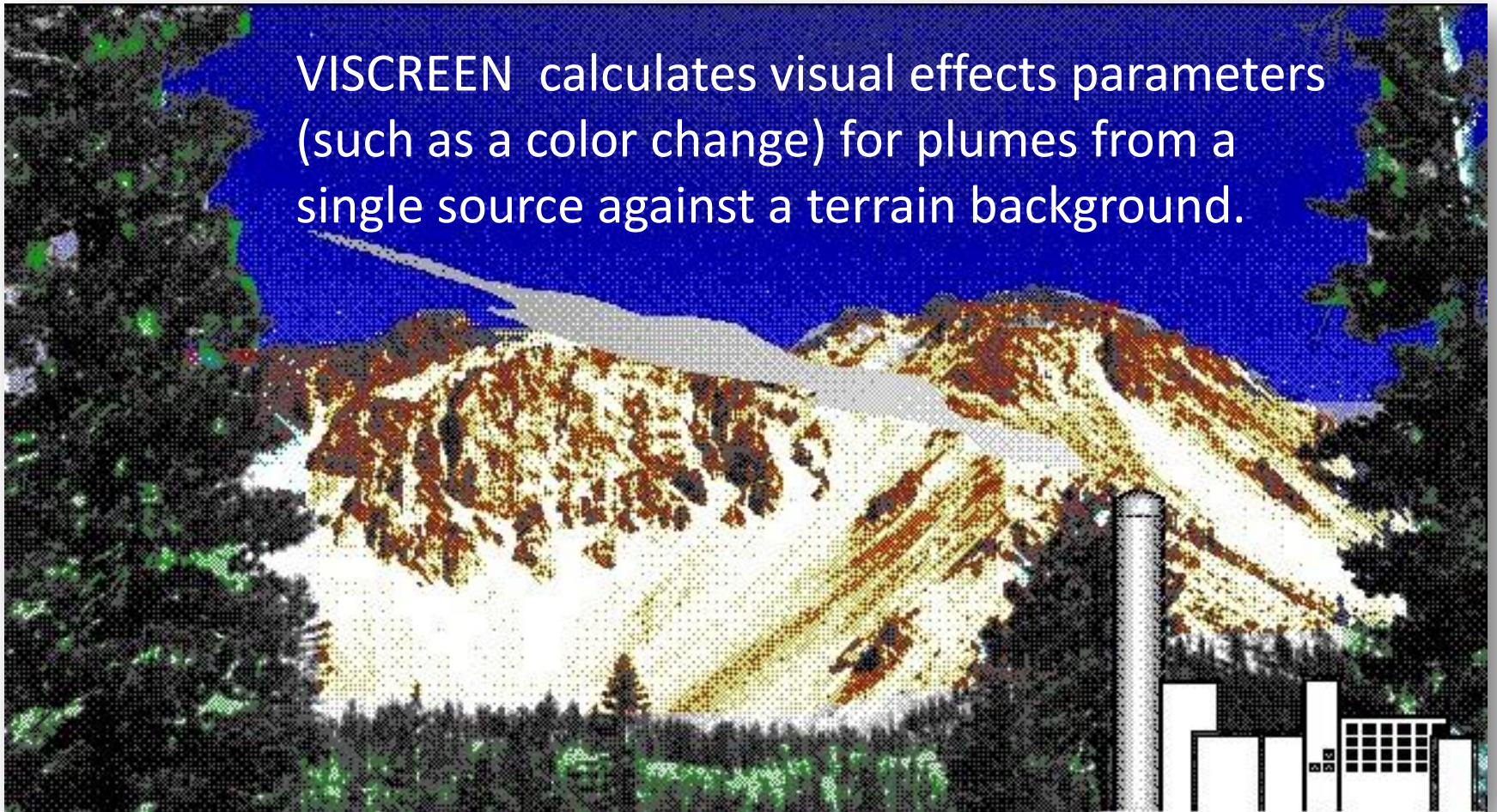


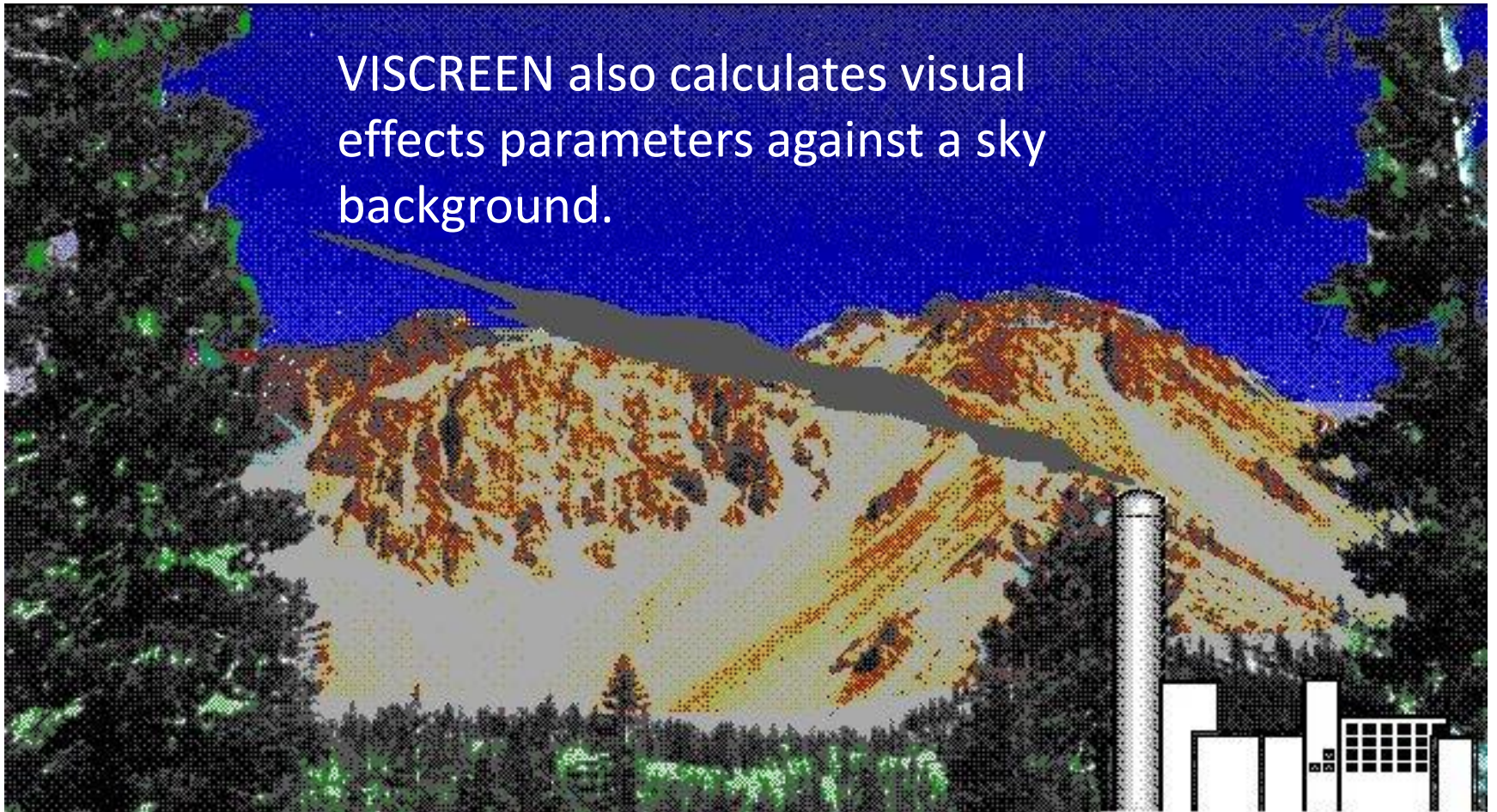
# Welcome to the VISCREEN Tutorial

VISCREEN calculates visual effects parameters (such as a color change) for plumes from a single source against a terrain background.



