Air Quality Impact Analysis
Of The
Hermit Project

AIR QUALITY IMPACT ANALYSIS
OF THE
HERMIT PROJECT

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EnecoTech

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 PROJECT OVERVIEW

Energy Fuels Nuclear, Inc. (Energy Fuels) is proposing to develop an underground uranium mine on unpatented mining claims on the Kanab Plateau approximately 22 miles south-southwest of Fredonia, Arizona and, at its closest point, approximately seventeen miles north of the boundary of the Grand Canyon National Park. The Project Area is situated at an elevation of 4,885 feet MSL and the relief in the immediate vicinity of the Project Area is relatively flat. The actual location of the proposed mining project, known as the Hermit Project, is shown in Figure 1.

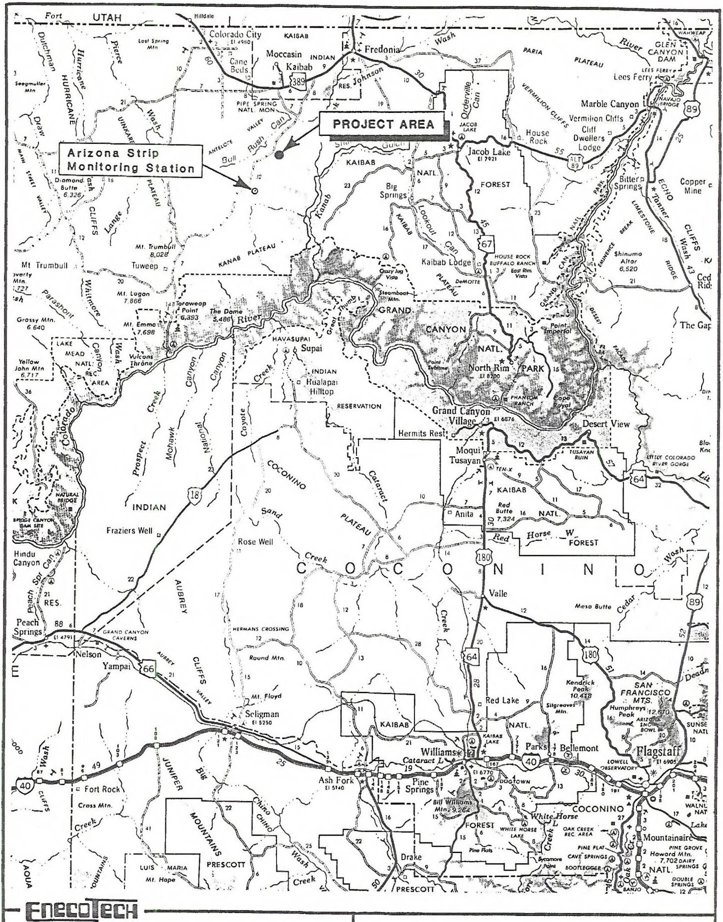
The proposed mining schedule calls for two shifts per day (from 7:00 a.m. to 11:00 p.m.) working five days per week, 52 weeks per year. Over the life of the mine, the Hermit Project is expected to support the removal of an average of 300 tons per day of uranium ore. Because the pertinent air quality standards address pollutant concentrations averaged on an annual, or more frequent basis, a longer or shorter project life does not affect this air quality analysis. Therefore, if maximum pollutant concentrations are assessed during "worst-case" operating conditions, as has been done in this study, it can be realistically assumed that pollutant concentrations in other operating years will be less.

Access to the ore body will be by a 1100 foot vertical shaft. To provide mine ventilation and an escape route, a second shaft, eight feet in diameter, will be drilled approximately 300 feet east of the mine portal. Figure 2 shows the surface locations of the shafts. The mine ventilation shaft will be capped with a 200,000 CFM fan to exhaust air, thereby ensuring adequate air flow throughout the mine workings.

While actual mining occurs underground, certain surface structures and activities will be required to support the mining project. A total of 23.6 acres will be disturbed to support these surface activities. Figure 2 presents the configuration of surface facilities within the Project Area.

Several of these surface facilities and/or activities could result in the release of pollutants into the atmosphere. These facilities and activities include:

- Mine vent;
- Wind erosion from ore, waste and top soil stockpiles and disturbed areas;



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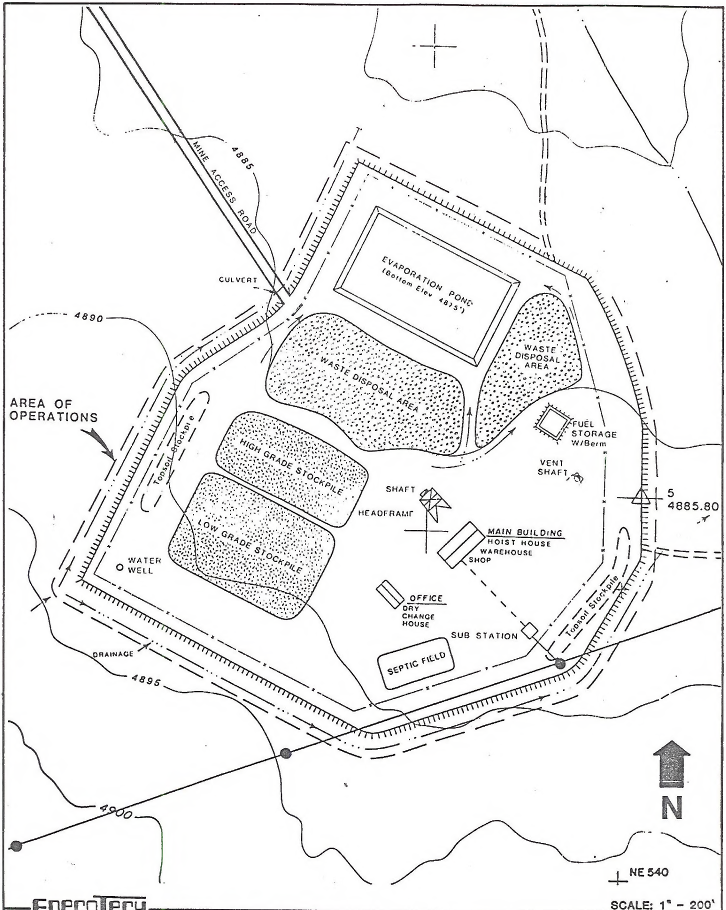
Location Map

PROJECT Hermit

FILE NO. ______ **DATE** 12/86 **FIGURE NO.** 1



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PROJECT **Hermit**

Project Area Emission Sources

FILE NO. ______ DATE 2/87 FIGURE NO. 2

- Loading and unloading of stockpiles;
- Ore and waste handling; and
- Ore transport.

By far, dust (particulates or TSP) will be the primary pollutant released as a result of the Project. (This analysis is not intended to analyze the potential radiological impacts resulting from the Project and, thus, they are excluded from further discussion). Other pollutants, specifically carbon monoxide (CO), oxides of nitrogen (NO_x) and sulfur dioxide (SO_2) will be emitted in very small amounts. These pollutants will result exclusively from vehicles involved in the Project activities. Since Energy Fuels will provide and encourage bus transportation for its employees to and from the Project Area, employee vehicle emissions will be below the diminimus levels. An average of only twelve haul trucks per day are proposed for ore transport, and therefore, haul truck exhaust emissions will also be below the diminimus level.

Since emissions of CO, NO_x and SO_2 resulting from the Project will be well below the diminimus levels, an attempt to quantify their potential impact on the local air quality would not be justified. Consequently, the contribution of the proposed Project with respect to these emissions will not be further analyzed in this study.

One of the larger sources of on-site particulate emissions will be stockpile loading and unloading and the resultant potential wind erosion. Ore and waste rock will be brought to the surface and dumped in their respective stockpiles. It is anticipated that 150,000 tons of barren waste rock will be generated through the course of the Project. This barren waste rock will be stored on the surface in two waste rock disposal areas. Top soil removed during construction activities will be stored in inactive stockpiles for use in subsequent reclamation activities. Location of the respective stockpiles is also shown on Figure 2.

No ore processing or milling is planned on-site. Instead, ore will be transported by haul truck to an uranium processing mill near Blanding, Utah. To accommodate the planned mining rate of 300 tons per day, up to twelve haul trucks will be employed daily (five days per week) to transport ore. Ore haulage from the Project Area will be via unpaved roads for approximately the first twelve miles (approximately 1.2 miles will be along the new project access road and approximately eleven miles will be on Mt. Trumbull Road), after which travel will be on paved roads. The haul trucks will be covered with tarpaulins to reduce the possibility of ore spillage and to minimize windblown emissions.

2.0 SITE CHARACTERISTICS

2.1 Climatology

The general Project region is classified as a semi-arid continental climate. As such, it is typified by cool winters, warm summers and light precipitation. Winter temperatures in the area commonly drop below freezing at night, while temperatures in the summer months routinely rise above 90°F. Annual precipitation in the area averages less than fifteen inches and the summer and winter months are typically the wettest. Winter precipitation is primarily in the form of snow; summer precipitation is the result of thunderstorm activity which at times can be heavy. Specifics of the area's precipitation, temperatures and wind patterns are presented below.

2.1.1 Precipitation

Twenty-three years of meteorological data have been collected and summarized at the Fredonia, Arizona weather observation station located approximately 22 miles northeast of the Project Area. Data from this station is representative of the Project Area. A summary of these data is presented in Table 1.

The data collected at the Fredonia station show that the annual average precipitation for the area is approximately 10.1 inches. Spring is usually the driest season, while the winter is usually the wettest. Winter precipitation, which usually occurs as snow, results primarily from Pacific storms passing over the area. Snowfall from year to year is quite variable in both frequency and amount, but averages 23.3 inches annually. At least a trace of frozen precipitation can be expected in every month from October through April with January normally the snowiest.

While the winter season is typically the wettest season, August is usually the wettest month, averaging 1.27 inches of precipitation. Summer and fall precipitation in the area is most commonly the result of locally induced thunderstorm activity.

The maximum recorded daily rainfall recorded in the area was just over two inches in a 24 hour period. Daily precipitation amounts of 0.10 inches or more should occur on the average of 28 days a year.

TABLE 1

CLIMATOLOGICAL SUMMARY FOR FREDONIA, ARIZONA[1]

Month	Temperature (°F) Mean Monthly	Mean Daily Maximum	Mean Daily Minimum	Extremes High	Extremes Low	Precipitation (in.) Totals Mean	Totals Maximum	Snowfall Mean	Snowfall Maximum[2]	Mean # Days Precipitation[2] ≥ .1"
JAN	32.7	46.0	19.4	66	-18	1.17	3.28	8.1	13.6	4
FEB	36.2	50.6	21.7	71	-15	.89	1.65	4.2	11.0	3
MAR	42.4	58.6	26.2	79	5	1.09	3.56	4.2	14.5	2
APR	50.7	68.7	32.7	86	10	.68	1.87	.7	2.0	1
MAY	58.0	77.0	39.0	94	20	.44	1.33	0	0	2
JUN	66.5	86.7	46.2	104	26	.32	.96	0	0	1
JUL	73.8	92.8	54.7	105	37	.69	1.88	0	0	2
AUG	72.1	90.1	54.1	104	33	1.27	2.68	0	0	4
SEPT	65.1	84.6	45.6	99	26	1.04	2.82	T	T	2
OCT	53.8	72.4	35.4	96	17	.88	3.08	.3	1.5	2
NOV	41.6	58.3	24.9	76	0	.62	1.39	1.2	6.0	3
DEC	34.6	48.5	20.7	70	-15	1.00	2.30	4.6	6.0	2
ANN	52.3	69.5	35.1	105	-18	10.09	3.56	22.3	14.5	28

Source: Climatography of the United States NO. 86-2 Arizona.
1. Unless otherwise specified, based upon period of record 1937 - 1960.
2. Period of record 1951 - 1960.

2.1.2 Temperature

Table 1 also presents a summary of temperature data from the Fredonia station. These data show that the average monthly maximum temperatures range from 46.0°F in January to 92.8°F in July. Average monthly minimums range from 19.4°F to 54.7°F also occurring in January and July, respectively. The mean annual temperature is 52.3°F.

The Table 1 data show that the daily maximum is normally above 90°F in July and August and daily minimum temperatures are normally below freezing from November through March. Temperature extremes recorded at Fredonia show a maximum of 105°F and a minimum of -18°F.

