot with timely alert and adequate flight guidance for the following:

(1) Approach/Missed Approach. To permit the aircraft to be flown using the maximum performance capability available without inadvertent loss of control, stall, and without ground contact.

(2) Takeoff and Climbout. To permit the aircraft to be flown during the initial or subsequent climb segments using the maximum performance capability available without inadvertent loss of control or ground contact with excess energy still available.

c. Airborne Wind Shear Detection and Avoidance System. A device or system which detects a potentially severe wind shear phenomena far enough in advance of the encounter in both the takeoff/climbout profile and the approach/landing profile to allow the pilot to successfully avoid the phenomena and thereby alleviate a flight hazard.

d. Severe Wind Shear. A wind shear of such intensity and

duration which would exceed the performance capability of a particular aircraft type, and cause inadvertent loss of control or ground contact if the pilot did not have information available from an airborne wind shear alerting and flight guidance system which meets the criteria of paragraph 4b.

e. Proof-of-Concept Testing. Proof-of-concept testing is defined as a generic demonstration in a full operational environment of facilities, weather, crew complement, aircraft systems, environmental systems, and any other relevant parameters necessary to show concept validity in terms of performance, system reliability, repeatability, and typical pilot response to failure as well as to demonstrate that an equivalent level of safety is provided. Proof-of-concept may be established by a combination of analysis, simulation, and/or flight demonstrations in an operational environment.

5. SCOPE. This advisory circular describes three types of airborne wind shear systems: (1) alerting systems, (2) alerting and flight guidance systems, and (3) detection and avoidance systems. The criteria outlined in this document are proposed for operational approval of alerting and flight guidance systems. These criteria are designed to permit acceptance of concepts which provide alerting of the presence of wind shear, and guidance to the pilot which will enable him to maximize the remaining performance capability of his aircraft in an effort to safely exit the shear. These criteria are intended to be sufficiently comprehensive to encourage the use of an airborne wind shear alerting and flight guidance system to enhance flight safety without unduly restricting technical innovations, or limiting the integration of existing aircraft equipment as airborne wind shear alerting devices. Although current technology does not permit a description of detailed criteria for testing and operational approval of detection and avoidance systems at this time, the agency encourages industry to develop such technology to provide flightcrews with "predictive" wind shear information so that potentially hazardous encounters can be detected and avoided.

6. SYSTEM APPROVAL. The type of airborne wind shear alerting and flight guidance system which may be considered for operational approval in accordance with the criteria in this advisory circular is not limited to a specific system or specific type of system. Operational approval may be granted to any system which meets the objectives of this advisory circular and provides the alerting and flight guidance capabilities described in paragraph 4b, or any system for which "proof-of-concept

testing" has demonstrated an equivalent level of safety.

7. TEST METHODS. One acceptable method for evaluation of an airborne wind shear alerting and flight guidance system is in a simulator specifically approved for this purpose by the FAA and piloted by company line crewmembers. The following is provided as an acceptable means of obtaining operational approval for the candidate wind shear system. Tests should be conducted to demonstrate the effectiveness of the proposed system, or combination of systems, and pilot procedures to successfully alleviate the hazardous effects of "severe" wind shear during takeoff and landing. Since operation in hazardous wind shear conditions must be evaluated, ground-based piloted simulation is the safest means of demonstrating compliance. Inflight tests may be acceptable if an airborne evaluation can be conducted using suitable precautions necessary to safeguard the test aircraft and crew and still provide the necessary data to demonstrate compliance with the criteria in this advisory circular.

a. Simulator Equipment. Simulators used for system qualification should be specifically approved for this purpose by the FAA's National Simulator Evaluation Team. These simulators should be capable of representing the essential parameters related to evaluating the proposed wind shear system's effectiveness. The simulator should be capable of full mission, pilot-in-the-loop simulation, with appropriate visual systems, instrumentation, recording systems, and appropriate dynamic modeling of the wind shear conditions to be encountered. Simulators approved for this purpose must meet or exceed all basic performance required of Phase I equipment (refer to AC 120-40, Airplane Simulator and Visual System Evaluation). Alternatives to ground-based simulation must consider and account for all factors listed above. Testing should be specific by aircraft type unless the applicant can show that one satisfactory test set can be extended to a similar type aircraft with equal or better effectiveness. Differences in related systems, flight dynamics, and aircraft specific procedures should be accounted for.

b. Recording Parameters. The applicant should provide data in graphic or tabular form for each test run and statistical summaries of the tests including: wind shear conditions used, flightpath records, touchdown dispersions, vertical speed, aircraft heading and altitude, power settings, aircraft configurations, visibility and ceiling conditions, and other relevant parameters which may be necessary to evaluate the particular system in question.

c. "Severe" Wind Field Profiles. Severe wind fields, as defined in paragraph 4d, are those which would exceed the total performance capability of a specific airframe and powerplant combination, unless timely alerting warns the pilot of the presence of wind shear and adequate flight guidance is available which would allow the pilot to maneuver the aircraft using the maximum performance available without inadvertent loss of control or stall.

(1) The profiles may either be derived using aircraft manufacturer performance data for the particular aircraft on which the approval will take place, or selected from those profiles in Appendix 1 which meet the definition of "severe" in paragraph 4d for the aircraft on which the equipment will be evaluated.

(2) The profiles which are presented in Appendix 1 are not necessarily representative of "severe" wind shear values for any particular type of aircraft, but are included as samples of wind field profile format acceptable as a method of developing specific types of wind shear for a particular aircraft and powerplant combination. These wind fields have been generated based on actual data measured and recorded during wind tower collection efforts and from known accident scenarios. They are represented in three-dimensional geometry, except for the turbulence data which is presented as a function of altitude alone. Further research is currently being performed in the area of wind field modeling and it is anticipated that models specific to particular types of aircraft and engine combinations will be available in the future. Appendix 1 will be updated as that information becomes available.

8. TEST SCENARIOS. The scenarios used for these tests should represent realistic operating environments expected to be encountered in line service. The tests should account for the fact that wind shear encounters are rare and should be designed to remove any training bias which might occur because of crew exposure to repeated severe wind shear profiles in a short period of time. For example, it can be expected that crews would anticipate a severe wind shear and develop an unrealistically high degree of proficiency with the proposed system in an evaluation in which a large number of severe wind shear encounters occur in one simulation period. In contrast, in actual service, the wind shear encounter may be unexpected and the crew may not have had the occasion to use the wind shear system since the last period of recurrent training. The result of such a biased test is likely to cause an apparent increase in effectiveness of the proposed system either because of anticipation or unrealistic levels of proficiency.

9. TEST CREWS. Pilots used in the evaluation should consist of appropriately rated and current pilots representative of those used by an air carrier in line service. A sufficient number of crews should be used to ensure that the results are representative of typical line pilot performance and are not biased by a select group.

10. FAA EVALUATIONS. Test time should be made available for air carrier operations inspectors representing the Director of Flight Operations to participate in the evaluation and make recommendations.

11. TEST CRITERIA. For operational approval of an airborne wind shear alerting and flight guidance system, the evaluation must conclusively demonstrate the capability of a candidate to alert

the pilot of severe wind shear conditions and provide the pilot with adequate flight guidance to safely transit or avoid the hazardous conditions. These tests should be conducted during the takeoff, climbout, approach, and landing phases of flight and should evaluate the system's performance in severe wind shear conditions which represent a realistic variation of turbulence, ceiling, visibility, and other relevant conditions expected in line service.

a. Takeoff and Climbout. During takeoff phase tests for an airborne wind shear alerting and flight guidance system, in severe wind shear conditions, the system should provide the pilot sufficient information to permit the aircraft to be flown during initial or subsequent climb segments using the maximum performance capability available without inadvertent loss of control, stall, or ground contact with excess energy still available.

b. Approach and Landing.

(1) During landing phase tests for an airborne wind shear altering and flight guidance system, in severe wind shear conditions, the system should alert the pilot to the presence of a severe wind shear when sufficient performance still remains to successfully accomplish a go-around.