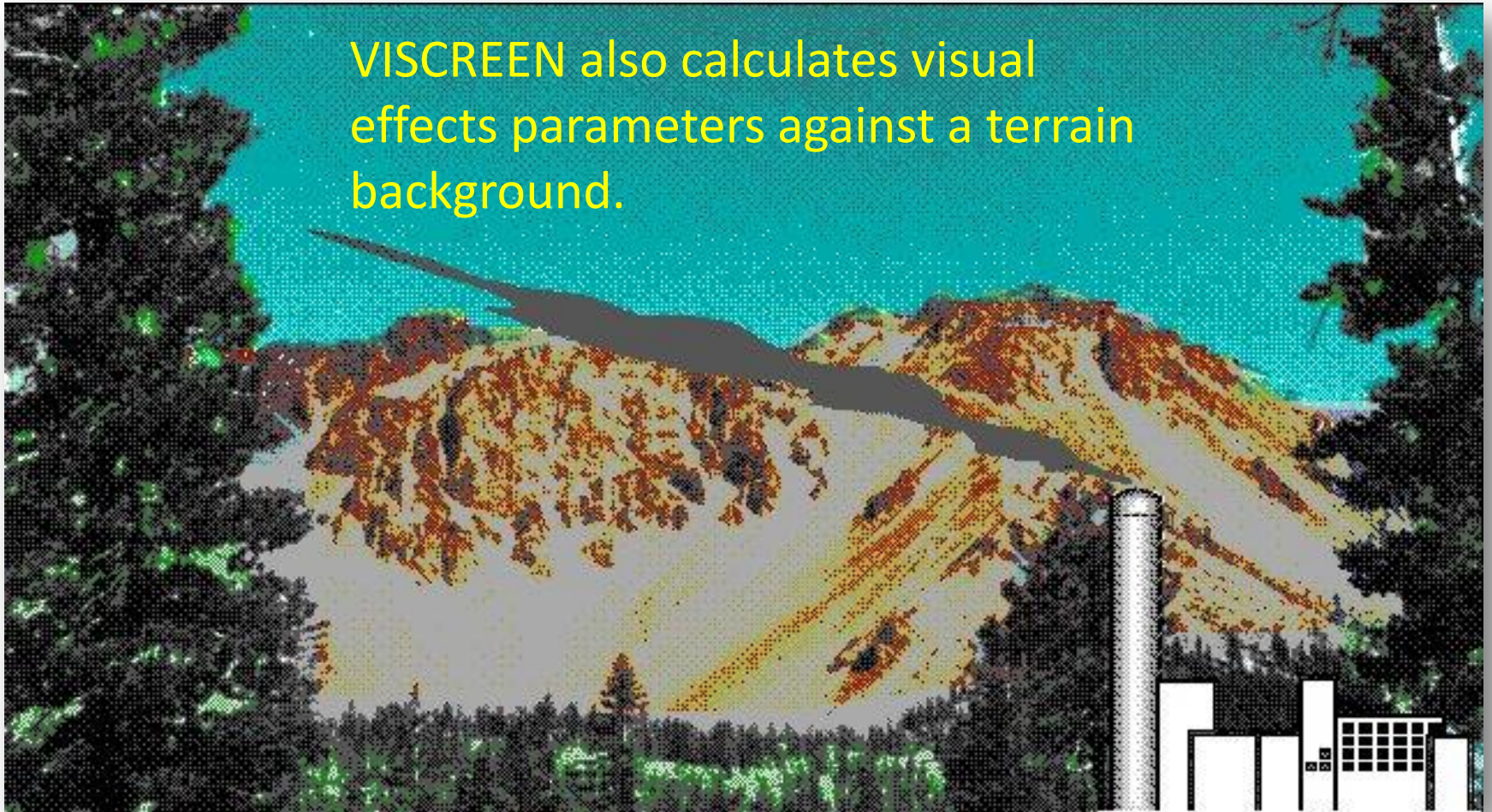


VISCREEN also calculates visual effects parameters against a sky background.