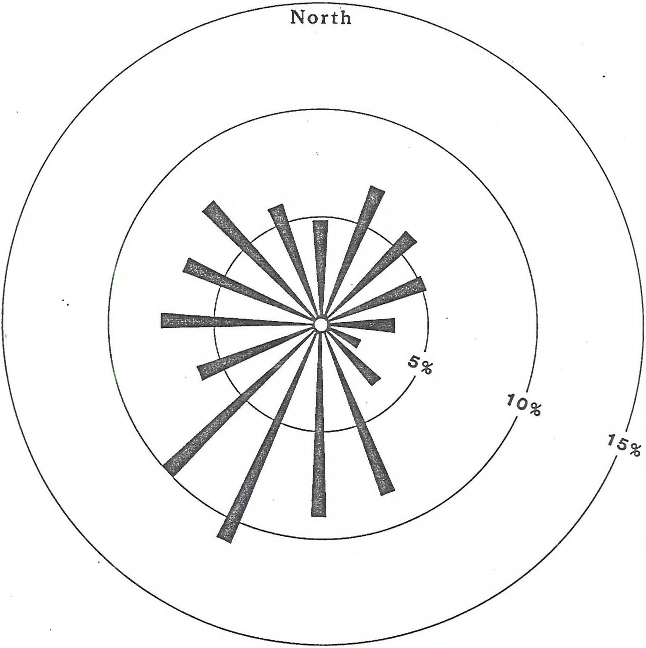
2.1.3 Winds

Long-term wind data are limited in the vicinity of the Project. However, to better define the wind patterns of the Arizona Strip Area, in 1983, Energy Fuels contracted with Fox Consultants Inc., an independent consultant, to measure wind patterns of the area. As a result, a one year data set was collected from a meteorological station located near Sunshine Point approximately seven miles south of the Project Area. Figure 1 shows the location of this meteorological station.

Wind data at this station were collected from March 1983 to March 1984 and, because of the similarities in terrain and the close proximity of the meteorological station to the Project Area, the resultant meteorological data are very representative of the Project Area. Figure 3 presents the graphical annual wind rose from the station and Table 2 presents the tabular wind rose which also presents wind speed data. These data show that the prevailing wind direction at the Project Area is from the south-southwest, with south-southeast through southwest winds clearly dominating the wind patterns of the Area. (Nearly 40 percent of all winds blew from the south-southeast through southwest sectors). On the other hand, easterly component winds are the least frequently occurring at the Project Area, with east-southeast occurring less than 1.0 percent of the time.

As shown in Table 2, wind speeds averaged 3.4 m/sec (7.6 mph) throughout the one year monitoring period, with higher average wind speeds more often associated with southerly component winds. However, high wind speeds were not common as wind speeds in excess of 11 m/sec (24.6 mph) occurred only 0.32 percent of the time.

Percent Occurrence Of Winds By Direction
March 1983-March 1984
Arizona Strip Station



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PROJECT Hermit	Wind Rose

FILE NO. ______ DATE 2/87 FIGURE NO. 3

TABLE 2

FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR
MARCH 1983 THROUGH MARCH 1984
ENERGY FUELS - ARIZONA STRIP AIR STATION MONITORING

DIRECTION	SPEED CLASS INTERVALS (M/S) 1<1.5	1.5< 3	3< 5	5< 8	8<11	>11	ALL	MEAN SPEED
N	0.31	2.10	1.41	0.35	0.04	0.00	4.21	3.0
NNE	0.29	2.18	2.89	1.05	0.15	0.00	6.56	3.6
NE	0.39	2.89	1.61	0.47	0.09	0.01	5.46	3.0
ENE	0.19	1.53	1.46	1.10	0.19	0.04	4.51	4.0
E	0.31	1.45	0.75	0.19	0.00	0.00	2.69	2.7
ESE	0.17	0.64	0.16	0.00	0.00	0.00	0.97	2.2
SE	0.44	2.06	0.63	0.09	0.00	0.00	3.22	2.3
SSE	0.32	4.26	2.76	0.87	0.07	0.00	8.27	3.0
S	0.79	4.30	2.90	1.85	0.04	0.00	9.88	3.3
SSW	0.56	5.00	3.22	2.09	0.56	0.05	11.49	3.6
SW	0.63	3.30	2.78	2.61	0.49	0.07	9.8	4.0
WSW	0.23	2.70	1.42	1.32	0.19	0.04	5.90	3.7
W	0.49	3.41	1.76	1.10	0.21	0.04	7.01	3.4
WNW	0.45	2.28	2.20	1.30	0.09	0.03	6.35	3.6
NW	0.32	2.81	2.73	1.08	0.12	0.04	7.09	3.5
NNW	0.20	1.66	2.49	0.96	0.20	0.00	5.51	3.8
ALL	6.07	42.58	31.16	16.42	2.44	0.32	98.99	34

CALM (less than one meter per second) = 1.0
PERIOD MEAN WIND SPEED = 3.4 M/S

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2.2 Air Quality

Associated with the Arizona Strip meteorological monitoring program, a Total Suspended Particulate (TSP) monitoring program was also conducted to establish the background TSP concentrations in the relatively remote and undisturbed Arizona Strip region.

Figure 1 shows the location of the Arizona Strip Air Quality Station. Data from this station were collected from March 1983 through March 1984 in accordance with EPA monitoring and quality assurance guidelines. As part of the QA procedures employed on this monitoring program, colocated samplers were operated to assess the precision of the TSP measurements.

Summaries of the 1983-1984 TSP data collected at the Arizona Strip Air Quality Station are presented in Table 3 and a listing of the individual sample results is included for reference in Appendix C. These data show that the annual geometric mean at this location was 13.7 $\mu g/m^3$. The highest 24-hour concentration measured in the sampling period was 59 $\mu g/m^3$. Because of the close proximity of the Arizona Strip monitoring station to the Project Area, the similarities in climatology and the absence of nearby major industrial sources, these data represent the baseline conditions at the Project Area.

TABLE 3

TSP SUMMARY FROM THE ARIZONA STRIP AIR MONITORING STATION*
March 1983 – March 1984

Concentration (µg/m^3)

	Spring	Summer	Fall	Winter	Annual
Arithmetic Mean	19.3	27.3	12.0	8.1	16.6
Geometric Mean	17.4	25.5	11.2	6.3	13.7
First 24-hr Max	32	59	23	16	59
Second 24-hr Max	30	46	20	14	46

* Data collected on EPA one day in six schedule.

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3.0 EMISSIONS INVENTORY

For use in the assessment of the potential "worst-case" air quality impacts from the Project, an emissions inventory for the Project was developed by quantifying all operations and activities to be conducted in the Project Area, during maximum production, that could potentially result in the atmospheric release of pollutants. Further, as part of this "worst-case" assessment, with the exception of covered haul trucks, no emission controls nor mitigation techniques were assumed to be in effect on any potential source.

The only pollutant to be released in any measurable amount into the atmosphere, as a result of the Project, will be particulates (TSP). Further, these TSP emissions are almost exclusively comprised of dust. While the EPA distinguishes between process related particulates (fugitive emissions) and non-process dust (fugitive dust emissions) in its delineation of major emission sources, these emissions have not been segregated in this study to provide a basis for the analysis of "worst-case" impacts.

A summary of the expected TSP emission sources and the calculated emission rate in tons per year (based upon maximum activity) for the Hermit Project is presented in Table 4. While haul road activities, in reality, are off-site emissions (occurring miles from the Project Area), they have been included in the Project emissions inventory so that their potential impact on the local air quality can also be assessed. The individual emission rate calculations for each source, identified in Table 4, are presented in Appendix B of this report.

Table 5 presents a summary of the emission factors used in generating the emissions inventory. The emission factors presented in Table 5, and used in the emissions calculations, are those recommended by the EPA for this type of Project. In cases where the EPA has not recommended a specific emission factor for an individual emission source, currently accepted emission factors are used. With respect to haul road emissions, there have been a number of studies conducted to attempt to quantify dust emissions generated from various sized haul trucks traveling at various speeds on different types of unpaved road surfaces (soil, gravel, etc.). These studies show a wide variance in the predicted emission rates from haul road traffic. Upon discussion with EPA and in keeping with the desire to evaluate the potential "worst-case" impacts under the most restrictive conditions, the emission factor presented in Table 5 was used

TABLE 4

EMISSIONS INVENTORY SUMMARY
HERMIT PROJECT

SOURCE	ANNUAL EMISSIONS (TPY)	
Project Area:		
Ore loadout to stockpile	1.56	
Ore loading from stockpile to haul trucks	1.95	
Waste rock disposal area	0.20	
Wind erosion, disturbed area and stockpile	25.60	
Mine vent	15.00	

Project Area Total		44.31
Product Transport:		
Haulroad Emission (per mile) (assuming 16.0 lbs/VMT @ 12 round trips per day)	49.92	

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TABLE 5

EMISSION FACTOR
HERMIT PROJECT

Source Type	Emission Factor	Reference
Haul road, unpaved	k*5.9(s/12)(S/30)(W/3)**0.7*(w/4)**0.5[(365-p)/365]	EPA
Ore, rock, loadout	0.04 lbs/ton	EPA
Ore, rock load to truck	0.05 lbs/ton	EPA
Wind erosion	a*I*C*K*L*V	EPA
Mine vent	0.002 grains/SCFM	AMAX 1980*

where:
- s is the silt content (12%)
- S is the vehicle speed (25 mph)
- p is the number of days with 0.01 inches or more of precipitation (95)
- a is the fraction of material that remains suspended (0.025)
- k is the fraction of material below 30 microns (0.80)
- I is the soil erodibility (38 ton/acre)
- C is the climatic factor (1.0)
- K is the roughness factor (1.0)
- L is the field width factor (1.0)
- V is the vegetative cover factor (1.0)
- W is the average vehicle weight (15 tons)
- w is the number of wheels (10)

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* AMAX 1980 - State of Colorado air permit for Mount Emmons.

Factor derived from stack tests on AMAX's Henderson underground Molybdeum mine vent in Henderson, Colorado. During testing this mine's annual production was a factor of 10 higher than the proposed Hermit Project's annual production. Consequently, this factor is believed to be much higher than what would be expected at this Project, but is used here for lack of better data.

to calculate haul road emission rates. Knowingly using this factor results in higher emission rates than are currently cited by other federal and state agencies; it was used to approximate "worst-case" conditions.

As shown in Table 4, during a maximum production year a total of 44.31 tons per year of TSP emissions could potentially be released from the Project Area. The primary source of TSP emissions within the Project Area will be wind erosion of disturbed areas and stockpiles. These emissions account for over one-half of all the Project Area's TSP emissions.

Also from Table 4, it is shown that haul road traffic has, as a maximum, the potential to release 16.0 pounds per vehicle of TSP for each mile traveled on unpaved haul roads. Since haul trucks will be tightly covered with tarpaulins, haul road emissions will result exclusively from natural dust from the road surface.

As shown in Table 5 and Appendix Table B-1, TSP emissions from haul roads are dependent upon the number of haul trucks, vehicle speed, number of wheels, vehicle weight, the silt content of the road surface and the number of natural precipitation occurrences. Based on the factors expected for the Project, the resultant dust emissions from each one mile section of unpaved haul road is calculated to be 49.92 tons per year.

With the exception of the mine vent, all Project Area and haul road emissions will be surface released. Emissions from the mine vent will be an elevated release due to the mechanical buoyancy caused by the ventilation fan.

4.0 MODELING PARAMETERS

4.1 Model Selection

To assess the air quality impacts resulting from the Project Area sources, the Industrial Source Complex (ISC) dispersion model was used. The long-Term version (ISCLT) and the Short-Term version (ISCST) of ISC were used to calculate the annual average and 24-hour "worst-case" concentrations, respectively.

The ISC dispersion model is a state-of-the-art, EPA generated and approved air quality dispersion model. Because the model can accommodate a large number of point (elevated or stack) and area emission sources, and the resultant concentrations can be computed at selected distances from the emission sources, it is routinely utilized in impact analyses such as this one.

The ISC model contains particulate deposition and settling algorithms which more closely approximate particle dispersion by allowing the larger particles to settle out (fall to the surface). This is done by dividing the emissions into particle size classes, each with its own settling velocity, mass fraction and reflection coefficient. The three particle size classes used in the ISC model runs are presented in Table 6 immediately following.

TABLE 6

ISC PARTICLE SIZE CLASSES

Particle Diameter*	Mass Mean Diameter	Mass Fraction	Settling Velocity**	Reflection Coefficient***
4 - 10 µm	7.4 µm	0.22	0.004	0.80
10 - 20 µm	15.5 µm	0.44	0.018	0.74
20 - 30 µm	25.3 µm	0.34	0.048	0.62

* Particle size in microns (µm).