(2) The system should provide sufficient information to the flightcrew during a go-around to allow the aircraft to be flown using the maximum performance capability available to avoid ground contact and to climb out of the wind shear condition in a flight attitude that would preclude an aerodynamic stall.

12. APPROVAL.

a. Operational approval for the use of an airborne wind shear alerting and flight guidance system will be made by the Director of Flight Operations (AFO-1) after the system receives supplemental type certificate (STC) airworthiness approval from the appropriate engineering and manufacturing office.

b. Operational approval of a new airborne wind shear alerting and flight guidance system will be based upon the criteria contained in this advisory circular. Approvals of modified wind shear systems (version of systems previously approved), application of approved systems to similar types of classes of aircraft, and air carriers using similar equipment previously approved may be based upon some or all of the following: limited flight evaluation, simulation, analysis, and equivalence to the similar system already approved.

c. Applicants desiring operational approval of an airborne wind shear alerting and flight guidance system should submit an application containing the following material to the appropriate FAA certificate-holding district office.

(1) Evidence of an FAA airworthiness (STC) approval of

the system to be operationally evaluated including a description of the system installation.

(2) A description of the test methods and wind profiles to be utilized during the evaluation scenarios.

(3) Evidence of capability to comply with paragraph 7a.

d. The principal operations inspector responsible for the applicant's operating certificate should review the application to ensure that the proposed evaluation program meets the general criteria of this advisory circular. The application should then be forwarded through the regional Flight Standards Division to the Office of Flight Operations, AFO-1, for further action.

/s/ Kenneth S. Hunt

Director of Flight Operations

APPENDIX 1. WIND FIELD DEFINITION AND GENERATION

1. ABSTRACT. This appendix details wind shear data that has been used by the Federal Aviation Administration (FAA) for conducting aircraft simulations of wind shear encounters. The data presented is not necessarily representative of "severe" wind shear profiles for any specific type of aircraft, but are included so that interested parties may use the same format in formulating their own wind field for the purpose of obtaining operational approval of an airborne wind shear alerting and flight guidance system, or a detection and avoidance system. Mean wind (longitudinal, lateral, and vertical) data, in knots, is a function of altitude and distance from the glidepath intercept point (in feet); Dryden turbulence data is a function of altitude only. Methods for using the data are also outlined. An explanation of the salient features of the wind field geometry is also included.

2. INTRODUCTION.

a. The wind fields listed in Appendices 2 through 7 are functions of both distance from the glidepath intercept point (GPIP) and altitude. The spacing between each altitude and distance point is not uniform and is not necessarily the same from one wind field to the next. The reason for using nonuniform spacing is to minimize the storage requirements for the data base, without compromising the wind shear rate information. (Note: If uniform spacing of the wind fields is necessary, then the grid spacing should collocate with the spacing of the data bases in Appendices 2 through 7.) At each distance and altitude there are three mean windspeeds (longitudinal, lateral, and vertical--u, v, and w).

b. At the end of Appendices 2 through 7 is the turbulence table for each wind field. The turbulence data is only a function of altitude. The altitude spacing is not uniform, nor does it correspond to the associated mean wind altitude spacing. The turbulence data at each altitude point includes the root-

mean-squared (RMS) Dryden turbulence intensities and the Dryden turbulence scale lengths.

3. COMPUTING THE MEAN WINDS.

a. Mean windspeeds (u, v, and w) can be linearly interpolated given an aircraft position referenced to the intended touchdown point (the GPIP).

b. If an aircraft's position is outside the limits of the particular wind field, then an extrapolation is not used. Instead, the data closest to the given position is used.

Table 1. Distance Index

Number	Distance from GPIP (+ past/- before) (feet)
1	+40,000
2	0
3	-2,000
4	-4,000
5	-6,000
6	-8,000
7	-9,000
8	-10,000
9	-11,000
10	-12,000
11	-13,000
12	-14,000
13	-16,000
14	-40,000

Using Wind Field 10 (Appendix 7) as an example, the distance indices are shown in Table. 1. If an aircraft distance point is 30,000 feet in front of the GPIP, then the windspeeds versus altitude is interpolated between 13 and 14 from Table 1. If the distance exceeds the boundary (i.e., greater than 40,000 feet or less than -40,000 feet), then the data will be used as if it were at those distance points. For example, if an aircraft is 10 nautical miles (approximately 60,000 feet) in front of the GPIP, then the data at -40,000 feet should be used.

c. The altitude vectors are determined in a similar manner. The altitude indices for Wind Field 10 (Appendix 7) are shown in Table 2.

Table 2. Altitude Index

Number	Height Above Runway (feet)
1	1,500
2	1,200
3	800
4	650
5	550
6	450
7	350

8	250
9	150
10	20

d. Using Wind Field 10 (Appendix 7), consider the case of an aircraft at 30,000 feet in front of the GPIP and at an altitude of 1,000 feet above the runway height. The first step is to define the boundaries to interpolate the three wind components. The boundaries for this case are between -16,000 and -40,000 feet distance (numbers 13 and 14 in Table 1), and 1,200 and 800 feet altitude (numbers 2 and 3 in Table 2). Finally, interpolate the three wind components with respect to the boundaries.
In extreme cases, for example, an aircraft 60,000 feet in front of the GPIP, at an altitude of 2,000 feet, the data is used at -40,000 feet distance (number 14 in Table 1) and 1,500 feet altitude (number 1 in Table 2).

Table 3. Dryden Turbulence Filters

$$Fu(S) = SIGMAu * SQRT\left(\frac{TAUu}{PI}\right) * \frac{1}{(1+TAUu*S)}$$

$$Fv(S) = SIGMAv * SQRT\left(\frac{TAUv}{PI2}\right) * \frac{(1+SQRT3*TAUv*S)}{(1+TAUv*s)*(1+TAUv*S)}$$

$$Fw(S) = SIGMAw * SQRT\left(\frac{TAUw}{PI2}\right) * \frac{(1+SQRT3*TAUw*S)}{(1+TAUw*S)*(1+TAUw*S)}$$

where:

SIGMAu, SIGMAv, SIGMAw are the RMS intensities;

TAUu = Lu/VA;

TAUv = Lv/VA;

TAUw = Lw/VA;

Lu, Lv, Lw are the turbulence scale lengths;

VA is the aircraft's true airspeed;

PI = 3.1415926535;

PI2 = 6.2831853070 (2 times PI);

SQRT3 = 1.732050808 (square root of 3); and

S is the Laplace transform variable.

The turbulence data is provided at the end of Appendices 2 through 7, and lists SIGMAu, SIGMAv, SIGMAw, Lu, Lv, and Lw versus altitude. If the aircraft's altitude is outside the bounds of the turbulence list, then the data at the boundary is used. As with the mean winds, extrapolation is not to be used.

5. DATA TO BE MADE AVAILABLE FOR REVIEW.

a. The following items will be made available for each simulated approach made through any wind field:

(1) Altitude vs. time;

(2) Distance from the GPIP vs. time;

(3) u, v, and w vs. time (mean windspeeds, including turbulence);

(4) The partial derivatives of u, v, and w with respect to altitude vs. time;

(5) The partial derivatives of u, v, and w with respect to distance vs. time; and

(6) The partial derivatives of u, v, and w with respect to time vs. time.

b. Items a(4), a(5), and a(6) are the partial derivatives of the mean windspeeds before turbulence has been added; items a(4) and a(5) are terms that are used to interpolate for the specific windspeeds. Item a(6) can be found by taking item a(4) multiplied by the rate of descent and added to item a(5) multiplied by the groundspeed.