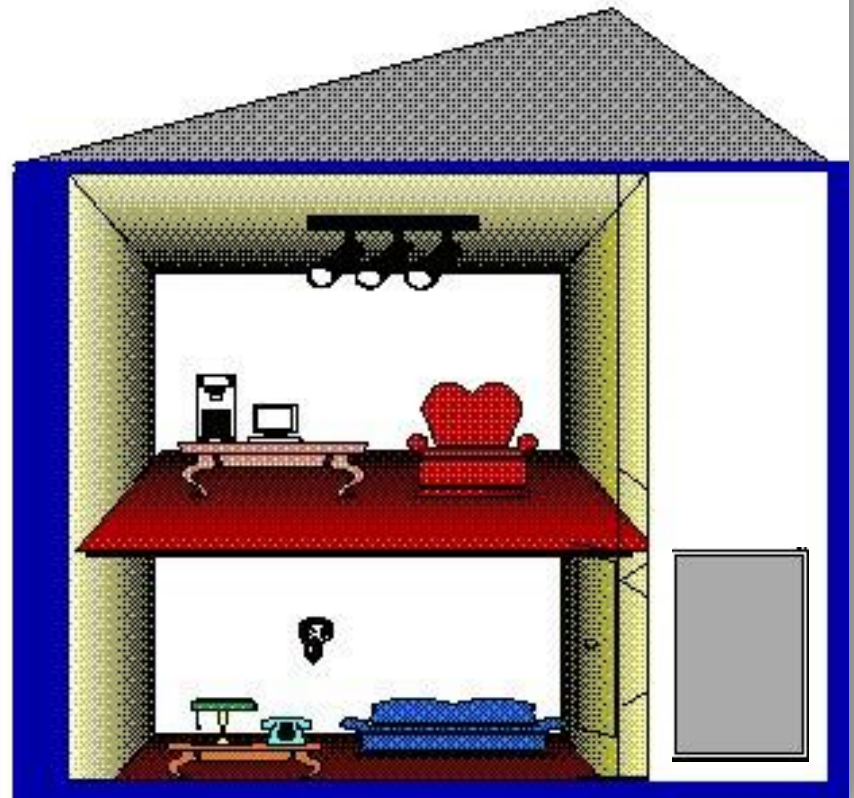




VISCREEN also calculates visual effects parameters against a terrain background.



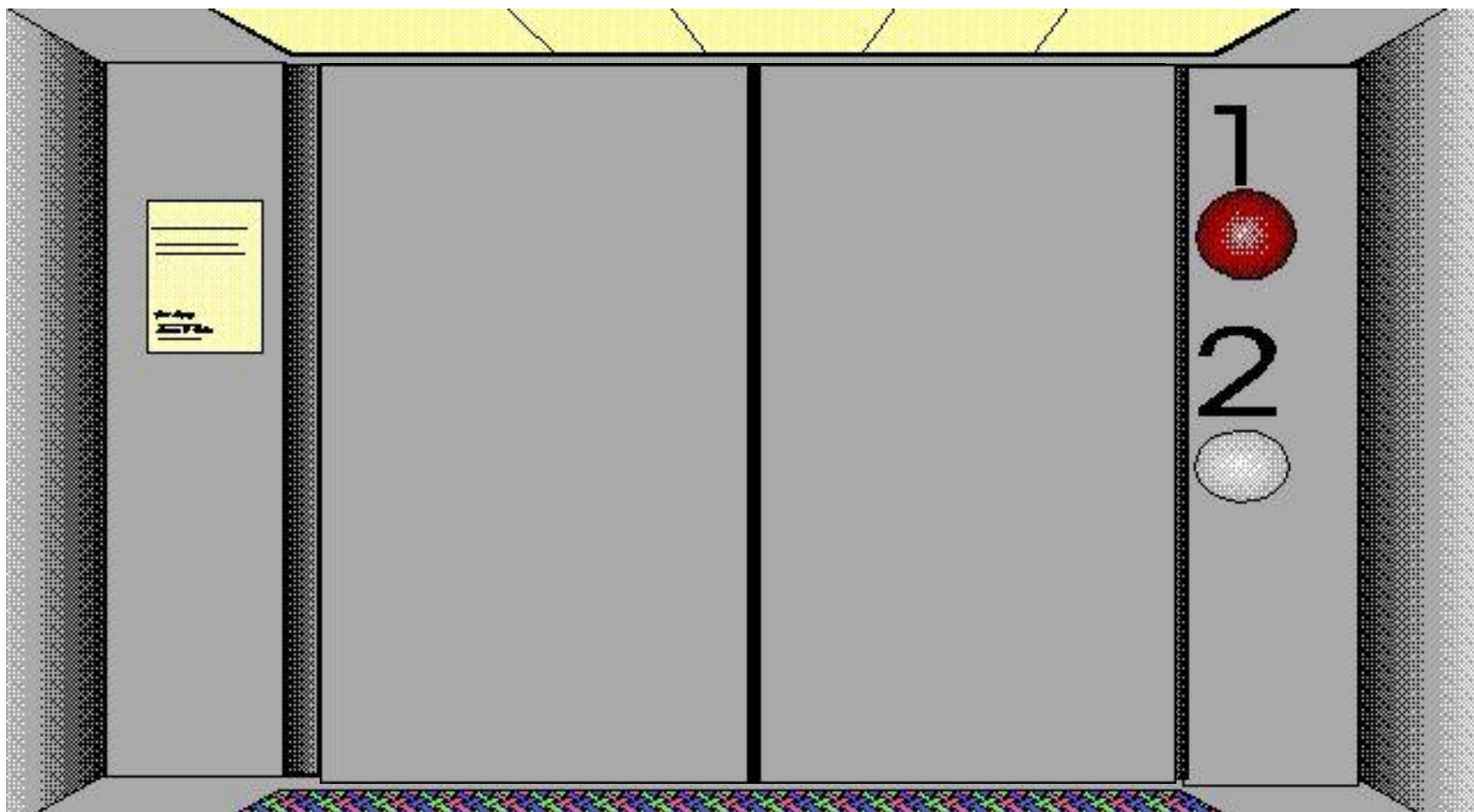
**VISCREEN**  
performs two  
levels of plume  
visual impact  
analysis, **Level-1**  
and **Level-2**.