** Settling velocity in meters per second.

*** Reflection coefficient taken from ISC User's Manual.

The same method described in the ISC User's Manual was used to calculate the various parameters. The particle size distributions were obtained from the report entitled "Survey of Fugitive Dust From Coal Mines" (EPA 1978). The report presents particle size distributions for most mining activities. From this report particle size distributions were examined for the various mining activities present at the Project Area and a composite particle size distribution was used for all sources.

4.2 Input Meteorology

ISCLT utilizes, as input, meteorological data (specifically wind speed, wind direction and atmospheric stability) in the standard Joint Frequency Distribution (JFD) format. The input JFD was obtained from the hourly meteorological data collected at the Arizona Strip Air Monitoring Station from March 1983 through March 1984 (see Section 2.0).

The observations taken at the Arizona Strip Station consisted of wind speed and wind direction. Concurrent hourly sigma theta (a stability indicator) values were abstracted from the continuous wind direction strip chart trace. These hourly values, in turn, were converted to standard atmospheric stability classes using the Mitchell-Timbre technique. From the hourly wind speed, wind direction and atmospheric stability, a Joint Frequency Distribution was generated for the one year data set. The JFD used for the modeling analyses is presented in Appendix A.

ISCST requires as input sequential hourly meteorological data consisting of wind speed, wind direction and stability values. For the ISCST model runs, the sequential hourly data collected from the Arizona Strip Air Monitoring Station were used for the ISCST modeling analysis.

4.3 Emissions Input

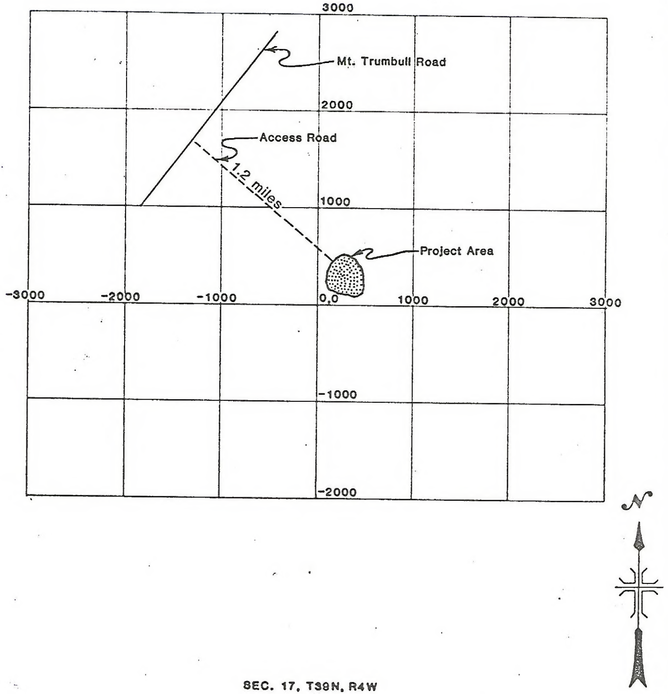
Emission source locations and emission rates are required input to the ISC model. Figure 2 shows the expected locations of each emission source within the Project Area. The emission rates were calculated using the emission factors described in the previous section. All emissions, except the mine vent and the off-site hauling of the ore, are represented by area sources.

The mine vent is located to the east of the main shaft (see Figure 2) and, in the modeling analyses, is represented by a point source. While the mine vent is shown to be approximately 300 feet to the east of the main shaft, relocating the mine vent would only minimally affect the modeling results presented in Section 5.0. The vent's exit velocity was calculated given the ventilation rate and the mine vent size (Table B-1, Appendix B). The temperature was assumed to be ambient and, as a result, the plume was assumed to have no thermal buoyancy.

For modeling, the haul roads were considered to be a line source with an emission rate of 49.92 tons per mile.

4.4 Modeling Grid

The ISC modeling or receptor grid is presented in Figure 4. The receptor grid is basically a 1000 meter rectangular grid around the Project Area. To allow assessment of concentrations at the property boundary, the origin of the receptor grid has been situated just southeast of the southern point of the Project Area. (See 0,0 point in Figure 4.)



SEC. 17, T39N, R4W
Mohave Co., Arizona

SCALE: 1" = 1000 METERS

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PROJECT Hermit	Emission/Modeling Grid

FILE NO. ______ DATE 2/87 FIGURE NO. 4

5.0 DISPERSION MODELING RESULTS

5.1 Air Quality Standards

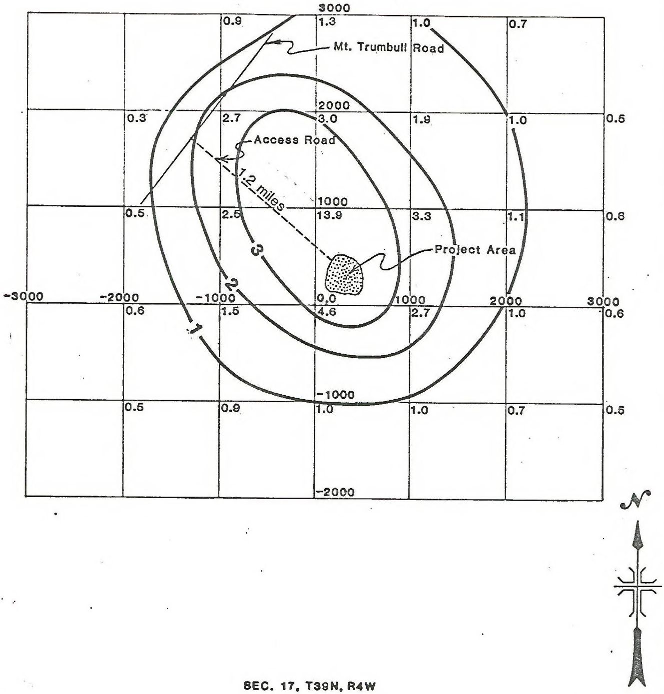
As stated earlier, only particulates are expected to be emitted from the proposed Project in noticeable enough quantities to result in an air quality impact. The National Ambient Air Quality Standards (NAAQS) for particulates are 260 $\mu g/m^3$ for the 24-hour average and 75 $\mu g/m^3$ for the annual geometric mean; and since the State of Arizona has adopted these same standards, modeling was conducted to address these standards.

Because the proposed Project is located approximately seventeen miles north of the closest boundary to the Grand Canyon National Park, it is extremely doubtful that Project related emissions could impact the Park, a mandatory Class 1 area. However, to confirm this contention an analysis was performed to assess whether or not emissions from the Project potentially could result in a significant air quality impact in the Park. For use in this assessment the EPA's designated levels or concentrations of significance, as established for Prevention of Significance Deterioration evaluations, were used to define the are of impact. The levels of significance, as established for particulates, are 1 $\mu g/m^3$ for an annual average and 5 $\mu g/m^3$ for a 24-hour average. Modeling was conducted to determine the location of these levels, and thus, to determine if any significant air quality impact could potentially occur within the Grand Canyon National Park.

Computer printouts of each model run are presented in Appendix A.

5.2 Annual Results

The Project emissions as presented in Table 4, including the haul road emissions from proposed new access (haul) road, and the one year Arizona Strip meteorological data (see Section 2.0) were input into the ISCLT model. The results of the annual ISCLT computer model run are presented graphically in Figure 5. The predicted particulate concentrations resulting from the Project Area are shown as lines of equal concentration or isopleths. The maximum concentration is predicted to be north of the Project Area with a concentration of 13.9 $\mu g/m^3$. This concentration is due primarily to the proposed new haul road which runs to the northwest of



SEC. 17, T39N, R4W
Mohave Co., Arizona

SCALE: 1" = 1000 METERS

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PROJECT Hermit

Annual Average Concentration

Units in Micrograms Per Cubic Meter

FILE NO. ________ DATE 2/87 FIGURE NO. 5

the Project area to the Mt. Trumbull Road. As can be seen from Figure 5, the concentration decreases very rapidly dropping off to less than 1 μg/m^3 within 3000 meters (1.9 miles).

As discussed in Section 2.0, the annual particulate background in the vicinity of the Project is, at a maximum, approximately 14 μg/m^3. Even adding the background concentration to the modeled impact, the resulting concentrations are predicted to be quite low, with a maximum impact of no more than 28 μg/m^3. This is well below the applicable state and federal standards.

Figure 5 also shows that the 1 μg/m^3 significance level isopleth, at its furthest distance in the direction of the Grand Canyon National Park, extends about 1000 meters from the Project Area. Thus, there should be no impact from the Project on the air quality of Grand Canyon National Park which is more than seventeen miles away.

5.3 24-Hour Results - "Worst-Case" Analysis

5.3.1 Project Area

To assess the short-term, or 24-hour, air quality impacts which might result from operations at the Project Area, potential maximum emission releases, including emissions from the proposed new haul road, were input into the ISCST (short-term) version of the ISC model and resultant pollutant concentrations were computed for each day (24-hour period) contained in the 1983 - 1984 Arizona Strip meteorological data set. That is, the ISCST modeling analysis used actual meteorological data and computed the individual daily particulate concentrations that would result if the proposed Hermit Project were in full operation during each day of the 1983 - 1984 data set. By using actual meteorological data in conjunction with the expected emission releases from the various project emission sources, a realistic assessment of the potential air quality impacts from the project can be made. These impacts, in turn, can be compared to the applicable state and federal standards to determine if the proposed Project may pose a threat to air quality of the area.

In addition, in the modeling analysis project emissions were conservatively assumed to be continuous throughout the one year meteorological data set, notwithstanding the fact that actual mining activities are scheduled for only two eight hour shifts per day, five days per week. Thus, concentrations computed by the ISCST model will be higher than would realistically occur. The purpose of allowing emissions to be released continuously in the modeling analysis was to establish the outside limits or "worst-case" of any air quality impact potentially resulting from the Project.

The "worst-case" day (24-hour period) particulate concentrations computed in the ISCST modeling analysis are presented graphically in Figure 6. In this Figure, the predicted 24-hour particulate concentrations resulting from the Project Area are shown for each receptor point and are plotted as isopleths.

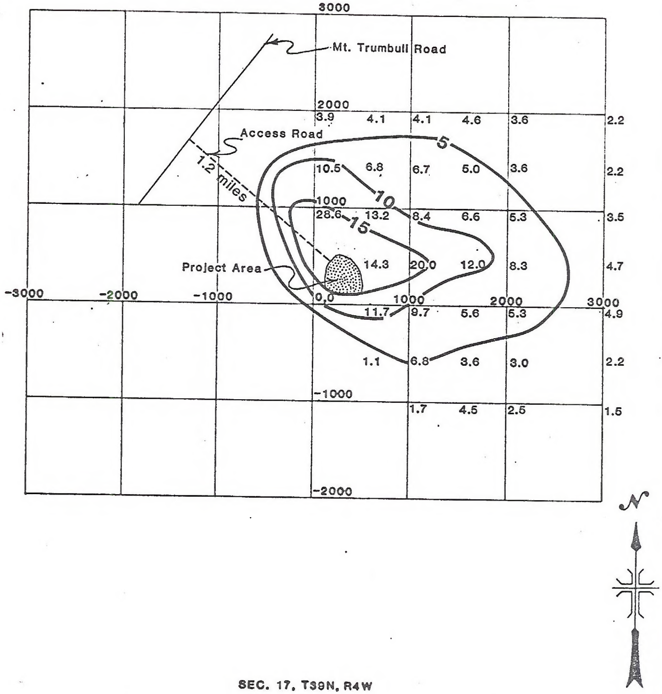
From Figure 6 it can be seen that the maximum off-site particulate concentration occurring on the actual "worst-case" day was 29 $\mu g/m^3$ and the 5 $\mu g/m^3$ level of significance extended, at its furthest point, to just over 2500 meters (1.5 miles) east of the Project Area. The predicted "worst-case" maximum of 29 $\mu g/m^3$ is well below the state and federal particulate standard of 260 $\mu g/m^3$ even when the highest 24-hour background concentration of 58 $\mu g/m^3$, as presented in Section 2.0, is added. Thus, this modeling study which employed actual meteorological data and highly conservative Project emissions assumptions show that there will be no significant air quality impact resulting from the Project.

Again, the 5 $\mu g/m^3$ level of insignificant is reached within 1.5 miles of the Project Area, well short of the Grand Canyon National Park. Thus, operation of the Project should not result in any measurable impact on the Park.