6. INDEX. The following list shows the titles for Appendices 2 through 7. The numbering of the "wind field" represents the labels used by the FAA during its wind shear research and development program. Wind fields 1, 2, 3, and 5 are considered obsolete and are not included.

a. Wind Field 4 (Appendix 2) - Pages 1-7

b. Wind Field 6 (Appendix 3) - Pages 1-6

c. Wind Field 7 (Appendix 4) - Pages 1-7

d. Wind Field 8 (Appendix 5) - Pages 1-7

e. Wind Field 9 (Appendix 6) - Pages 1-7

f. Wind Field 10 (Appendix 7) - Pages 1-6

Wind Field 4

12,900.0 feet beyond the GPIP

	Mean Winds (Knots)		
Altitude (feet)	Longitudinal	Lateral	Vertical

0.00	12.50	0.00	0.00
75.00	12.50	0.00	0.00
100.00	12.50	0.00	0.00
150.00	12.50	0.00	0.00
200.00	12.50	0.00	0.00
300.00	12.50	0.00	0.00
400.00	12.50	0.00	0.00
500.00	12.50	0.00	0.00
600.00	12.50	0.00	0.00
700.00	12.50	0.00	0.00
800.00	12.50	0.00	0.00
1500.00	12.50	0.00	0.00

10,500.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-7.00	0.00	0.00
75.00	-7.00	0.00	0.00
100.00	-7.00	0.00	0.00
150.00	-6.00	0.00	0.00
200.00	-5.00	0.00	0.00
300.00	-4.00	0.00	0.00
400.00	-2.00	0.00	0.00
500.00	-1.00	0.00	0.00
600.00	0.00	0.00	0.00
700.00	2.00	0.00	0.00
800.00	5.00	0.00	0.00
1500.00	5.00	0.00	0.00

9,500.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-27.50	0.00	0.00
75.00	-27.50	0.00	0.00
100.00	-27.50	0.00	0.00
150.00	-26.00	0.00	0.00
200.00	-24.00	0.00	0.00
300.00	-20.00	0.00	0.00
400.00	-17.00	0.00	0.00
500.00	-13.00	0.00	0.00
600.00	-9.00	0.00	0.00
700.00	1.00	0.00	0.00
800.00	5.00	0.00	0.00
1500.00	5.00	0.00	0.00

9,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-27.50	0.00	0.00
75.00	-27.50	0.00	0.00
100.00	-27.50	0.00	0.00
150.00	-25.50	0.00	0.00
200.00	-24.00	0.00	0.00
300.00	-20.00	0.00	0.00
400.00	-16.00	0.00	0.00
500.00	-13.00	0.00	0.00
600.00	-9.00	0.00	0.00
700.00	-1.00	0.00	0.00
800.00	5.00	0.00	0.00
1500.00	5.00	0.00	0.00

3,500.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-27.00	0.00	0.00
75.00	-27.00	0.00	0.00
100.00	-27.00	0.00	0.00
150.00	-27.00	0.00	0.00
200.00	-27.00	0.00	0.00
300.00	-24.00	0.00	0.00
400.00	-23.00	0.00	0.00
500.00	-18.50	0.00	0.00
600.00	-9.00	0.00	0.00
700.00	-1.00	0.00	0.00
800.00	5.00	0.00	0.00
1500.00	5.00	0.00	0.00

1,500.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-27.50	0.00	0.00
75.00	-27.50	0.00	0.00
100.00	-27.50	0.00	0.00
150.00	-27.50	0.00	0.00
200.00	-24.00	0.00	0.00
300.00	-19.00	0.00	0.00
400.00	-15.00	0.00	0.00
500.00	-8.00	0.00	0.00
600.00	-4.00	0.00	0.00
700.00	-1.00	0.00	0.00
800.00	5.00	0.00	0.00
1500.00	5.00	0.00	0.00

500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-3.00	0.00	0.00
75.00	-3.00	0.00	-5.90
100.00	-3.00	0.00	-8.90
150.00	-5.00	0.00	-11.90
200.00	-8.00	0.00	-11.90
300.00	7.00	0.00	-11.90
400.00	7.50	0.00	-11.90
500.00	8.00	0.00	-11.90
600.00	9.00	0.00	-11.90
700.00	9.00	0.00	-11.90
800.00	10.00	0.00	-11.90
1500.00	10.00	0.00	-11.90

1,500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-7.00	0.00	0.00
75.00	-7.00	0.00	-5.90
100.00	-6.00	0.00	-8.90
150.00	-5.00	0.00	-11.90
200.00	0.00	0.00	-11.90
300.00	7.50	0.00	-11.90
400.00	9.00	0.00	-11.90
500.00	10.00	0.00	-11.90
600.00	10.00	0.00	-11.90
700.00	10.00	0.00	-11.90
800.00	11.00	0.00	-11.90
1500.00	11.00	0.00	-11.90

2,500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	20.00	0.00	0.00
75.00	20.00	0.00	-5.90
100.00	20.00	0.00	-8.90
150.00	20.00	0.00	-11.90
200.00	25.00	0.00	-11.90
300.00	12.00	0.00	-11.90
400.00	12.00	0.00	-11.90
500.00	12.00	0.00	-11.90
600.00	12.00	0.00	-11.90
700.00	12.00	0.00	-11.90
800.00	12.00	0.00	-11.90
1500.00	12.00	0.00	-11.90

3,500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	36.00	0.00	0.00
75.00	36.00	0.00	-5.90
100.00	36.00	0.00	-8.90
150.00	36.00	0.00	-11.90
200.00	36.00	0.00	-11.90
300.00	25.00	0.00	-11.90
400.00	21.00	0.00	-11.90
500.00	18.00	0.00	-11.90
600.00	17.00	0.00	-11.90
700.00	16.00	0.00	-11.90
800.00	14.00	0.00	-11.90
1500.00	14.00	0.00	-11.90

4,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	41.00	0.00	0.00
75.00	41.00	0.00	-5.90
100.00	41.00	0.00	-8.90
150.00	40.00	0.00	-11.90
200.00	39.00	0.00	-11.90
300.00	30.00	0.00	-11.90
400.00	25.00	0.00	-11.90
500.00	22.00	0.00	-11.90
600.00	20.00	0.00	-11.90
700.00	18.00	0.00	-11.90
800.00	16.00	0.00	-11.90

1500.00	16.00	0.00	-11.90

6,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	53.00	0.00	0.00
75.00	53.00	0.00	0.00
100.00	53.00	0.00	0.00
150.00	53.00	0.00	0.00
200.00	50.00	0.00	0.00
300.00	45.00	0.00	0.00
400.00	40.00	0.00	0.00
500.00	35.00	0.00	0.00
600.00	30.00	0.00	0.00
700.00	25.00	0.00	0.00
800.00	20.00	0.00	0.00
1500.00	20.00	0.00	0.00

7,500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	53.00	0.00	0.00
75.00	53.00	0.00	0.00
100.00	53.00	0.00	0.00
150.00	53.00	0.00	0.00
200.00	53.00	0.00	0.00
300.00	49.00	0.00	0.00
400.00	47.50	0.00	0.00
500.00	43.00	0.00	0.00
600.00	34.00	0.00	0.00
700.00	25.50	0.00	0.00
800.00	20.00	0.00	0.00
1500.00	20.00	0.00	0.00

12,500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	53.00	0.00	0.00
75.00	53.00	0.00	0.00
100.00	53.00	0.00	0.00
150.00	51.00	0.00	0.00
200.00	48.00	0.00	0.00
300.00	46.00	0.00	0.00
400.00	42.00	0.00	0.00
500.00	38.00	0.00	0.00

600.00	34.00	0.00	0.00
700.00	25.50	0.00	0.00
800.00	20.00	0.00	0.00
1500.00	20.00	0.00	0.00

14,500.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	35.00	0.00	0.00
75.00	35.00	0.00	0.00
100.00	35.00	0.00	0.00
150.00	34.00	0.00	0.00
200.00	33.00	0.00	0.00
300.00	32.00	0.00	0.00
400.00	28.50	0.00	0.00
500.00	27.50	0.00	0.00
600.00	25.00	0.00	0.00
700.00	22.00	0.00	0.00
800.00	20.00	0.00	0.00
1500.00	20.00	0.00	0.00