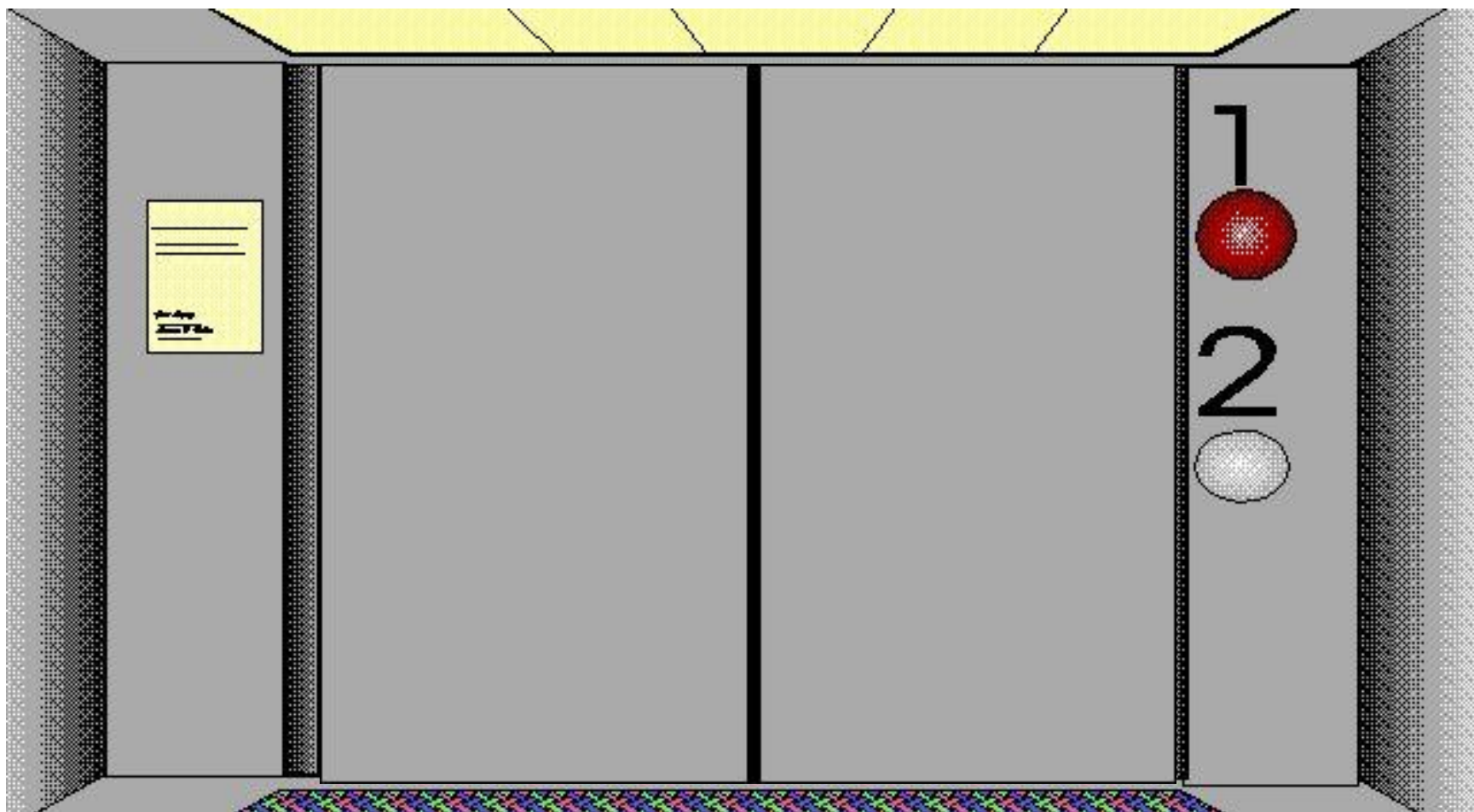




**VISCREEN**  
performs two  
levels of plume  
visual impact  
analysis, **Level-1**  
and **Level-2**.









Here is an example of a Level – 1 interactive session. Inputs are in BLUE

=====

WELCOME TO PROGRAM VISCREEN! (Ver 1.01)