5.3.2 Haul Roads

While the haul roads and, consequently, haul road emissions will primarily be outside of the Project Area, it is useful to determine what impact, if any, the haul road emissions would have on the area's air quality. To do this, haul road emissions were modeled using actual "worst-case" meteorological conditions as obtained from the one year meteorological monitoring program (see Section 2.0).

Ore haulage from the Project will involve traveling over about twelve miles of unpaved road. Immediately from the Project Area, haul trucks will traverse the approximate 1.2 miles of proposed new project road running to the northwest from the site and connecting to Mt. Trumbull Road. Haul truck traffic will then travel north on Mt. Trumbull Road for



SEC. 17, T39N, R4W
Mohave Co., Arizona

SCALE: 1" = 1000 METERS

ENECOTECH
Denver, Colorado

PROJECT Hermit	"Worst-Case" 24-Hour Impact Units in Micrograms Per Cubic Meter

FILE NO. ________ DATE 2/87 FIGURE NO. 6

about eleven miles to State Route 389. From this point on, ore haulage will be via paved roads. Figure 7 shows the proposed haul road route from the Project Area.

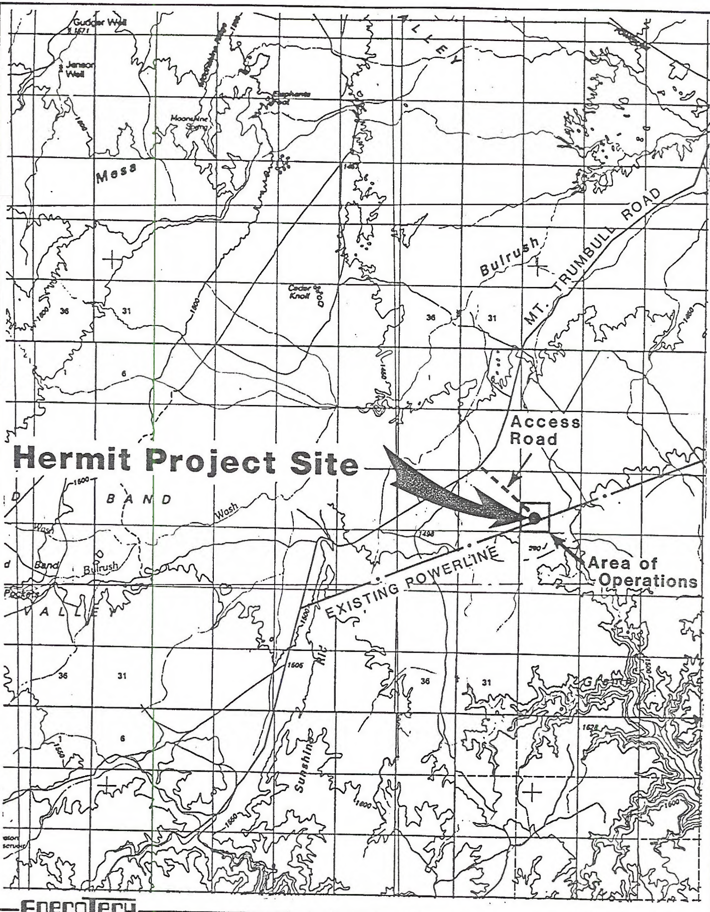
The particulate emissions resulting from haul traffic on the proposed access road were modeled as part of the Project Area impact analyses (Section 5.2 and 5.3.1). These emissions were included as part of the Project Area analyses so that the combined "worst-case" effect of the direct Project-related emissions and haul road activity could be computed. Results of the long-term (annual) and short-term (24-hour) analyses are presented graphically in Figures 5 and 6, respectively. As discussed in the previous sections the combined impact of the direct Project-related emissions and the access road emissions are so low that it can be concluded that they do not pose any threat to the particulate standards.

To assess the maximum impact of the Hermit mine's haul road traffic on Mt. Trumbull road, the particulate emissions resulting from this approximate eleven mile haul road segment were input into the ISCST model and the 24-hour particulate concentrations were computed for each day in the 1983 - 1984 meteorological data set. However, to be consistent with the conservative approach of this analysis, haul road traffic was assumed to continue from 7:00 a.m. until 11:00 p.m., seven days a week, at a rate of twelve round trips per day. In other words, no adjustment was made in the modeling analysis for weekend shutdowns. The particulate emission rate of 16.0 pounds per vehicle mile traveled (as presented in Section 3.0) was used throughout the modeling analysis.

The maximum or "worst-case" day particulate concentrations computed by ISCST show that the maximum 24-hour particulate concentration resulting from actual meteorological conditions and full haul road activities was 20 $\mu g/m^3$. This value is well below the allowable state and federal standards of 260 $\mu g/m^3$ and, thus, poses no threat to the local air quality.

5.4 Cumulative Impacts

At the time activities at the Hermit Project begin, in either May or June of 1987, mining activities at the Hack Canyon Mines (Hack 1, 2 and 3) will have ceased. Consequently, once activities at the Hermit Project begin, there will be only three other operating mining projects in the Arizona Strip District. The closest operation to the Hermit Project is the Kanab North Project located approximately six miles to the east. The Pigeon



ENECOTECH
Denver, Colorado

PROJECT	Hermit	Haul Road Configuration

FILE NO. ______ DATE 2/87 FIGURE NO. 7

Project is located approximately thirteen miles to the east-northeast and the recently approved Pinenut Project is approximately thirteen miles south of the Hermit Project.

Each of the operational and proposed mining projects are approximately the same size and have or will have relatively the same production rates and emissions. Further, the ore haulage rates and schedules are or will be similar - namely ten to twelve haul trucks per day (five days per week) on the average.

The impact analysis results for the Hermit Project presented in Sections 5.2 and 5.3.1 show that the particulate concentrations resulting from the proposed Hermit Project are well below the applicable standards. Further, these results show that the Project Impact Area does not extend beyond 3000 meters (1.9 miles) in any direction around the Project. (Resultant particulate concentrations fall below the level of significance within 3000 meters). Thus, with the extremely small impact area associated with the proposed Hermit Project and the relatively great distances between the other existing and planned mining operations in the area, there is virtually no potential for overlap of impacts from the Hermit Project Area.

However, since the Kanab North, Pinenut and Hermit Project will utilize common segments of Mt. Trumbull Road for ore haulage, there is a potential for cumulative impacts from ore haulage on these common segments. As currently planned the Kanab North, the Pinenut and the Hermit Projects will utilize a common seven mile section of Mt. Trumbull Road for ore haulage. Ore haulage from the Pigeon Mine does not involve Mt. Trumbull Road and the Hack Mines will be shut down prior to initiating ore haulage from the Kanab North, Pinenut and Hermit Projects.

Since the Kanab North, Pinenut and Hermit Projects each expect ore haulage rates to average ten to twelve haul truck trips (round trips) per day, five days per week, during the period when all three mines will be in the ore production phase of operations (1990 - 1993), there is a potential for a total of 72 haul trucks (36 round trips) to traverse the common segment of Mt. Trumbull Road each day.

To assess the potential cumulative air quality impact resulting from the concurrent ore haulage on the common segment of Mt. Trumbull Road, dispersion modeling was conducted using ISCST. A haul road emission rate of 16.0 pounds per vehicle mile traveled (this emission rate assumes no emission controls) was input into the model and the 24-hour particulate concentrations were computed for each day in the 1983 - 1984 meteorological data set. Again to be consistent with the conservative approach used throughout this impact analysis, haul road traffic was assumed to continue from 7:00 a.m. until 11:00 p.m., seven days a week, at a rate of 36 round trips per day, even though current plans do not anticipate a seven day per week hauling schedule.

The maximum or "worst-case" day particulate concentrations computed by ISCST show that the maximum 24-hour particulate concentration resulting from actual meteorological conditions and 36 round trips was 60 $\mu g/m^3$. This value is well below the allowable 24-hour standard. In fact, when carrying the analysis further the modeling shows that even doubling the haul road traffic on the common road segment to 72 round trips per day would only result in a maximum 24-hour concentration of 120 $\mu g/m^3$. This value is still well below the allowable 24-hour standard of 260 $\mu g/m^3$.

Thus, it can be concluded that the cumulative impacts resulting from the concurrent utilization of Mt. Trumbull Road poses no threat to the local air quality even if haulage is substantially increased.

6.0 IMPACTS ON SENSITIVE RECEPTORS

The closest sensitive receptor to the proposed Hermit Project is the Grand Canyon National Park - a mandatory Class 1 area. At its closest point, the proposed Hermit Project is approximately seventeen miles north of the Park boundary.

The "worst-case" impact analyses presented in Section 5.0 show that the maximum area of impact, as defined by the EPA concentrations or levels of significance, affected by the Hermit Project is at a maximum 3000 meters (1.9 miles) surrounding the Project Area. This is over fifteen miles short of the nearest Park boundary. Further, since all associated haul roads run northerly away from the Project Area, their impact areas will even be further away from the Park.

With such a small area of impact and with such a great distance to the Park boundary, it can be concluded with a great degree of certainty that the proposed Hermit Project will have a negligible air quality impact on the Grand Canyon National Park and no detectable impact on the visibility within the Park.

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-200.0, -130.0, 130.0, 200.0, 500.0, 1000.0, 1500.0, 2000.0, 3000.0, 4000.0,

*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-400.0, -200.0, .0, 200.0, 400.0,

APPENDIX A

COMPUTER LISTINGS

ANNUAL AVERAGE CONCENTRATIONS FROM THE PROJECT AREA - ISCLT

MAXIMUM PROJECT AREA IMPACT - ISCST

MAXIMUM 24-HOUR HAUL ROAD IMPACT - ISCST

ENECOTECH

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) = 1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) = 1
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) = 1
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) = 0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) = 0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) = 1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)	
WITH THE FOLLOWING TIME PERIODS:	
HOURLY (YES=1,NO=0)	ISW(7) = 0
2-HOUR (YES=1,NO=0)	ISW(8) = 0
3-HOUR (YES=1,NO=0)	ISW(9) = 0
4-HOUR (YES=1,NO=0)	ISW(10) = 0
6-HOUR (YES=1,NO=0)	ISW(11) = 0
8-HOUR (YES=1,NO=0)	ISW(12) = 0
12-HOUR (YES=1,NO=0)	ISW(13) = 0
24-HOUR (YES=1,NO=0)	ISW(14) = 1
PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)	ISW(15) = 0
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE	
SPECIFIED BY ISW(7) THROUGH ISW(14):	
DAILY TABLES (YES=1,NO=0)	ISW(16) = 1
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) = 1
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) = 1
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) = 2
RURAL-URBAN OPTION (RURAL=0,URBAN MODE 1=1,URBAN MODE 2=2)	ISW(20) = 0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) = 1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) = 1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES)0)	ISW(23) = 0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) = 1
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) = 1

NUMBER OF INPUT SOURCES	NSOURC = 21
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP = 0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD = 0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS = 10
NUMBER OF Y (THETA) GRID VALUES	NYPNTS = 5
NUMBER OF DISCRETE RECEPTORS	NXWYPT = 0
NUMBER OF HOURS PER DAY IN METEOROLOGICAL DATA	NHOURS = 16
NUMBER OF DAYS OF METEOROLOGICAL DATA	NDAYS = 3
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =.10000E+07
ENTRAINMENT COEFFICIENT FOR UNSTABLE ATMOSPHERE	BETA1 = .600
ENTRAINMENT COEFFICIENT FOR STABLE ATMOSPHERE	BETA2 = .600
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED	ZR = 10.00 METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET = 2
ALLOCATED DATA STORAGE	LIMIT = 10000 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN	MIMIT = 5081 WORDS

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-200.0, -130.0, 130.0, 200.0, 500.0, 1000.0, 1500.0, 2000.0, 3000.0, 4000.0,

*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-400.0, -200.0, .0, 200.0, 400.0,

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
1	1	0	3	.37800E+00	.0	-1000.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
2	1	0	3	.37800E+00	.0	-900.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
3	1	0	3	.37800E+00	.0	-800.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
4	1	0	3	.37800E+00	.0	-700.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
5	1	0	3	.37800E+00	.0	-600.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
6	1	0	3	.37800E+00	.0	-500.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
7	1	0	3	.37800E+00	.0	-400.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
8	1	0	3	.37800E+00	.0	-300.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
9	1	0	3	.37800E+00	.0	-200.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
10	1	0	3	.37800E+00	.0	-100.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
11	1	0	3	.37800E+00	.0	.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
12	1	0	3	.37800E+00	.0	100.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
13	1	0	3	.37800E+00	.0	200.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
14	1	0	3	.37800E+00	.0	300.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
15	1	0	3	.37800E+00	.0	400.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
16	1	0	3	.37800E+00	.0	500.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
17	1	0	3	.37800E+00	.0	600.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
18	1	0	3	.37800E+00	.0	700.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
19	1	0	3	.37800E+00	.0	800.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
20	1	0	3	.37800E+00	.0	900.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00
21	1	0	3	.37800E+00	.0	1000.0	1.0	3.00	3.00	46.00	.00	.00	.00	.00