17,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	12.50	0.00	0.00
75.00	12.50	0.00	0.00
100.00	12.50	0.00	0.00
150.00	12.50	0.00	0.00
200.00	12.50	0.00	0.00
300.00	12.50	0.00	0.00
400.00	12.50	0.00	0.00
500.00	12.50	0.00	0.00
600.00	12.50	0.00	0.00
700.00	12.50	0.00	0.00
800.00	12.50	0.00	0.00
1500.00	12.50	0.00	0.00

Wind Field 4

Dryden Turbulence Data

Altitude (feet)	Rms Intensities (Kts)			Scale Lengths (feet)		
	Long	Lat	Vert	Long	Lat	Vert
20.00	3.40	2.70	2.34	105.70	49.70	10.40
100.00	4.05	3.46	3.53	216.70	134.20	53.00
200.00	4.43	3.95	4.35	306.50	213.50	106.00

400.00	4.85	4.50	5.36	433.50	339.60	212.00
600.00	5.11	4.86	6.05	530.90	445.60	318.00
1500.00	5.74	5.78	7.94	840.90	824.50	795.30

Wind Field 6

40,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-16.90	3.00	0.00
150.00	-19.40	7.50	-0.20
250.00	-20.10	8.00	-0.70
350.00	-23.60	9.00	2.20
450.00	-20.80	10.00	14.70
550.00	-26.70	11.00	-9.70
650.00	-13.50	12.00	-9.70
800.00	-4.60	12.80	-6.50
1200.00	-4.00	11.20	-3.30
1500.00	-4.80	10.00	-3.40

5,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-16.90	3.00	0.00
150.00	-19.40	7.50	-0.20
250.00	-20.10	8.00	-0.70
350.00	-23.60	9.00	2.20
450.00	-20.80	10.00	14.70
550.00	-26.70	11.00	-9.70
650.00	-13.50	12.00	-9.70
800.00	-4.60	12.80	-6.50
1200.00	-4.00	11.20	-3.30
1500.00	-4.80	10.00	-3.40

3,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-15.50	3.00	0.00
150.00	-20.30	7.50	-0.40
250.00	-21.40	8.00	-2.50
350.00	-23.80	9.00	-1.10
450.00	-26.60	10.00	-2.50
550.00	-26.00	11.00	-8.00
650.00	-23.50	12.00	-12.90
800.00	-5.60	12.80	-7.70

1200.00	-3.10	11.20	-7.40
1500.00	-2.30	10.00	-6.10

1,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-13.20	3.00	0.00
150.00	-19.90	7.50	0.00
250.00	-22.20	8.00	-3.60
350.00	-20.80	9.00	-6.00
450.00	-25.60	10.00	0.00
550.00	-28.40	11.00	0.00
650.00	-23.10	12.00	-11.40
800.00	-9.10	12.80	-10.90
1200.00	-2.70	11.20	-8.40
1500.00	-2.40	10.00	-9.00

1,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-5.50	3.00	0.00
150.00	-9.90	7.50	-0.90
250.00	-10.40	8.00	-6.10
350.00	-10.40	9.00	-17.90
450.00	-11.10	10.00	-27.70
550.00	-7.00	11.00	-30.60
650.00	-4.10	12.00	-27.00
800.00	0.00	12.80	-16.60
1200.00	0.00	11.20	-14.80
1500.00	0.00	10.00	-14.80

3,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	5.50	3.00	0.00
150.00	9.90	7.50	-0.90
250.00	10.40	8.00	-6.10
350.00	10.40	9.00	-17.90
450.00	11.10	10.00	-27.70
550.00	7.00	11.00	-30.60
650.00	4.10	12.00	-27.70
800.00	0.00	12.80	-16.60
1200.00	0.00	11.20	-14.80
1500.00	0.00	10.00	-14.80

4,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	11.90	3.00	0.00
150.00	17.50	7.50	-0.70
250.00	18.80	8.00	-6.10
350.00	20.80	9.00	-10.30
450.00	18.80	10.00	-12.30
550.00	17.40	11.00	-24.00
650.00	6.20	12.00	-24.60
800.00	5.60	12.80	-13.40
1200.00	2.40	11.20	-14.00
1500.00	1.50	10.00	-12.30

5,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	13.20	3.00	0.00
150.00	19.90	7.50	0.00
250.00	22.20	8.00	-3.60
350.00	20.80	9.00	-6.00
450.00	25.60	10.00	0.00
550.00	28.40	11.00	0.00
650.00	23.10	12.00	-11.40
800.00	9.10	12.80	-10.90
1200.00	2.70	11.20	-8.40
1500.00	2.40	10.00	-9.00

6,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	14.50	3.00	0.00
150.00	20.80	7.50	-0.40
250.00	21.50	8.00	-2.60
350.00	23.10	9.00	-4.10
450.00	29.00	10.00	2.30
550.00	28.40	11.00	0.00
650.00	25.40	12.00	11.90
800.00	7.80	12.80	9.70
1200.00	3.20	11.20	8.90
1500.00	2.40	10.00	7.00

7,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical

20.00	15.50	3.00	0.00
150.00	20.30	7.50	-0.40
250.00	21.40	8.00	-2.50
350.00	23.80	9.00	-1.10
450.00	26.60	10.00	2.50
550.00	26.00	11.00	-8.00
650.00	23.50	12.00	-12.90
800.00	5.60	12.80	-7.70
1200.00	3.10	11.20	-7.40
1500.00	2.30	10.00	-6.10

8,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	16.80	3.00	0.00
150.00	20.10	7.50	-0.20
250.00	20.80	8.00	-0.90
350.00	23.80	9.00	0.00
450.00	25.50	10.00	6.00
550.00	25.30	11.00	-12.90
650.00	20.80	12.00	-12.90
800.00	4.90	12.80	-8.10
1200.00	3.30	11.20	-5.60
1500.00	6.10	10.00	-4.40

9,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	16.90	3.00	0.00
150.00	19.40	7.50	-0.20
250.00	20.10	8.00	-0.70
350.00	23.60	9.00	2.20
450.00	20.80	10.00	14.70
550.00	26.70	11.00	-9.70
650.00	13.50	12.00	-9.70
800.00	4.60	12.80	-6.50
1200.00	4.00	11.20	-3.30
1500.00	4.80	10.00	-3.40

11,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	17.10	3.00	0.00
150.00	19.30	7.50	0.00
250.00	20.00	8.00	-0.20
350.00	23.20	9.00	2.20
450.00	26.60	10.00	-2.50

550.00	17.80	11.00	-4.40
650.00	15.60	12.00	-3.00
800.00	6.60	12.80	-1.90
1200.00	6.10	11.20	-1.50
1500.00	5.80	10.00	-0.90

50,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	9.60	3.00	0.00
150.00	19.10	7.50	0.00
250.00	20.10	8.00	0.00
350.00	22.90	9.00	0.00
450.00	26.70	10.00	0.00
550.00	19.00	11.00	0.00
650.00	15.80	12.00	0.00
800.00	7.00	12.80	0.00
1200.00	6.50	11.20	0.00
1500.00	6.00	10.00	0.00

Wind Field 6

Dryden Turbulence Data

Altitude (feet)	Rms Intensities (Kts)			Scale Lengths (feet)		
	Long	Lat	Vert	Long	Lat	Vert
20.00	3.40	2.70	2.34	105.70	49.70	10.40
100.00	4.05	3.46	3.53	216.70	134.20	53.00
200.00	4.43	3.95	4.35	306.50	213.50	106.00
400.00	4.85	4.50	5.36	433.50	339.60	212.00
600.00	5.11	4.86	6.05	530.90	445.60	318.00
1500.00	5.74	5.78	7.94	840.90	824.50	795.30