=====

Path & file name for Summary Report

(max 40 characters including file name & extension): exam1.sum

File Exists, do you want to overwrite it? Y <- might appear if this is a rerun

Path & file name for Results Output

(max 40 characters including file name & extension): exam1.tst

File Exists, do you want to overwrite it? Y <- might appear if this is a rerun

Input the name of the emissions source: Power Plant

Input the name of the receptor (Class I area): National Park

Select the units of mass for emission rates--

1=gram (g); 2=kg; 3=metric tonne (mt); 4=lb; 5=ton:

Enter no. (1-5): 1

Select the units of time for emission rates--

1=sec; 2=min; 3=hr; 4=day; 5=yr:

Enter no. (1-5): 1

Input the emission rates for the following species:

Particulates (G /S ): 25

NOx (as NO2) (G /S ): 380

Do you want to use default (zero) emission  
rates for primary NO2, soot, and sulfate (y/n)? Y

SUMMARY: Emissions for power plant  
Particulates           25.000000 G /S  
NOx (as NO2)           380.000000 G /S  
Primary NO2            0.000000E+00 G /S  
Soot                    0.000000E+00 G /S  
Primary SO4            0.000000E+00 G /S

Are these the emission rates you meant to use (y/n)? Y

Input the distance between the emissions source and  
the observer (in kilometers): 70

Input the distance between the emissions source and the  
closest Class I area boundary (in kilometers): 70

Input the distance between the emissions source and the  
most distant Class I area boundary (in kilometers): 90

Input the background visual range for the area (km): 170

Do you wish to use Level-1 default parameters (y/n)? y



Additional inputs will either be a "Y", "N", or just a press of the Enter key. You can use the vertical scroll bar to the right to follow along with the rest of this interactive session display.

#### SUMMARY OF ALL EMISSIONS AND METEOROLOGICAL INPUT

Emissions for power plant in G /S :

Particulate =	25.000000
NOx =	380.000000
Primary NO2 =	0.000000E+00
Soot =	0.000000E+00
Primary SO4 =	0.000000E+00

Meteorological and Ambient Data for national park

Wind speed (m/s) =	1.000000
Stability Index =	6
Visual Range (km) =	170.000000
Ozone Conc. (ppm) =	4.000000E-02
Plume Offset Angle=	11.250000 degrees


Distances Between power plant and national park

Source-Observer =	70.000000 km
Min. Source-Class I =	70.000000 km
Max. Source-Class I =	90.000000 km

Are these input values ready for execution (y/n)? y

Do you want to use the default screening threshold (y/n)? Y

OVERALL RESULTS OF PLUME VISIBILITY SCREENING



What you are about to see  
is an example of the file,  
EXAM1.SUM.





This is the summary report  
generated by VISCREEN.

This is a copy of the EXAM1.SUM file. You can use the vertical scroll bar to the right to review the output of an EXAM1 interactive session.

Visual Effects Screening Analysis for  
Source: power plant  
Class I Area: national park