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

* SOURCE-RECEPTOR COMBINATIONS LESS THAN 100 METERS OR THREE BUILDING HEIGHTS IN DISTANCE. NO AVERAGE CONCENTRATION IS CALCULATED *

	- - RECEPTOR LOCATION - -		
SOURCE NUMBER	X OR RANGE (METERS)	Y (METERS) OR DIRECTION (DEGREES)	DISTANCE BETWEEN (METERS)
6	-130.0	-400.0	65.11
6	130.0	-400.0	65.11
7	-130.0	-400.0	31.10
7	130.0	-400.0	31.10
8	-130.0	-400.0	65.11
8	130.0	-400.0	65.11
8	-130.0	-200.0	65.11
8	130.0	-200.0	65.11
9	-130.0	-200.0	31.10
9	130.0	-200.0	31.10
10	-130.0	-200.0	65.11
10	130.0	-200.0	65.11
10	-130.0	.0	65.11
10	130.0	.0	65.11
11	-130.0	.0	31.10
11	130.0	.0	31.10
12	-130.0	.0	65.11
12	130.0	.0	65.11
12	-130.0	200.0	65.11
12	130.0	200.0	65.11
13	-130.0	200.0	31.10
13	130.0	200.0	31.10
14	-130.0	200.0	65.11
14	130.0	200.0	65.11
14	-130.0	400.0	65.11
14	130.0	400.0	65.11
15	-130.0	400.0	31.10
15	130.0	400.0	31.10
16	-130.0	400.0	65.11
16	130.0	400.0	65.11

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

* OAILY 16-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENOING WITH HOUR 16 FOR OAY 103 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRIO *

* MAXIMUM VALUE EQUALS 60.44895 ANO OCCURRED AT (200.0, 200.0) *

Y-AXIS / (METERS) /	-200.0	-130.0	130.0	200.0	500.0	1000.0	1500.0	2000.0	3000.0
	X-AXIS (METERS)								
400.0 /	.00000	.00000	5.34414	60.44890	31.95974	15.44940	9.71071	7.46860	4.84705
200.0 /	.00000	.00000	5.34414	60.44895	32.12696	17.81814	10.74590	7.72844	5.17612
.0 /	.00000	.00000	5.34414	60.44895	32.13263	18.98085	12.10262	8.13743	5.27139
-200.0 /	.00000	.00000	5.34414	60.44895	32.13272	19.27472	13.12567	8.79609	5.38404
-400.0 /	.00000	.00000	5.34414	60.44895	32.13033	19.10911	13.57481	9.57818	5.46073

!!!!1 AL CONCENTRATIO MUS B MULTIPLIE- B 16/2 T OBTAI 24 HOUR AVERAGE !!!!!

*** Energy Fuels - Mt. Trumbull Road - Hermit MAX E Road - 16 hou ***

* DAILY 16-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 16 FOR DAY 103 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 60.44895 AND OCCURRED AT (200.0, 200.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) 4000.0
400.0 /	3.29566
200.0 /	3.83119
.0 /	4.09320
-200.0 /	4.09058
-400.0 /	3.87519

!!!!1 AL╞ CONCENTRATIO╪ MUS╘ B┤ MULTIPLIE- B┘ 16/2┤ T╧ OBTAI╪ 24 HOUR AVERAGE !!!!!

- ISCLT INPUT DATA -

NUMBER OF SOURCES = 15
NUMBER OF X AXIS GRID SYSTEM POINTS = 11
NUMBER OF Y AXIS GRID SYSTEM POINTS = 11
NUMBER OF SPECIAL POINTS = 0
NUMBER OF SEASONS = 1
NUMBER OF WIND SPEED CLASSES = 6
NUMBER OF STABILITY CLASSES = 6
NUMBER OF WIND DIRECTION CLASSES = 16
FILE NUMBER OF DATA FILE USED FOR REPORTS = 1
THE PROGRAM IS RUN IN RURAL MODE
CONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR = .10000000E+07
ACCELERATION OF GRAVITY (METERS/SEC**2) = 9.800
HEIGHT OF MEASUREMENT OF WIND SPEED (METERS) = 10.000
ENTRAINMENT PARAMETER FOR UNSTABLE CONDITIONS = .600
ENTRAINMENT PARAMETER FOR STABLE CONDITIONS = .600
CORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORTH (DEGREES) = .000
DECAY COEFFICIENT = .00000000E+00
PROGRAM OPTION SWITCHES = 1, 1, 1, 0, 0, 3, 2, 2, 3, 2, 2, 0, 0, 0, 0, 0, 0, 1, 1, 0,
ALL SOURCES ARE USED TO FORM SOURCE COMBINATION 1
DISTANCE X AXIS GRID SYSTEM POINTS (METERS)= -3000.00, -2000.00, -1500.00, -1000.00, -500.00, .00,
500.00, 1000.00, 1500.00, 2000.00, 3000.00,
DISTANCE Y AXIS GRID SYSTEM POINTS (METERS)= -3000.00, -2000.00, -1500.00, -1000.00, -500.00, .00,
500.00, 1000.00, 1500.00, 2000.00, 3000.00,

- AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

	STABILITY CATEGORY 1	STABILITY CATEGORY 2	STABILITY CATEGORY 3	STABILITY CATEGORY 4	STABILITY CATEGORY 5	STABILITY CATEGORY 6
SEASON 1	283.0000	283.0000	283.0000	283.0000	283.0000	283.0000

- MIXING LAYER HEIGHT (METERS) -

SEASON 1

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 2	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 3	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 4	.500000E+03	.500000E+03	.750000E+03	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 5	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05
STABILITY CATEGORY 6	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 1

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00013000	.00279994	.00172996	.00000000	.00000000	.00000000
22.500	.00026999	.00319993	.00132997	.00000000	.00000000	.00000000
45.000	.00039999	.00332993	.00079998	.00000000	.00000000	.00000000
67.500	.00000000	.00106998	.00026999	.00000000	.00000000	.00000000
90.000	.00013000	.00212996	.00106998	.00000000	.00000000	.00000000
112.500	.00026999	.00079998	.00000000	.00000000	.00000000	.00000000
135.000	.00079998	.00399992	.00199996	.00013000	.00000000	.00000000
157.500	.00106998	.00612987	.00159997	.00000000	.00000000	.00000000
180.000	.00066999	.00652986	.00345993	.00052999	.00000000	.00000000
202.500	.00092998	.00585988	.00172996	.00013000	.00000000	.00000000
225.000	.00092998	.00385992	.00332993	.00000000	.00000000	.00000000
247.500	.00000000	.00212996	.00132997	.00000000	.00000000	.00000000
270.000	.00079998	.00439991	.00212996	.00026999	.00000000	.00000000
292.500	.00039999	.00172996	.00305994	.00000000	.00000000	.00000000
315.000	.00013000	.00478990	.00292994	.00013000	.00000000	.00000000
337.500	.00039999	.00185996	.00159997	.00013000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 2

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00066999	.00132997	.00106998	.00026999	.00000000	.00000000
22.500	.00052999	.00146997	.00159997	.00026999	.00000000	.00000000
45.000	.00106998	.00252995	.00052999	.00039999	.00000000	.00000000
67.500	.00052999	.00132997	.00066999	.00000000	.00000000	.00000000
90.000	.00000000	.00199996	.00079998	.00000000	.00000000	.00000000
112.500	.00026999	.00132997	.00052999	.00000000	.00000000	.00000000
135.000	.00079998	.00319993	.00146997	.00013000	.00000000	.00000000
157.500	.00039999	.00692986	.00359993	.00013000	.00000000	.00000000
180.000	.00092998	.00319993	.00345993	.00106998	.00000000	.00000000
202.500	.00106998	.00439991	.00225995	.00159997	.00000000	.00000000
225.000	.00066999	.00132997	.00212996	.00079998	.00000000	.00000000
247.500	.00052999	.00132997	.00092998	.00000000	.00000000	.00000000
270.000	.00000000	.00092998	.00225995	.00092998	.00000000	.00000000
292.500	.00052999	.00039999	.00212996	.00106998	.00000000	.00000000
315.000	.00013000	.00199996	.00279994	.00119998	.00000000	.00000000
337.500	.00000000	.00119998	.00106998	.00000000	.00000000	.00000000

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- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WINO SPEEO, OIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 3

DIRECTION (OEGREES)	WINO SPEEO CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEEO CATEGORY 3 (4.3000MPS)	WINO SPEEO CATEGORY 4 (6.8000MPS)	WINO SPEED CATEGORY 5 (9.5000MPS)	WINO SPEEO CATEGORY 6 (12.5000MPS)
..000	.00039999	.00185996	.00079998	.00026999	.00000000	.00000000
22.500	.00052999	.00185996	.00199996	.00092998	.00000000	.00000000
45.000	.00066999	.00305994	.00172996	.00026999	.00013000	.00000000
67.500	.00039999	.00332993	.00119998	.00026999	.00000000	.00000000
90.000	.00052999	.00172996	.00106998	.00000000	.00000000	.00000000
112.500	.00079998	.00106998	.00013000	.00000000	.00000000	.00000000
135.000	.00146997	.00385992	.00079998	.00039999	.00000000	.00000000
157.500	.00146997	.00798983	.00518989	.00146997	.00000000	.00000000
180.000	.00079998	.00518989	.00492990	.00305994	.00000000	.00000000
202.500	.00066999	.00452991	.00412991	.00252995	.00000000	.00000000
225.000	.00052999	.00185996	.00305994	.00252995	.00013000	.00000000
247.500	.00026999	.00146997	.00159997	.00146997	.00000000	.00000000
270.000	.00079998	.00052999	.00199996	.00159997	.00000000	.00000000
292.500	.00052999	.00106998	.00252995	.00225995	.00000000	.00000000
315.000	.00052999	.00132997	.00252995	.00239995	.00000000	.00000000
337.500	.00000000	.00119998	.00252995	.00079998	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 4

OIRECTION (DEGREES)	WINO SPEEO CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WINO SPEED CATEGORY 3 (4.3000MPS)	WINO SPEEO CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WINO SPEED CATEGORY 6 (12.5000MPS)
.000	.00199996	.00825983	.00478990	.00252995	.00039999	.00000000
22.500	.00146997	.00518989	.00785984	.00758984	.00119998	.00000000
45.000	.00199996	.00518989	.00385992	.00399992	.00052999	.00013000
67.500	.00092998	.00385992	.00372992	.01025979	.00132997	.00039999
90.000	.00119998	.00292994	.00172996	.00159997	.00000000	.00000000
112.500	.00039999	.00159997	.00026999	.00000000	.00000000	.00000000
135.000	.00132997	.00412991	.00079998	.00013000	.00000000	.00000000
157.500	.00172996	.01544968	.01158976	.00465990	.00052999	.00000000
180.000	.00252995	.01464970	.01224975	.01184975	.00026999	.00000000
202.500	.00252995	.01611966	.01344972	.01477969	.00399992	.00052999
225.000	.00212996	.01144976	.01278973	.02037958	.00385992	.00066999
247.500	.00106998	.00825983	.00572988	.01091977	.00146997	.00039999
270.000	.00146997	.01051978	.00772984	.00705985	.00185996	.00039999
292.500	.00119998	.00652986	.00598988	.00905981	.00052999	.00026999
315.000	.00132997	.00825983	.00798983	.00612987	.00066999	.00039999
337.500	.00039999	.00625987	.00612987	.00785984	.00159997	.00000000

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- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 5