Wind Field 7

50,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	10.69	4.86	0.00
164.04	11.66	3.89	0.39
328.08	12.24	2.92	1.94
492.12	12.63	0.58	2.92
656.17	13.22	-0.49	3.89
820.21	14.58	-1.94	5.83
984.25	13.02	-3.89	7.39

1148.29	12.44	-4.28	7.97
1312.33	12.44	-4.28	7.77
1476.37	12.44	-4.47	6.80
1640.42	12.24	-4.47	5.83

4,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	10.69	4.86	0.00
164.04	11.66	3.89	0.39
328.08	12.24	2.92	1.94
492.12	12.63	0.58	2.92
656.17	13.22	-0.49	3.89
820.21	14.58	-1.94	5.83
984.25	13.02	-3.89	7.39
1148.29	12.44	-4.28	7.97
1312.33	12.44	-4.28	7.77
1476.37	12.44	-4.47	6.80
1640.42	12.24	-4.47	5.83

2,633.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	9.23	7.09	0.00
164.04	10.92	5.54	-0.39
328.08	12.63	3.41	-1.85
492.12	12.50	0.29	-2.14
656.17	15.69	-0.19	-2.04
820.21	16.04	-3.40	-2.92
984.25	15.94	-3.98	-3.30
1148.29	15.49	-4.18	-3.89
1312.33	15.49	-5.54	-4.08
1476.37	14.89	-6.12	-4.08
1640.42	14.81	-6.51	-4.08

1,266.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	3.89	7.77	0.00
164.04	5.25	7.19	0.00
328.08	8.75	3.89	-0.39
492.12	12.38	0.97	-0.68
656.17	15.55	0.00	0.78
820.21	18.46	-2.33	0.97

984.25	20.41	-3.89	1.17
1148.29	20.60	-5.05	1.94
1312.33	20.41	-6.80	2.14
1476.37	19.83	-7.77	2.33
1640.42	18.46	-9.14	2.33

101.1 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	10.69	7.77	0.00
164.04	11.72	6.51	-0.37
328.08	12.63	4.47	-1.94
492.12	12.24	3.50	-2.92
656.17	15.55	2.62	-3.11
820.21	13.61	0.58	-5.83
984.25	13.02	-1.94	-6.03
1148.29	12.63	-4.28	-5.83
1312.33	12.24	-6.51	-4.28
1476.37	13.90	-8.94	-4.08
1640.42	8.36	-11.66	-3.89

1,468.1 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	16.52	5.64	0.00
164.04	18.56	4.66	-0.31
328.08	20.41	4.47	-1.36
492.12	19.79	4.08	-1.94
656.17	19.86	3.89	-2.14
820.21	19.71	3.30	-2.14
984.25	24.49	1.94	-1.94
1148.29	21.77	0.00	-0.74
1312.33	20.41	-2.92	-0.58
1476.37	16.52	-5.83	0.00
1640.42	14.48	-7.77	1.01

2,835.1 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	24.30	1.36	0.00
164.04	24.68	1.36	-0.23
328.08	24.68	1.26	-1.03
492.12	24.68	1.94	-0.58
656.17	24.88	1.94	0.00
820.21	24.49	1.36	0.19
984.25	24.61	0.78	0.49
1148.29	23.85	0.97	1.13
1312.33	21.87	-0.68	1.94

1476.37	20.31	-2.33	2.47
1640.42	20.60	-4.28	3.46

4,202.2 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	20.60	-2.92	0.00
164.04	21.48	-1.55	-0.17
328.08	21.48	-1.55	-0.70
492.12	23.27	-1.55	-0.41
656.17	23.27	-1.36	-0.23
820.21	22.45	-0.97	0.00
984.25	23.56	-0.58	0.00
1148.29	22.88	-0.58	0.58
1312.33	20.47	-0.97	0.72
1476.37	20.60	-1.55	1.65
1640.42	20.60	-1.94	2.57

5,569.2 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	20.60	-3.89	0.00
164.04	20.49	-3.01	-0.12
328.08	20.51	-2.62	-0.37
492.12	21.83	-1.55	-0.23
656.17	21.67	-0.68	-0.31
820.21	20.41	0.00	-0.19
984.25	20.21	0.00	-0.19
1148.29	19.38	0.10	-0.14
1312.33	18.33	0.00	0.10
1476.37	16.99	-0.29	0.19
1640.42	17.55	-0.39	0.00

6,936.2 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	19.63	-3.89	0.00
164.04	20.60	-3.50	-0.04
328.08	19.24	-2.72	-0.02
492.12	20.41	-1.36	-0.06
656.17	18.76	0.00	-0.08
820.21	18.37	0.00	1.40
984.25	17.45	0.00	0.00
1148.29	16.33	0.00	2.00
1312.33	12.83	0.00	3.89
1476.37	10.05	0.00	5.97
1640.42	6.71	-2.92	9.72

8,303.2 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	16.72	-5.54	0.00
164.04	15.10	-5.15	0.04
328.08	14.58	-4.86	1.75
492.12	10.50	-4.66	2.92
656.17	9.00	-4.28	3.89
820.21	10.15	-4.08	4.86
984.25	9.52	-4.18	5.83
1148.29	5.91	-4.28	5.93
1312.33	2.33	-4.47	6.90
1476.37	-0.97	-4.08	6.32
1640.42	-3.85	-6.51	7.00

9,670.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	12.42	-7.97	0.00
164.04	10.86	-7.19	0.14
328.08	8.75	-7.00	1.26
492.12	7.39	-6.61	2.04
656.17	3.01	-5.44	1.73
820.21	0.58	-5.44	2.92
984.25	-0.97	-5.64	1.75
1148.29	3.27	-6.22	2.14
1312.33	-3.63	-6.61	3.11
1476.37	-4.18	-6.03	2.92
1640.42	-6.06	-7.77	3.62

11,037.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	8.12	-7.58	0.00
164.04	6.63	-7.58	0.17
328.08	3.89	-7.48	0.80
492.12	4.28	-7.19	1.17
656.17	0.00	-6.22	1.07
820.21	-0.91	-6.32	0.97
984.25	-2.04	-6.71	1.34
1148.29	-3.19	-7.19	1.40
1312.33	-5.23	-7.48	1.57
1476.37	-0.14	-7.48	2.08
1640.42	-7.06	-7.77	2.78

12,404.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	3.83	-6.80	0.00
164.04	2.39	-7.19	0.10
328.08	0.97	-7.19	0.31
492.12	1.17	-7.39	0.29
656.17	-2.92	-7.00	0.41
820.21	-2.41	-7.19	0.72
984.25	-3.11	-7.39	0.93
1148.29	-3.30	-7.58	0.97
1312.33	-6.80	-7.77	1.07
1476.37	-8.26	-7.77	1.61
1640.42	-8.94	-7.97	1.94

13,771.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	0.00	-6.22	0.00
164.04	-1.22	-6.61	0.02
328.08	-1.94	-6.90	0.10
492.12	-3.34	-7.39	0.00
656.17	-5.83	-7.58	1.22
820.21	-6.16	-7.87	0.47
984.25	-7.33	-7.97	0.52
1148.29	-7.68	-7.87	0.54
1312.33	-9.72	-8.07	0.56
1476.37	-10.38	-8.07	0.84
1640.42	-10.88	-8.07	0.91

50,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	0.00	-6.22	0.00
164.04	-1.22	-6.61	0.02
328.08	-1.94	-6.90	0.10
492.12	-3.34	-7.39	0.00
656.17	-5.83	-7.58	-1.22
820.21	-6.16	-7.87	0.47
984.25	-7.33	-7.97	0.52
1148.29	-7.68	-7.87	0.54
1312.33	-9.72	-8.07	0.56
1476.37	-10.38	-8.07	0.84
1640.42	-10.88	-8.07	0.91

Wind Field 7

Dryden Turbulence Data

Altitude (feet)	Rms Intensities (Kts)	Scale Lengths (feet)