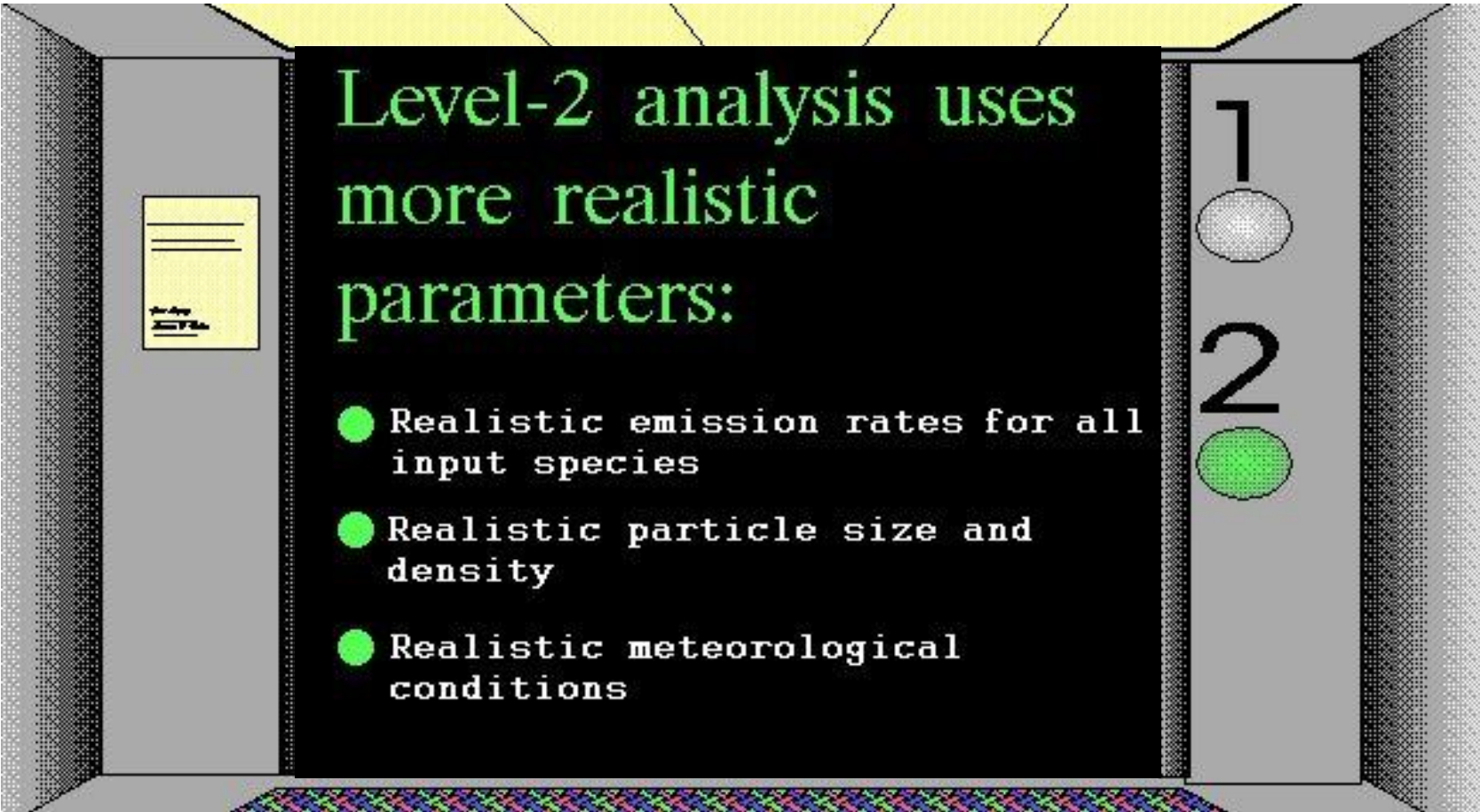
\*\*\* Level-1 Screening \*\*\*  
Input Emissions for

Particulates	25.00	G	/S
NOx (as NO2)	380.00	G	/S
Primary NO2	.00	G	/S