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00132997	.00492990	.00305994	.00000000	.00000000	.00000000
22.500	.00212996	.00825983	.01464970	.00000000	.00013000	.00000000
45.000	.00279994	.01038979	.00638987	.00000000	.00000000	.00000000
67.500	.00052999	.00545989	.00772984	.00000000	.00000000	.00000000
90.000	.00132997	.00265994	.00225995	.00000000	.00000000	.00000000
112.500	.00066999	.00079998	.00013000	.00000000	.00000000	.00000000
135.000	.00185996	.00172996	.00013000	.00000000	.00000000	.00000000
157.500	.00132997	.00732985	.00265994	.00000000	.00000000	.00000000
180.000	.00452991	.01051978	.00399992	.00000000	.00000000	.00000000
202.500	.00359993	.01704965	.01011979	.00000000	.00000000	.00000000
225.000	.00558988	.01118977	.00665986	.00000000	.00000000	.00000000
247.500	.00172996	.01104977	.00412991	.00000000	.00000000	.00000000
270.000	.00385992	.01411971	.00239995	.00000000	.00000000	.00000000
292.500	.00319993	.01118977	.00678986	.00000000	.00000000	.00000000
315.000	.00146997	.01118977	.00838983	.00000000	.00000000	.00000000
337.500	.00159997	.00718985	.01104977	.00000000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 6

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00146997	.00265994	.00000000	.00000000	.00000000	.00000000
22.500	.00092998	.00305994	.00000000	.00000000	.00000000	.00000000
45.000	.00159997	.00399992	.00000000	.00000000	.00000000	.00000000
67.500	.00106998	.00092998	.00000000	.00000000	.00000000	.00000000
90.000	.00172996	.00212996	.00000000	.00000000	.00000000	.00000000
112.500	.00092998	.00013000	.00000000	.00000000	.00000000	.00000000
135.000	.00185996	.00172996	.00000000	.00000000	.00000000	.00000000
157.500	.00079998	.00119998	.00000000	.00000000	.00000000	.00000000
180.000	.00332993	.00159997	.00000000	.00000000	.00000000	.00000000
202.500	.00159997	.00159997	.00000000	.00000000	.00000000	.00000000
225.000	.00185996	.00225995	.00000000	.00000000	.00000000	.00000000
247.500	.00146997	.00212996	.00000000	.00000000	.00000000	.00000000
270.000	.00172996	.00305994	.00000000	.00000000	.00000000	.00000000
292.500	.00172996	.00185996	.00000000	.00000000	.00000000	.00000000
315.000	.00185996	.00332993	.00000000	.00000000	.00000000	.00000000
337.500	.00092998	.00185996	.00000000	.00000000	.00000000	.00000000

- ISCLT INPUT DATA (CONT.) -

- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 2	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 3	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 4	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 5	.200000E-01	.200000E-01	.200000E-01	.200000E-01	.200000E-01	.200000E-01
STABILITY CATEGORY 6	.350000E-01	.350000E-01	.350000E-01	.350000E-01	.350000E-01	.350000E-01

- WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.100000E+00	.100000E+00	.100000E+00	.100000E+00	.100000E+00	.100000E+00
STABILITY CATEGORY 2	.150000E+00	.150000E+00	.150000E+00	.150000E+00	.150000E+00	.150000E+00
STABILITY CATEGORY 3	.200000E+00	.200000E+00	.200000E+00	.200000E+00	.200000E+00	.200000E+00
STABILITY CATEGORY 4	.250000E+00	.250000E+00	.250000E+00	.250000E+00	.250000E+00	.250000E+00
STABILITY CATEGORY 5	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00
STABILITY CATEGORY 6	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00

- SOURCE INPUT DATA -

```
C T SOURCE SOURCE     X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE  HEIGHT  ELEV- /          - SOURCE DETAILS DEPENDING ON TYPE -
R P                 (M)         (M)        (M)   ATION /
D E                                                (M)  /
-----------------------------------------------------------------------------------------------------------------------
X       1  STACK     450.00      365.00   1.00      .00 GAS EXIT TEMP (DEG K)= 298.00, GAS EXIT VEL. (M/SEC)= 20.00,
                                                        STACK DIAMETER (M)= 2.400, HEIGHT OF ASSO. BLDG. (M)=    .00, WIDTH OF
                                                        ASSO. BLDG. (M)=     .00, WAKE EFFECTS FLAG = 0
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC                            ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 4.32000E-01
X       2  AREA      215.00      365.00   1.00      .00 WIDTH OF AREA (M)=   75.00
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC  PER SQUARE METER          ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 8.98000E-06
X       3  AREA      182.00      304.00   1.00      .00 WIDTH OF AREA (M)=   75.00
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC  PER SQUARE METER          ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 8.98000E-06
X       4  AREA      320.00      365.00   1.00      .00 WIDTH OF AREA (M)=   75.00
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC  PER SQUARE METER          ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 5.11000E-07
X       5  AREA      330.00      550.00   1.00      .00 WIDTH OF AREA (M)=   75.00
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC  PER SQUARE METER          ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 5.11000E-07
X       6  AREA      182.00      365.00   1.00      .00 WIDTH OF AREA (M)=   35.00
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC  PER SQUARE METER          ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 1.00000E-08
X       7  AREA      150.00      275.00   1.00      .00 WIDTH OF AREA (M)=  330.00
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC  PER SQUARE METER          ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 6.76000E-06
WARNING - DISTANCE BETWEEN SOURCE      7 AND POINT X,Y=     500.00,      500.00 IS LESS THAN PERMITTED
X       8 VOLUME     108.60      641.40   1.00      .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                        STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                             - PARTICULATE CATEGORIES -
                                                                                1       2       3
                                                        FALL VELOCITY (MPS)      .0040   .0180   .0480
                                                        MASS FRACTION            .2200   .4400   .3400
                                                        REFLECTION COEFFICIENT  .8000   .7400   .6200
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC                            ) -
                                                                  SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 1.79500E-01
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- SOURCE INPUT DATA (CONT.) -

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C T SOURCE SOURCE     X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE  HEIGHT  ELEV- /              - SOURCE DETAILS DEPENDING ON TYPE -
R P                  (M)         (M)       (M)    ATION /
D E                                                (M)  /
----------------------------------------------------------------------------------------------------------------------
X       9 VOLUME     -32.80      782.80    1.00     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                        STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                             - PARTICULATE CATEGORIES -
                                                                               1       2       3
                                                        FALL VELOCITY (MPS)     .0040   .0180   .0480
                                                        MASS FRACTION           .2200   .4400   .3400
                                                        REFLECTION COEFFICIENT  .8000   .7400   .6200
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 1.79500E-01
X      10 VOLUME    -174.20      924.30    1.00     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                        STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                             - PARTICULATE CATEGORIES -
                                                                               1       2       3
                                                        FALL VELOCITY (MPS)     .0040   .0180   .0480
                                                        MASS FRACTION           .2200   .4400   .3400
                                                        REFLECTION COEFFICIENT  .8000   .7400   .6200
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 1.79500E-01
X      11 VOLUME    -315.70     1065.70    1.00     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                        STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                             - PARTICULATE CATEGORIES -
                                                                               1       2       3
                                                        FALL VELOCITY (MPS)     .0040   .0180   .0480
                                                        MASS FRACTION           .2200   .4400   .3400
                                                        REFLECTION COEFFICIENT  .8000   .7400   .6200
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 1.79500E-01
X      12 VOLUME    -457.10     1207.10    1.00     .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                        STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                             - PARTICULATE CATEGORIES -
                                                                               1       2       3
                                                        FALL VELOCITY (MPS)     .0040   .0180   .0480
                                                        MASS FRACTION           .2200   .4400   .3400
                                                        REFLECTION COEFFICIENT  .8000   .7400   .6200
                                                             - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                 1.79500E-01
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- SOURCE INPUT DATA (CONT.) -

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C T SOURCE SOURCE     X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE  HEIGHT  ELEV- /             - SOURCE DETAILS DEPENDING ON TYPE -
R P                  (M)         (M)        (M)   ATION /
D E                                                (M)  /
-------------------------------------------------------------------------------------------------------------------------------
X      13 VOLUME   -598.10     1348.50   1.00      .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                       STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                                - PARTICULATE CATEGORIES -
                                                                                  1      2      3
                                                       FALL VELOCITY (MPS)      .0040  .0180  .0480
                                                       MASS FRACTION            .2200  .4400  .3400
                                                       REFLECTION COEFFICIENT  .8000  .7400  .6200
                                                            - SOURCE STRENGTHS ( GRAMS PER SEC                                  ) -
                                                                 SEASON 1      SEASON 2      SEASON 3      SEASON 4
                                                                1.79500E-01
X      14 VOLUME   -739.90     1489.90   1.00      .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                       STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                                - PARTICULATE CATEGORIES -
                                                                                  1      2      3
                                                       FALL VELOCITY (MPS)      .0040  .0180  .0480
                                                       MASS FRACTION            .2200  .4400  .3400
                                                       REFLECTION COEFFICIENT  .8000  .7400  .6200
                                                            - SOURCE STRENGTHS ( GRAMS PER SEC                                  ) -
                                                                 SEASON 1      SEASON 2      SEASON 3      SEASON 4
                                                                1.79500E-01
X      15 VOLUME   -881.40     1631.40   1.00      .00 STANDARD DEVIATION OF THE CROSSWIND SOURCE DISTRIBUTION (M)=  10.00
                                                       STANDARD DEVIATION OF THE VERTICAL SOURCE DISTRIBUTION (M)=   5.00
                                                                                - PARTICULATE CATEGORIES -
                                                                                  1      2      3
                                                       FALL VELOCITY (MPS)      .0040  .0180  .0480
                                                       MASS FRACTION            .2200  .4400  .3400
                                                       REFLECTION COEFFICIENT  .8000  .7400  .6200
                                                            - SOURCE STRENGTHS ( GRAMS PER SEC                                  ) -
                                                                 SEASON 1      SEASON 2      SEASON 3      SEASON 4
                                                                1.79500E-01
```

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-3000.000	-2000.000	-1500.000	-1000.000	-500.000	.000	500.000	1000.000	1500.000
	- CONCENTRATION -								
3000.000	.154322	.378256	.598347	.911966	1.173769	1.253367	1.241547	1.048814	.921459
2000.000	.148275	.295638	.623543	2.732063	3.999588	3.000382	2.401556	1.883574	1.282024
1500.000	.192584	.410255	.784549	5.113924	12.529500	5.490071	3.808425	2.463339	1.572774
1000.000	.246098	.527905	1.058403	2.471028	7.338008	13.881150	7.347954	3.296376	1.708664
500.000	.307253	.648150	1.055702	1.784715	3.298178	12.564150	4.361539	3.728064	1.775740
.000	.317789	.616529	.925453	1.460685	2.421234	4.620816	5.215021	2.730411	1.590411
-500.000	.316508	.613332	.831389	1.133185	1.601266	1.925251	1.798789	1.548757	1.158046
-1000.000	.330200	.532312	.702331	.921726	1.030704	1.040899	.959728	.962345	.846473
-1500.000	.307128	.485102	.611109	.657342	.761610	.668390	.649878	.655270	.583159
-2000.000	.291142	.439931	.472589	.515747	.532099	.487182	.475408	.449485	.462903
-3000.000	.262265	.304197	.319944	.338604	.309088	.298324	.293428	.278390	.283429

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	2000.000	3000.000
	- CONCENTRATION -	
3000.000	.714707	.494773
2000.000	.965434	.497773
1500.000	.954025	.556864
1000.000	1.073309	.552262
500.000	1.149789	.626684
.000	1.004321	.554940
-500.000	.854040	.527731
-1000.000	.711993	.453030
-1500.000	.561362	.399999
-2000.000	.419651	.365512
-3000.000	.281040	.254576

** END OF ISCLT PROGRAM, 15 SOURCES PROCESSED **

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*** Energy Fuels Main Facility - Hermit MAX E OF FACILITY ***

CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) = 1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) = 1
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) = 1
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) = 0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) = 0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) = 1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION) WITH THE FOLLOWING TIME PERIODS:	
HOURLY (YES=1,NO=0)	ISW(7) = 0
2-HOUR (YES=1,NO=0)	ISW(8) = 0
3-HOUR (YES=1,NO=0)	ISW(9) = 0
4-HOUR (YES=1,NO=0)	ISW(10) = 0
6-HOUR (YES=1,NO=0)	ISW(11) = 0
8-HOUR (YES=1,NO=0)	ISW(12) = 0
12-HOUR (YES=1,NO=0)	ISW(13) = 0
24-HOUR (YES=1,NO=0)	ISW(14) = 1
PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)	ISW(15) = 0
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE SPECIFIED BY ISW(7) THROUGH ISW(14):	
DAILY TABLES (YES=1,NO=0)	ISW(16) = 1
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) = 1
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) = 1
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) = 2
RURAL-URBAN OPTION (RURAL=0,URBAN MODE 1=1,URBAN MODE 2=2)	ISW(20) = 0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) = 1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) = 1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0)	ISW(23) = 0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) = 1
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) = 1
NUMBER OF INPUT SOURCES	NSOURC = 15
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP = 0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD = 0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS = 10
NUMBER OF Y (THETA) GRID VALUES	NYPNTS = 9
NUMBER OF DISCRETE RECEPTORS	NXWYPT = 0
NUMBER OF HOURS PER DAY IN METEOROLOGICAL DATA	NHOURS = 24
NUMBER OF DAYS OF METEOROLOGICAL DATA	NDAYS = 5
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =.10000E+07
ENTRAINMENT COEFFICIENT FOR UNSTABLE ATMOSPHERE	BETA1 = .600
ENTRAINMENT COEFFICIENT FOR STABLE ATMOSPHERE	BETA2 = .600
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED	ZR = 10.00 METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET = 2
ALLOCATED DATA STORAGE	LIMIT = 10000 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN	MIMIT = 4075 WORDS