	Long	Lat	Vert	Long	Lat	Vert
20.00	3.40	2.70	2.34	105.70	49.70	10.40
100.00	4.05	3.46	3.53	216.70	134.20	53.00
200.00	4.43	3.95	4.35	306.50	213.50	106.00
400.00	4.85	4.50	5.36	433.50	339.60	212.00
600.00	5.11	4.86	6.05	530.90	445.60	318.00
1500.00	5.74	5.78	7.94	840.90	824.50	795.30

Wind Field 8

50,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	5.17	15.45	0.00
164.04	4.98	15.74	0.06
328.08	5.01	16.04	0.12
492.12	5.01	16.13	0.39
656.17	5.05	17.49	0.52
820.21	5.05	18.46	0.64
984.25	4.86	18.85	0.43
1148.29	4.86	19.05	0.64
1312.33	4.80	18.85	0.72
1476.37	5.00	18.76	0.70
1640.42	4.33	18.56	0.97

3,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	5.17	15.45	0.00
164.04	4.98	15.74	0.06
328.08	5.01	16.04	0.12
492.12	5.01	16.13	0.39
656.17	5.05	17.49	0.52
820.21	5.05	18.46	0.64
984.25	4.86	18.85	0.43
1148.29	4.86	19.05	0.64
1312.33	4.80	18.85	0.72
1476.37	5.00	18.76	0.70
1640.42	4.33	18.56	0.97

1,177.3 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical

0.00	4.94	15.35	0.00
164.04	4.74	15.55	0.21
328.08	4.90	15.94	0.49
492.12	4.90	16.91	1.55
656.17	5.05	18.85	1.54
820.21	5.05	19.63	1.94
984.25	4.86	20.21	1.11
1148.29	4.86	20.99	1.42
1312.33	4.66	20.60	1.69
1476.37	3.89	20.41	1.63
1640.42	2.74	19.83	2.39

645.5 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-3.40	17.10	0.00
164.04	-5.58	16.33	0.39
328.08	-5.25	18.17	0.86
492.12	-3.21	18.17	0.97
656.17	-2.24	20.60	2.53
820.21	-2.04	20.89	3.25
984.25	-1.46	22.06	3.11
1148.29	-0.97	23.03	3.89
1312.33	-0.97	22.16	4.96
1476.37	0.97	21.87	5.54
1640.42	1.17	20.99	5.93

2,468.2 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-22.35	23.13	0.00
164.04	-22.55	20.21	-0.14
328.08	-22.55	23.32	0.06
492.12	-18.21	22.35	-0.19
656.17	-17.63	27.21	0.52
820.21	-17.49	25.66	1.17
984.25	-22.35	27.40	0.00
1148.29	-22.35	25.85	0.97
1312.33	-22.35	27.21	1.55
1476.37	-20.41	25.07	1.94
1640.42	-18.46	23.90	3.69

4,290.9 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-21.48	27.21	0.00
164.04	-21.77	28.57	0.06
328.08	-22.02	26.82	-0.14

492.12	-22.35	27.89	-0.29
656.17	-22.55	28.47	-0.19
820.21	-22.84	29.64	-0.19
984.25	-24.20	27.60	-0.19
1148.29	-24.33	27.30	-0.10
1312.33	-24.68	26.53	0.00
1476.37	-24.06	24.59	0.00
1640.42	-24.30	23.42	0.00

6,113.7 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-21.57	39.06	0.00
164.04	-21.38	38.87	1.36
328.08	-21.87	37.50	1.94
492.12	-22.35	35.37	1.94
656.17	-23.36	34.60	1.94
820.21	-24.49	29.93	1.94
984.25	-26.04	27.79	1.85
1148.29	-27.79	27.21	1.94
1312.33	-28.82	24.30	2.14
1476.37	-30.13	23.52	1.94
1640.42	-32.59	23.52	1.94

7,936.4 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-25.07	38.97	0.00
164.04	-24.30	36.83	1.55
328.08	-25.21	34.69	3.40
492.12	-25.85	32.17	4.16
656.17	-26.98	29.06	5.89
820.21	-29.93	24.98	5.44
984.25	-29.35	22.45	5.93
1148.29	-32.85	20.51	8.36
1312.33	-34.21	18.66	6.94
1476.37	-36.35	15.84	8.36
1640.42	-38.29	13.51	8.36

9,759.1 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-22.35	27.21	0.00
164.04	-24.80	26.43	1.75
328.08	-25.66	25.66	2.92
492.12	-26.71	21.77	4.18
656.17	-27.48	17.49	5.83
820.21	-28.36	13.41	6.45

984.25	-30.36	11.66	6.80
1148.29	-31.78	10.30	5.66
1312.33	-33.53	5.83	6.80
1476.37	-34.95	3.89	6.74
1640.42	-37.41	3.10	6.47

11,581.9 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-22.16	14.58	0.00
164.04	-22.35	13.90	-0.04
328.08	-24.30	13.41	0.00
492.12	-26.24	10.39	1.03
656.17	-26.43	7.09	1.46
820.21	-26.76	6.80	1.94
984.25	-29.93	3.89	2.33
1148.29	-30.71	2.33	2.95
1312.33	-32.07	2.33	3.17
1476.37	-33.37	1.94	3.89
1640.42	-35.96	0.77	3.89

13,404.6 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-18.46	19.44	0.00
164.04	-19.30	16.13	-0.39
328.08	-21.07	13.41	-0.58
492.12	-22.74	10.69	-0.39
656.27	-24.68	7.77	0.00
820.21	-24.49	4.66	1.26
984.25	-26.34	2.53	1.50
1148.29	-26.47	-0.58	1.50
1312.33	-30.61	-3.89	1.65
1476.37	-31.43	-4.66	1.36
1640.42	-34.50	-7.77	1.36

15,227.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-15.45	17.49	0.00
164.04	-16.42	16.23	-0.04
328.08	-19.16	11.95	0.00
492.12	-20.80	8.36	0.00
656.17	-22.93	4.86	0.39
820.21	-24.43	1.94	1.09
984.25	-26.36	-0.39	1.71
1148.29	-26.61	-2.04	1.94
1312.33	-29.35	-3.89	2.33

1476.37	-29.78	-6.51	2.33
1640.42	-30.13	-7.77	2.08

17,050.1 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-14.58	13.61	0.00
164.04	-18.08	11.66	0.10
328.08	-19.30	7.77	0.19
492.12	-22.16	5.44	0.19
656.17	-22.84	2.92	0.78
820.21	-24.39	-0.19	0.39
984.25	-26.24	-1.55	0.43
1148.29	-26.74	-3.50	0.66
1312.33	-28.18	-5.25	0.97
1476.37	-28.73	-5.83	1.75
1640.42	-29.02	-7.58	1.75

18,872.8 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-20.02	11.76	0.00
164.04	-20.31	10.30	-0.19
328.08	-22.06	7.77	-0.39
492.12	-22.60	3.89	-0.39
656.17	-23.58	1.46	-0.39
820.21	-24.33	-1.10	-0.19
984.25	-24.92	-3.11	0.00
1148.29	-26.38	-4.37	0.00
1312.33	-27.02	-6.71	0.14
1476.37	-27.68	-7.29	1.17
1640.42	-27.93	-7.68	0.87

20,695.5 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-22.35	12.24	0.00
164.04	-22.55	11.66	0.00
328.08	-22.74	7.77	0.19
492.12	-22.93	3.89	0.19
656.17	-24.30	0.00	0.39
820.21	-24.30	-1.94	0.39
984.25	-26.24	-4.86	0.58
1148.29	-26.43	-5.25	0.58
1312.33	-26.63	-5.83	0.58
1476.37	-26.63	-6.22	0.58
1640.42	-26.82	-7.19	0.00

50,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-22.35	12.24	0.00
164.04	-22.55	11.66	0.00
328.08	-22.74	7.77	0.19
492.12	-22.93	3.89	0.19
656.17	-24.30	0.00	0.39
820.21	-24.30	-1.94	0.39
984.25	-26.24	-4.86	0.58
1148.29	-26.43	-5.25	0.58
1312.33	-26.63	-5.83	0.58
1476.37	-26.63	-6.22	0.58
1640.42	-26.82	-7.19	0.00

Wind Field 8

Dryden Turbulence Data

Altitude (feet)	Rms Intensities (Kts)			Scale Lengths (feet)		
	Long	Lat	Vert	Long	Lat	Vert
20.00	3.40	2.70	2.34	105.70	49.70	10.40
100.00	4.05	3.46	3.53	216.70	134.20	53.00
200.00	4.43	3.95	4.35	306.50	213.50	106.00
400.00	4.85	4.50	5.36	433.50	339.60	212.00
600.00	5.11	4.86	6.05	530.90	445.60	318.00
1500.00	5.74	5.78	7.94	840.90	824.50	795.30

Wind Field 9

50,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	13.61	-0.19	0.00
164.04	12.44	0.00	-1.75
328.08	10.69	0.00	-1.94
492.12	9.72	1.94	-2.14
656.17	9.33	3.88	-2.53
820.21	9.14	4.08	-2.92
984.25	9.14	4.08	-2.92
1148.29	8.94	4.08	-2.92
1312.33	8.94	4.08	-3.11
1476.37	8.94	4.08	-3.50
1640.42	8.75	4.08	-3.50

1,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	13.61	-0.19	0.00
164.04	12.44	0.00	-1.75
328.08	10.69	0.00	-1.94
492.12	9.72	1.94	-2.14
656.17	9.33	3.88	-2.53
820.21	9.14	4.08	-2.92
984.25	9.14	4.08	-2.92
1148.29	8.94	4.08	-2.92
1312.33	8.94	4.08	-3.11
1476.37	8.94	4.08	-3.50
1640.42	8.75	4.08	-3.50

1,806.8 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	25.46	3.11	0.00
164.04	23.81	1.94	-0.87
328.08	22.35	2.92	-0.78
492.12	21.38	1.07	-0.97
656.17	19.44	0.68	-1.17
820.21	18.08	0.00	-1.36
984.25	17.49	-0.10	-1.94
1148.29	17.10	-0.97	-2.24
1312.33	16.13	-0.78	-2.20
1476.37	15.74	-0.58	-2.72
1640.42	14.91	-0.49	-2.58

2,613.6 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	21.96	0.00	0.00
164.04	21.96	0.00	1.55
328.08	21.38	0.19	0.19
492.12	22.02	0.19	0.97
656.17	21.38	0.00	0.97
820.21	20.54	-0.97	-0.17
984.25	19.05	-0.39	0.58
1148.29	18.17	-3.11	0.19
1312.33	17.49	-2.72	0.00
1476.37	17.10	-1.55	-1.81
1640.42	16.33	-1.55	-1.46

3,420.4 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	17.49	-3.30	0.00
164.04	19.92	-4.08	-0.58
328.08	20.08	-4.08	-0.23
492.12	22.35	-4.18	-0.19
656.17	21.96	-3.50	-0.10
820.21	19.96	-3.40	0.00
984.25	20.47	-3.89	0.45
1148.29	21.38	-3.30	-0.10
1312.33	20.08	-2.82	-0.43
1476.37	18.02	-1.17	0.10
1640.42	18.52	-0.29	0.00

4,227.2 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	22.35	-4.08	0.00
164.04	22.16	-4.08	-1.55
328.08	21.71	-3.69	-1.17
492.12	22.02	-4.08	-0.97
656.17	22.08	-4.08	-0.58
820.21	19.63	-3.69	-0.39
984.25	17.49	-3.11	-0.06
1148.29	18.08	-2.72	0.23
1312.33	17.10	-2.72	0.00
1476.37	17.49	-0.97	1.11
1640.42	17.10	0.00	2.04

5,034.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	19.20	-3.50	0.00
164.04	21.69	-3.30	-0.02
328.08	22.12	-3.40	-0.10
492.12	21.90	-3.30	-0.10
656.17	21.38	-3.30	0.00
820.21	19.69	-3.40	0.00
984.25	17.49	-3.21	0.78
1148.29	14.97	-2.62	0.91
1312.33	14.38	-2.53	1.94
1476.37	13.80	-1.46	1.94
1640.42	11.80	-0.97	2.47

5,840.7 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	12.63	-5.25	0.00

164.04	18.46	-4.86	0.80
328.08	21.38	-5.83	1.67
492.12	20.35	-4.08	1.94
656.17	21.38	-3.89	2.29
820.21	19.05	-3.89	2.72
984.25	17.49	-3.50	2.84
1148.29	12.69	-0.58	3.40
1312.33	9.72	0.97	3.89
1476.37	5.83	3.11	4.72
1640.42	5.19	0.39	5.35

6,647.5 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	14.38	-8.07	0.00
164.04	13.80	-6.90	0.86
328.08	15.84	-7.77	1.73
492.12	15.55	-5.83	1.94
656.17	14.58	-4.28	2.82
820.21	11.66	-2.92	3.30
984.25	9.33	0.29	3.89
1148.29	5.83	5.44	4.31
1312.33	4.80	8.16	5.35
1476.37	3.50	12.44	7.13
1640.42	2.92	14.09	7.91

7,454.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	11.66	-3.89	0.00
164.04	11.27	-4.08	0.89
328.08	10.50	-5.25	1.77
492.12	8.75	-1.75	1.94
656.17	5.83	1.75	3.36
820.21	4.28	3.69	3.89
984.25	3.50	7.77	4.76
1148.29	1.94	13.61	4.98
1312.33	1.85	16.52	6.80
1476.37	1.30	20.41	7.77
1640.42	0.78	23.32	8.36

8,261.1 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	12.24	1.94	0.00
164.04	9.33	0.00	0.95
328.08	6.32	2.33	1.83
492.12	4.41	5.34	1.94

656.17	3.01	10.00	3.89
820.21	2.72	13.50	3.63
984.25	1.17	16.62	5.64
1148.29	-0.25	20.89	5.62
1312.33	-0.87	22.25	6.32
1476.37	-0.97	23.32	7.77
1640.42	-1.26	24.30	8.01

9,067.9 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	5.83	0.00	0.00
164.04	3.89	3.88	0.93
328.08	2.53	9.33	1.87
492.12	1.22	11.85	1.94
656.17	0.39	17.49	3.89
820.21	-0.97	21.18	3.38
984.25	-1.94	23.52	5.05
1148.29	-3.25	25.26	5.40
1312.33	-3.50	25.46	5.83
1476.37	-3.50	26.24	7.09
1640.42	-3.79	26.43	7.44

9,874.7 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-0.19	8.74	0.00
164.04	0.00	11.08	0.87
328.08	-0.97	14.28	1.89
492.12	-1.71	19.14	2.00
656.17	-4.18	23.22	3.89
820.21	-3.89	25.85	3.13
984.25	-4.86	26.63	4.47
1148.29	-5.97	27.21	4.74
1312.33	-6.10	27.40	5.25
1476.37	-5.13	27.21	6.06
1640.42	-5.54	27.21	6.47

10,681.5 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-3.11	11.85	0.00
164.04	-3.36	15.55	0.84
328.08	-3.50	20.79	1.92
492.12	-4.28	24.10	2.08
656.17	-5.05	27.40	3.21
820.21	-5.83	27.40	2.90
984.25	-6.80	27.40	3.89

1148.29	-6.41	27.21	4.10
1312.33	-6.34	27.21	4.66
1476.37	-6.41	27.40	5.05
1640.42	-5.83	27.21	5.19

11,488.3 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-5.34	14.87	0.00
164.04	-5.44	18.46	0.78
328.08	-5.25	23.42	1.55
492.12	-5.93	26.63	2.14
656.17	-5.64	27.41	2.04
820.21	-6.26	27.41	2.18
984.25	-7.19	27.41	2.37
1148.29	-6.71	27.40	2.33
1312.33	-6.55	27.40	2.20
1476.37	-6.71	27.40	2.57
1640.42	-6.84	27.40	2.53