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* SOURCE-RECEPTOR COMBINATIONS LESS THAN 100 METERS OR THREE BUILDING HEIGHTS IN DISTANCE. NO AVERAGE CONCENTRATION IS CALCULATED *

	- - RECEPTOR LOCATION - -		
SOURCE NUMBER	X OR RANGE (METERS)	Y (METERS) OR DIRECTION (DEGREES)	DISTANCE BETWEEN (METERS)
15	500.0	500.0	8.30

*** Energy Fuels Main Facility - Hermit MAX E OF FACILITY ***

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** X-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-2000.0, -1000.0, -500.0, .0, 500.0, 1000.0, 1500.0, 2000.0, 3000.0, 4000.0,

*** Y-COORDINATES OF RECTANGULAR GRID SYSTEM ***
(METERS)

-2000.0, -1500.0, -1000.0, -500.0, .0, 500.0, 1000.0, 1500.0, 2000.0,

*** Energy Fuels Main Facility - Hermit MAX E OF FACILITY ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
1	0	0	0	.43200E+00	450.0	365.0	1.0	1.00	273.00	20.00	2.40	.00	.00	.00
2	1	0	3	.27300E+00	108.6	641.4	1.0	3.00	3.00	10.00	.00	.00	.00	.00
3	1	0	3	.27300E+00	-32.8	782.8	1.0	3.00	3.00	10.00	.00	.00	.00	.00
4	1	0	3	.27300E+00	-174.2	924.3	1.0	3.00	3.00	10.00	.00	.00	.00	.00
5	1	0	3	.27300E+00	-315.7	1065.7	1.0	3.00	3.00	10.00	.00	.00	.00	.00
6	1	0	3	.27300E+00	-457.1	1207.1	1.0	3.00	3.00	10.00	.00	.00	.00	.00
7	1	0	3	.27300E+00	-598.5	1348.5	1.0	3.00	3.00	10.00	.00	.00	.00	.00
8	1	0	3	.27300E+00	-739.9	1489.9	1.0	3.00	3.00	10.00	.00	.00	.00	.00
9	1	0	3	.27300E+00	-881.4	1631.4	1.0	3.00	3.00	10.00	.00	.00	.00	.00
10	2	0	0	.89800E-05	215.0	365.0	1.0	3.00	.00	75.00	.00	.00	.00	.00
11	2	0	0	.89800E-05	182.0	304.0	1.0	3.00	.00	75.00	.00	.00	.00	.00
12	2	0	0	.51100E-06	320.0	365.0	1.0	3.00	.00	75.00	.00	.00	.00	.00
13	2	0	0	.51100E-06	330.0	550.0	1.0	3.00	.00	35.00	.00	.00	.00	.00
14	2	0	0	.10000E-07	182.0	365.0	1.0	3.00	.00	35.00	.00	.00	.00	.00
15	2	0	0	.67600E-05	150.0	275.0	1.0	3.00	.00	330.00	.00	.00	.00	.00

*** Energy Fuels Main Facility - Hermit MAX E OF FACILITY ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 103 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 32.59062 AND OCCURRED AT (-500.0, 1500.0) *

Y-AXIS (METERS) /	X-AXIS (METERS) -2000.0	-1000.0	-500.0	.0	500.0	1000.0	1500.0	2000.0	3000.0
2000.0 /	.00000	.00000	.03397	.82708	.91949	1.05711	1.08765	1.07001	1.07572
1500.0 /	.00000	.00000	32.59062	9.50707	5.94730	4.21244	3.25352	2.77357	2.28842
1000.0 /	.00000	.00000	.00104	28.60751	13.21285	8.38229	6.63242	5.35837	3.54615
500.0 /	.00000	.00000	.00000	.03088	14.32547	19.98986	12.03195	8.27043	4.69292
.0 /	.00000	.00000	.00000	.00000	.41527	9.75253	5.63178	4.58933	3.83071
-500.0 /	.00000	.00000	.00000	.00000	.00008	.32091	3.58435	3.01546	2.26258
-1000.0 /	.00000	.00000	.00000	.00000	.00000	.00071	.28279	1.80009	1.47717
-1500.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00282	.24964	1.45468
-2000.0 /	.00000	.00000	.00000	.00000	.00000	.00000	.00002	.00714	.73319

*** Energy Fuels Main Facility - Hermit MAX E OF FACILITY ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 103 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 32.59062 AND OCCURRED AT (-500.0, 1500.0) *

Y-AXIS / (METERS) /	X-AXIS (METERS) 4000.0
2000.0 /	1.08444
1500.0 /	1.59391
1000.0 /	2.77515
500.0 /	3.23001
.0 /	2.93747
-500.0 /	1.47618
-1000.0 /	1.28236
-1500.0 /	.88589
-2000.0 /	1.03466

APPENDIX B

EMISSION INVENTORY

TABLE

B-1 HAUL ROADS, PRODUCT TRANSPORT

B-2 ORE LOADOUT TO ORE STOCKPILE

B-3 ORE LOADING FROM STOCKPILE TO HAUL TRUCK

B-4 WASTE ROCK DUMPING

B-5 WIND EROSION - ALL SOURCES

B-6 MINE VENT

TABLE B-1

ENERGY FUELS NUCLEAR HERMIT PROJECT

Source Description: Haul road, product transport on unpaved road

Process Rate: 12 round trips per day

Emission Factor: E = k*5.9(s/12)(S/30)(W/3)**0.7*
(w/4)**0.5((365-p)/365)

where:
s = silt content (12%)*
S = vehicle speed (25 mph)**
p = average number of days with 0.01 or greater inches of precipitation (60)
W = average vehicle weight (15 tons)
w = number of wheels (10)
k = percent of material less than 30 microns (0.8)

Control Efficiency: None

Emission per Vehicle Mile: E(lbs/vmt) =
0.8*5.9(12/12)(25/30)(15/3)**0.7*
(10/4)**0.5([365-60]/365)
= 16.0

Emission Rate:
Daily: 16.0 * 12 trips * 2 (RT) = 384.0 lbs/day/mile
Annual: 384.0 * 260 = 49.92 tons/mile/year

---

* Silt content of 12% is standard EPA default value.
** Average speed expected on haul roads.

TABLE B-2

ENERGY FUELS NUCLEAR HERMIT PROJECT

Source Description:	Ore loadout to ore stockpile
Process Rate:	300 ton per day, 260 days per year
Emission Factor:	E = 0.04 pounds/ton
Control Efficiency:	None
Emission Rate:	
Daily:	0.04 * 300 tons/day = 12.0 pounds/day
Annual:	260 day * 12.0 pounds/day = 1.56 (TPY)

TABLE B-3

ENERGY FUELS NUCLEAR HERMIT PROJECT

Source Description:	Ore loading from stockpile to haul trucks
Process Rate:	300 ton per day, 260 days per year
Emission Factor:	E = 0.05 pounds/ton
Control Efficiency:	None
Emission Rate:	
Daily:	0.05 * 300 tons/day = 15.0 pounds/day
Annual:	260 day * 15.0 pounds/day = 1.95 (TPY)

TABLE B-4

ENERGY FUELS NUCLEAR HERMIT PROJECT

Source Description:	Waste rock dumping to waste rock stockpile
Process Rate:	25000 tons maximum mine life or 10000 tons maximum per year maximum
Emission Factor:	E = 0.04 pounds/ton
Control Efficiency:	None
Emission Rate:	
Annual:	0.04 lbs/ton * 10000 tons = 0.20 ton/yr

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TABLE B-5

ENERGY FUELS NUCLEAR HERMIT PROJECT

Source Description: Wind erosion from distributed areas (includes ore, waste rock and topsoil stockpiles)

Process Rate: Entire disturbed area, 27.0 acres

Emission Factor: E = a*I*C*K*L*V (Universal soil loss equation)

where:
a is the amount remaining suspended 0.025
I is soil erodibility (38 tons/acre/year)
C is climate factor (1.00)
K is roughness factor (1.0)
L is the field width factor (1.0)
V is the vegetative cover factor (1.0)

Control Efficiency: None

Calculations: 0.025 * 38 * 1.0 * 1.0 * 1.0 * 1.0
= 0.95 tons/acre/yr

Emission Rate:
Annual: 0.95 tons/acre/year * 27.0 acres = 25.6 tons/year

TABLE B-6

ENERGY FUELS NUCLEAR HERMIT PROJECT

Source Description:	Mine vent
Process Rate:	200,000 standard cubic feet per minute (SCFM) exit flow rate from vent
Emission Factor:	0.002 grains per SCFM
Control Efficiency:	None
Emission Rate:	
Daily:	0.002 * 200,000 * 1440 = 82.3 lbs/day
Annual:	82.3 lbs/day * 365 = 15.0 tons/year

APPENDIX C

TSP CONCENTRATIONS

Second Quarter 1983

Third Quarter 1983

Fourth Quarter 1983

First Quarter 1984

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ARIZONA STRIP PROJECT
SECOND QUARTER 1983
TSP CONCENTRATIONS

DATE	SAMPLER A	COLOCATED SAMPLER B
3/13/83	13	12
3/19/83	5	MSG
3/30/83	MSG	MSG
3/31/83	25	25
4/ 6/83	14	MSG
4/12/83	25	26
4/18/83	21	20
4/24/83	MSG	MSG
4/30/83	MSG	MSG
5/ 6/83	32	28
5/12/83	13	13
5/18/83	MSG	MSG
5/24/83	23	24
5/30/83	MSG	MSG
Arithmetic Mean:	19.0	21.1
Geometric Mean:	16.9	20.1
Standard Deviation	7.8	5.9

* Concentrations are adjusted to standard temperature and pressure.

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ARIZONA STRIP PROJECT
FOURTH QUARTER 1983
TSP CONCENTRATIONS

DATE	SAMPLER A	COLOCATED SAMPLER B
9/ 3/83	16	17
9/ 9/83	14	15
9/15/83	16	19
9/21/83	20	23
9/27/83	10	10
10/ 3/83	7	9
10/ 9/83	8	8
10/15/83	14	14
10/21/83	16	15
10/27/83	16	20
11/ 2/83	9	10
11/ 8/83	7	7
11/14/83	14	15
11/20/83	7	7
11/26/83	6	7
Arithmetic Mean:	12.0	13.1
Geometric Mean:	11.2	12.1
Standard Deviation	4.5	5.2

* Concentrations are adjusted to standard temperature and pressure.

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ARIZONA STRIP PROJECT
THIRD QUARTER 1983
TSP CONCENTRATIONS

DATE	SAMPLER A	COLOCATED SAMPLER B
6/ 5/83	36	33
6/11/83	36	46
6/17/83	59	56
6/23/83	24	23
6/29/83	26	29
7/ 5/83	30	29
7/11/83	22	23
7/17/83	29	21
7/23/83	19	20
7/29/83	20	20
8/ 4/83	20	19
8/10/83	17	18
8/16/83	MSG	14
8/22/83	14	11
8/28/83	30	20
Arithmetic Mean:	27.3	25.5
Geometric Mean:	25.5	23.4
Standard Deviation	11.3	11.9

* Concentrations are adjusted to standard temperature and pressure.

ARIZONA STRIP PROJECT
FIRST QUARTER 1984
TSP CONCENTRATIONS

DATE	SAMPLER A	COLOCATED SAMPLER B
12/ 2/83	MSG	MSG
12/ 8/83	4	5
12/14/83	5	4
12/20/83	MSG	MSG
12/26/83	6	6
1/ 1/84	6	1
1/ 7/84	9	10
1/13/84	11	8
1/19/84	7	6
1/25/84	8	7
1/31/84	16	16
2/ 6/84	13	12
2/12/84	3	4
2/18/84	5	6
2/24/84	12	14
Arithmetic Mean:	8.1	7.6
Geometric Mean:	7.8	6.3
Standard Deviation	3.9	4.3

* Concentrations are adjusted to standard temperature and pressure.