40,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
0.00	-5.34	14.87	0.00
164.04	-5.44	18.46	0.78
328.08	-5.25	23.42	1.55
492.12	-5.93	26.63	2.14
656.17	-5.64	27.41	2.04
820.21	-6.26	27.41	2.18
984.25	-7.19	27.41	2.37
1148.29	-6.71	27.40	2.33
1312.33	-6.55	27.40	2.20
1476.37	-6.71	27.40	2.57
1640.42	-6.84	27.40	2.53

Wind Field 9

Dryden Turbulence Data

Altitude (feet)	Rms Intensities (Kts)			Scale Lengths (feet)		
	Long	Lat	Vert	Long	Lat	Vert
20.00	3.40	2.70	2.34	105.70	49.70	10.40
100.00	4.05	3.46	3.53	216.70	134.20	53.00
200.00	4.43	3.95	4.35	306.50	213.50	106.00
400.00	4.85	4.50	5.36	433.50	339.60	212.00
600.00	5.11	4.86	6.05	530.90	445.60	318.00

1500.00	5.74	5.78	7.94	840.90	824.50	795.30

Wind Field 10

40,000.0 feet beyond the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-9.70	3.00	0.00
150.00	-12.20	7.50	-0.20
250.00	-12.90	8.00	-0.70
350.00	-16.40	9.00	2.20
450.00	-13.60	10.00	14.70
550.00	-19.50	11.00	-9.70
650.00	-6.30	12.00	-9.70
800.00	2.60	12.80	-6.50
1200.00	3.20	11.20	-3.30
1500.00	2.40	10.00	-3.40

At the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-9.70	3.00	0.00
150.00	-12.20	7.50	-0.20
250.00	-12.90	8.00	-0.70
350.00	-16.40	9.00	2.20
450.00	-13.60	10.00	14.70
550.00	-19.50	11.00	-9.70
650.00	-6.30	12.00	-9.70
800.00	2.60	12.80	-6.50
1200.00	3.20	11.20	-3.30
1500.00	2.40	10.00	-3.40

2,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-8.30	3.00	0.00
150.00	-13.10	7.50	-0.40
250.00	-14.20	8.00	-2.50
350.00	-16.60	9.00	-1.10
450.00	-19.50	10.00	-2.50
550.00	-18.80	11.00	-8.00
650.00	-16.30	12.00	-12.90
800.00	1.60	12.80	-7.70
1200.00	4.10	11.20	-7.40
1500.00	4.90	10.00	-6.10

4,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	-6.00	3.00	0.00
150.00	-12.70	7.50	0.00
250.00	-15.00	8.00	-3.60
350.00	-13.60	9.00	-6.00
450.00	-18.40	10.00	0.00
550.00	-21.20	11.00	0.00
650.00	-15.90	12.00	-11.40
800.00	-1.90	12.80	-10.90
1200.00	4.50	11.20	-8.40
1500.00	4.80	10.00	-9.00

6,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	1.70	3.00	0.00
150.00	-2.70	7.50	-0.90
250.00	-3.20	8.00	-6.10
350.00	-3.20	9.00	-17.90
450.00	-3.90	10.00	-27.70
550.00	0.20	11.00	-30.60
650.00	3.10	12.00	-27.00
800.00	7.20	12.80	-16.60
1200.00	7.20	11.20	-14.80
1500.00	7.20	10.00	-14.80

8,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	12.70	3.00	0.00
150.00	17.10	7.50	-0.90
250.00	17.60	8.00	-6.10
350.00	17.60	9.00	-17.90
450.00	18.30	10.00	-27.70
550.00	14.20	11.00	-30.60
650.00	11.30	12.00	-27.70
800.00	7.20	12.80	-16.60
1200.00	7.20	11.20	-14.80
1500.00	7.20	10.00	-14.80

9,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical

20.00	19.10	3.00	0.00
150.00	24.70	7.50	-0.70
250.00	26.00	8.00	-6.10
350.00	28.00	9.00	-10.30
450.00	26.00	10.00	-12.30
550.00	24.60	11.00	-24.00
650.00	13.40	12.00	-24.60
800.00	12.80	12.80	-13.40
1200.00	9.60	11.20	-14.00
1500.00	8.70	10.00	-12.30

10,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	20.40	3.00	0.00
150.00	27.10	7.50	0.00
250.00	29.40	8.00	-3.60
350.00	28.00	9.00	-6.00
450.00	32.80	10.00	0.00
550.00	35.60	11.00	0.00
650.00	30.30	12.00	-11.40
800.00	16.30	12.80	-10.90
1200.00	9.90	11.20	-8.40
1500.00	9.60	10.00	-9.00

11,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	21.70	3.00	0.00
150.00	28.00	7.50	-0.40
250.00	28.70	8.00	-2.60
350.00	30.30	9.00	-4.10
450.00	36.20	10.00	2.30
550.00	35.60	11.00	0.00
650.00	32.60	12.00	11.90
800.00	15.00	12.80	9.70
1200.00	10.40	11.20	8.90
1500.00	9.60	10.00	7.00

12,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	22.70	3.00	0.00
150.00	27.50	7.50	-0.40
250.00	28.60	8.00	-2.50
350.00	31.00	9.00	-1.10
450.00	33.80	10.00	2.50

550.00	33.20	11.00	-8.00
650.00	30.70	12.00	-12.90
800.00	12.80	12.80	-7.70
1200.00	10.30	11.20	-7.40
1500.00	9.50	10.00	-6.10

13,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	24.00	3.00	0.00
150.00	27.30	7.50	-0.20
250.00	28.00	8.00	-0.90
350.00	31.00	9.00	0.00
450.00	32.70	10.00	6.00
550.00	32.50	11.00	-12.90
650.00	28.00	12.00	-12.90
800.00	12.10	12.80	-8.10
1200.00	10.50	11.20	-5.60
1500.00	13.30	10.00	-4.40

14,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	24.10	3.00	0.00
150.00	26.60	7.50	-0.20
250.00	27.30	8.00	-0.70
350.00	30.80	9.00	2.20
450.00	28.00	10.00	14.70
550.00	33.90	11.00	-9.70
650.00	20.70	12.00	-9.70
800.00	11.80	12.80	-6.50
1200.00	11.20	11.20	-3.30
1500.00	12.00	10.00	-3.40

16,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	24.30	3.00	0.00
150.00	26.50	7.50	0.00
250.00	27.20	8.00	-0.20
350.00	30.40	9.00	2.20
450.00	33.80	10.00	-2.50
550.00	25.00	11.00	-4.40
650.00	22.80	12.00	-3.00
800.00	13.80	12.80	-1.90
1200.00	13.30	11.20	-1.50
1500.00	13.00	10.00	-0.90

40,000.0 feet in front of the GPIP

Mean Winds (Knots)

Altitude (feet)	Longitudinal	Lateral	Vertical
20.00	16.80	3.00	0.00
150.00	26.30	7.50	0.00
250.00	27.30	8.00	0.00
350.00	30.10	9.00	0.00
450.00	33.90	10.00	0.00
550.00	26.20	11.00	0.00
650.00	23.00	12.00	0.00
800.00	14.20	12.80	0.00
1200.00	13.70	11.20	0.00
1500.00	13.20	10.00	0.00

Wind Field 10

Dryden Turbulence Data

Altitude (feet)	Rms Intensities (Kts)			Scale Lengths (feet)		
	Long	Lat	Vert	Long	Lat	Vert
20.00	3.40	2.70	2.34	105.70	49.70	10.40
100.00	4.05	3.46	3.53	216.70	134.20	53.00
200.00	4.43	3.95	4.35	306.50	213.50	106.00
400.00	4.85	4.50	5.36	433.50	339.60	212.00
600.00	5.11	4.86	6.05	530.90	445.60	318.00
1500.00	5.74	5.78	7.94	840.90	824.50	795.30