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APPENDIX D

Joint Frequency Distributoin

From Airzona Strip Station Monitoring

March 1983 - March 1984

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FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS A
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

	SPEED CLASS INTERVALS (KNOTS)							
DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
N	0.15	2.81	1.93	0.00	0.00	0.00	4.89	5.6
NNE	0.30	3.56	1.48	0.00	0.00	0.00	5.33	5.3
NE	0.44	3.70	0.89	0.00	0.00	0.00	5.04	4.9
ENE	0.00	1.19	0.30	0.00	0.00	0.00	1.48	5.0
E	0.15	2.37	1.19	0.00	0.00	0.00	3.70	5.4
ESE	0.30	0.89	0.00	0.00	0.00	0.00	1.19	4.0
SE	0.89	4.44	2.07	0.00	0.00	0.00	7.41	4.9
SSE	1.19	6.81	1.78	0.00	0.00	0.00	9.78	4.7
S	0.74	7.26	3.70	0.59	0.00	0.00	12.30	5.6
SSW	1.04	6.22	1.78	0.15	0.00	0.00	9.19	4.9
SW	1.04	4.30	3.56	0.00	0.00	0.00	8.89	5.6
WSW	0.00	2.37	1.48	0.00	0.00	0.00	3.85	5.8
W	0.89	4.89	2.22	0.44	0.00	0.00	8.44	5.5
WNW	0.44	1.93	3.26	0.00	0.00	0.00	5.63	6.2
NW	0.15	5.19	3.11	0.00	0.00	0.00	8.44	5.7
NNW	0.44	1.93	1.78	0.15	0.00	0.00	4.30	5.8
ALL	8.15	59.85	30.52	1.33	0.00	0.00	99.85	5.4

Calm (less than one knot) = 0.1%
Period mean wind speed = 5.4 knots
Percent occurrence for A stability class 9.3%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

EnecoTech

FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS B
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

SPEED CLASS INTERVALS (KNOTS)

DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
N	0.88	1.58	1.41	0.35	0.00	0.00	4.22	5.8
NNE	0.70	1.93	2.11	0.35	0.00	0.00	5.10	6.0
NE	1.41	3.34	0.70	0.53	0.00	0.00	5.98	5.0
ENE	0.88	1.76	0.88	0.00	0.00	0.00	3.51	4.8
E	0.18	2.81	0.70	0.00	0.00	0.00	3.69	5.0
ESE	0.35	1.76	0.70	0.00	0.00	0.00	2.81	5.1
SE	1.05	4.04	1.93	0.00	0.00	0.00	7.03	4.8
SSE	0.35	8.96	4.57	0.18	0.00	0.00	14.06	5.6
S	1.23	4.04	4.04	1.23	0.00	0.00	10.54	6.3
SSW	1.41	5.80	2.81	2.11	0.00	0.00	12.13	6.2
SW	0.88	1.76	2.64	1.05	0.00	0.00	6.33	7.0
WSW	0.70	1.76	1.41	0.00	0.00	0.00	3.87	5.3
W	0.00	1.23	2.28	1.23	0.00	0.00	4.75	7.9
WNW	0.70	0.53	2.81	1.41	0.00	0.00	5.45	7.8
NW	0.18	2.46	3.51	1.41	0.00	0.00	7.56	7.2
NNW	0.00	1.58	1.41	0.00	0.00	0.00	2.99	6.0
ALL	10.90	45.34	33.92	9.84	0.00	0.00	100.00	6.1

Calm (less than one knot) = 0.0%
Period mean wind speed = 6.1 knots
Percent occurrence for B stability class 7.8%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS C
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

SPEED CLASS INTERVALS (KNOTS)

DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
N	0.38	1.75	0.63	0.25	0.00	0.00	3.00	5.3
NNE	0.50	1.63	1.88	0.88	0.00	0.00	4.88	6.6
NE	0.63	2.88	1.63	0.25	0.13	0.00	5.50	5.9
ENE	0.38	3.13	1.13	0.25	0.00	0.00	4.88	5.3
E	0.50	1.63	0.75	0.00	0.00	0.00	2.88	4.7
ESE	0.75	1.00	0.13	0.00	0.00	0.00	1.88	4.0
SE	1.38	3.63	0.75	0.25	0.00	0.00	6.00	4.7
SSE	1.25	7.38	4.13	1.25	0.00	0.00	14.00	5.7
S	0.75	4.75	4.50	2.88	0.00	0.00	12.88	7.0
SSW	0.63	4.25	3.50	2.75	0.00	0.00	11.13	7.1
SW	0.50	1.75	2.63	2.50	0.13	0.00	7.50	8.2
WSW	0.25	1.38	1.50	1.25	0.00	0.00	4.38	7.4
W	0.75	0.50	1.88	1.38	0.00	0.00	4.50	8.0
WNW	0.50	1.00	2.25	2.13	0.00	0.00	5.88	7.9
NW	0.50	1.25	2.38	2.13	0.13	0.00	6.38	8.1
NNW	0.00	1.13	2.38	0.75	0.00	0.00	4.25	7.9
ALL	9.63	39.00	32.00	18.88	0.38	0.00	99.88	6.7

Calm (less than one knot) = 0.1%
Period mean wind speed = 6.7 knots
Percent occurrence for C stability class 11.0%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

EnecoTech

FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS D
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

SPEED CLASS INTERVALS (KNOTS)

DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
N	0.48	2.03	1.24	0.65	0.10	0.00	4.50	6.8
NNE	0.34	1.34	1.93	1.99	0.31	0.00	5.91	8.9
NE	0.52	1.31	1.00	1.00	0.17	0.03	4.02	7.6
ENE	0.24	1.00	0.89	2.61	0.34	0.10	5.19	10.3
E	0.31	0.76	0.45	0.38	0.00	0.00	1.89	6.5
ESE	0.10	0.38	0.07	0.00	0.00	0.00	0.55	4.5
SE	0.34	1.10	0.17	0.03	0.00	0.00	1.65	4.4
SSE	0.41	3.75	2.75	1.10	0.14	0.00	8.15	6.8
S	0.58	3.68	3.06	2.92	0.07	0.00	10.31	7.6
SSW	0.58	4.13	3.40	3.75	1.03	0.14	13.03	8.9
SW	0.55	2.96	3.16	5.19	1.07	0.17	13.10	9.8
WSW	0.28	2.06	1.38	2.85	0.41	0.10	7.08	9.4
W	0.34	2.61	1.89	1.79	0.48	0.10	7.22	8.4
WNW	0.31	1.62	1.48	2.23	0.17	0.07	5.88	8.9
NW	0.34	1.99	1.99	1.44	0.14	0.07	5.98	7.9
NNW	0.10	1.62	1.51	1.99	0.28	0.00	5.50	9.2
ALL	5.84	32.31	26.37	29.94	4.71	0.79	99.97	8.5

Calm (less than one knot) = 0.0%
Period mean wind speed = 8.5 knots
Percent occurrence for D stability class 39.9%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS E
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

SPEED CLASS INTERVALS (KNOTS)

DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
N	0.52	1.73	1.05	0.00	0.00	0.00	3.31	5.3
NNE	0.84	3.20	5.72	0.00	0.05	0.00	9.81	6.2
NE	1.10	3.99	2.41	0.00	0.00	0.00	7.50	5.2
ENE	0.21	1.94	2.94	0.00	0.00	0.00	5.09	6.5
E	0.47	1.00	0.89	0.00	0.00	0.00	2.36	5.2
ESE	0.26	0.26	0.05	0.00	0.00	0.00	0.58	3.7
SE	0.73	0.68	0.05	0.00	0.00	0.00	1.47	3.4
SSE	0.47	2.68	0.94	0.00	0.00	0.00	4.09	5.1
S	1.63	4.04	1.47	0.00	0.00	0.00	7.14	4.7
SSW	1.31	6.66	3.67	0.00	0.00	0.00	11.65	5.3
SW	2.20	4.30	2.57	0.00	0.00	0.00	9.08	4.9
WSW	0.68	4.20	1.52	0.00	0.00	0.00	6.40	4.8
W	1.52	5.30	0.94	0.00	0.00	0.00	7.76	4.4
WNW	1.26	4.35	2.52	0.00	0.00	0.00	8.13	5.1
NW	0.58	4.35	2.99	0.00	0.00	0.00	7.92	5.5
NNW	0.63	2.78	4.30	0.00	0.00	0.00	7.71	6.2
ALL	14.43	51.47	34.05	0.00	0.05	0.00	100.00	5.3

Calm (less than one knot) = 0.0%
Period mean wind speed = 5.3 knots
Percent occurrence for E stability class 26.2%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS F
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
	SPEED CLASS INTERVALS (KNOTS)							
N	2.36	4.72	0.00	0.00	0.00	0.00	7.08	3.6
NNE	1.42	5.42	0.00	0.00	0.00	0.00	6.84	4.2
NE	2.83	6.60	0.00	0.00	0.00	0.00	9.43	3.9
ENE	1.89	1.65	0.00	0.00	0.00	0.00	3.54	3.4
E	3.07	3.07	0.00	0.00	0.00	0.00	6.13	3.1
ESE	1.65	0.24	0.00	0.00	0.00	0.00	1.89	2.5
SE	3.07	2.83	0.00	0.00	0.00	0.00	5.90	3.1
SSE	1.42	2.12	0.00	0.00	0.00	0.00	3.54	3.3
S	5.90	2.83	0.00	0.00	0.00	0.00	8.73	2.9
SSW	2.83	2.83	0.00	0.00	0.00	0.00	5.66	3.3
SW	3.30	3.54	0.00	0.00	0.00	0.00	6.84	3.0
WSW	2.36	3.77	0.00	0.00	0.00	0.00	6.13	3.4
W	3.07	5.42	0.00	0.00	0.00	0.00	8.49	3.3
WNW	3.07	3.54	0.00	0.00	0.00	0.00	6.60	3.2
NW	3.07	5.66	0.00	0.00	0.00	0.00	8.73	3.5
NNW	1.65	2.83	0.00	0.00	0.00	0.00	4.48	3.2
ALL	42.92	57.08	0.00	0.00	0.00	0.00	100.00	3.4

Calm (less than one knot) = 0.0%
Period mean wind speed = 3.4 knots
Percent occurrence for F stability class 5.8%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

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FREQUENCY OF WINDS BY DIRECTION AND SPEED
FOR STABILITY CLASS ALL
DATA RECORDED FROM MARCH 1983 THROUGH MARCH 1984
GRAND CANYON - ARIZONA

SPEED CLASS INTERVALS (KNOTS)

DIRECTION	1,<3	3,<6	6,<10	10,<16	16,<21	>21	ALL	MEAN SPEED
N	0.59	2.11	1.13	0.32	0.04	0.00	4.19	5.9
NNE	0.58	2.35	2.77	0.92	0.14	0.00	6.76	7.0
NE	0.88	2.87	1.35	0.47	0.08	0.01	5.66	5.8
ENE	0.37	1.59	1.35	1.07	0.14	0.04	4.56	7.8
E	0.51	1.36	0.66	0.15	0.00	0.00	2.68	5.2
ESE	0.34	0.56	0.11	0.00	0.00	0.00	1.02	4.2
SE	0.82	1.91	0.51	0.04	0.00	0.00	3.28	4.4
SSE	0.65	4.46	2.32	0.59	0.05	0.00	8.07	5.9
S	1.25	4.20	2.76	1.63	0.03	0.00	9.87	6.4
SSW	1.02	5.05	3.09	1.98	0.41	0.05	11.60	7.1
SW	1.21	3.24	2.76	2.43	0.44	0.07	10.15	7.8
WSW	0.51	2.65	1.36	1.28	0.16	0.04	6.00	7.2
W	0.88	3.35	1.59	1.00	0.19	0.04	7.06	6.5
WNW	0.78	2.32	2.02	1.24	0.07	0.03	6.45	6.9
NW	0.55	3.08	2.40	0.92	0.07	0.03	7.04	6.6
NNW	0.34	1.96	2.27	0.89	0.11	0.00	5.57	7.3
ALL	11.27	43.07	28.44	14.93	1.94	0.32	99.96	6.7

Calm (less than one knot) = 0.0%
Period mean wind speed = 6.7 knots
Percent occurrence for ALL stability classes 100.0%

ENECOTECH INC.
SBWIND(1.0) 12/ 2/84

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