Soot	.00	G	/S
Primary SO4	.00	G	/S

\*\*\*\* Default Particle Characteristics Assumed

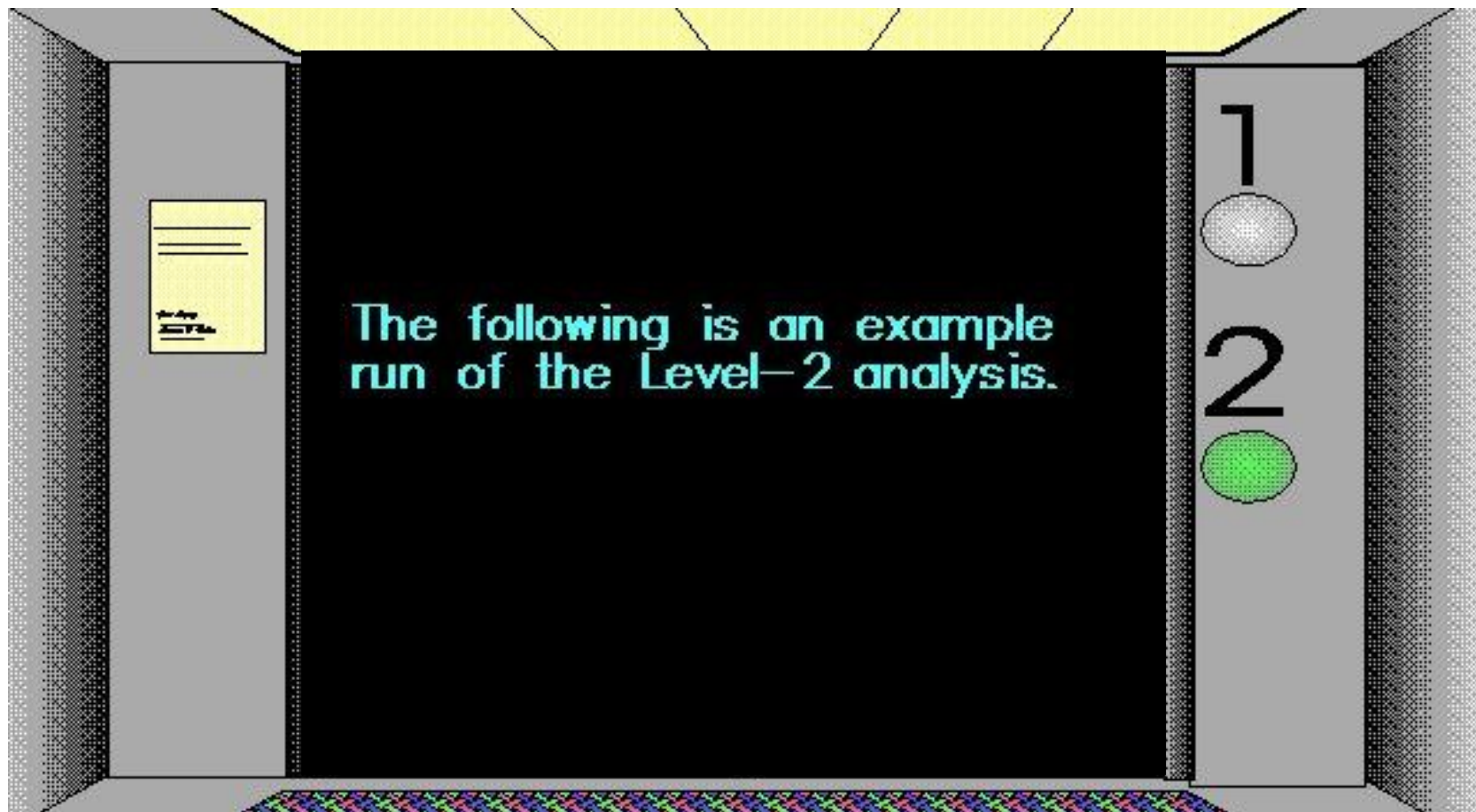
Transport Scenario Specifications:





## Level-2 analysis uses more realistic parameters:

- Realistic emission rates for all input species
- Realistic particle size and density
- Realistic meteorological conditions



Here is an example of a Level – 2 interactive session. Inputs are in BLUE

```
=====

WELCOME TO PROGRAM VISCREEN! (Ver 1.01)

=====

Path & file name for Summary Report
(max 40 characters including file name & extension): exam2.sum
File Exists, do you want to overwrite it? Y <- might appear if this is a rerun

Path & file name for Results Output
(max 40 characters including file name & extension): exam2.tst
File Exists, do you want to overwrite it? Y <- might appear if this is a rerun

Input the name of the emissions source: Power Plant
Input the name of the receptor (Class I area): National Park

Select the units of mass for emission rates--
1=gram (g); 2=kg; 3=metric tonne (mt); 4=lb; 5=ton:
Enter no. (1-5): 1

Select the units of time for emission rates--
1=sec; 2=min; 3=hr; 4=day; 5=yr:
Enter no. (1-5): 1

Input the emission rates for the following species:
Particulates (G /S ): 25
NOx (as NO2) (G /S ): 380
```



Do you want to use default (zero) emission rates for primary NO2, soot, and sulfate (y/n)? Y

SUMMARY: Emissions for power plant

Particulates	25.000000 G /S
NOx (as NO2)	380.000000 G /S
Primary NO2	0.000000E+00 G /S
Soot	0.000000E+00 G /S
Primary SO4	0.000000E+00 G /S

Are these the emission rates you meant to use (y/n)? Y

Input the distance between the emissions source and the observer (in kilometers): 70

Input the distance between the emissions source and the closest Class I area boundary (in kilometers): 70

Input the distance between the emissions source and the most distant Class I area boundary (in kilometers): 90

Input the background visual range for the area (km): 170

Do you wish to use Level-1 default parameters (y/n)? n

## SPECIFICATION OF PARTICLE DENSITY AND SIZE

Enter the density and the index corresponding to the mass median diameter of the size distribution for BACKGROUND fine and coarse particulate, and PLUME particulate, soot, and primary sulfate).

Mass median diameter (in  $\mu\text{m}$ ): 1=0.1  $\mu\text{m}$ ; 2=0.2  $\mu\text{m}$ ; 3=0.3  $\mu\text{m}$ ; 4=0.5  $\mu\text{m}$ ; 5=1  $\mu\text{m}$ ; 6=2  $\mu\text{m}$ ; 7=5  $\mu\text{m}$ ; 8=6  $\mu\text{m}$ ; 9=10  $\mu\text{m}$ .

Enter density ( $\text{g}/\text{cm}^3$ ) and size index

(default values are shown in parentheses):

Background Fine Particulate Density (1.5): 1.5

Background Fine Particulate Size Index (3): 3

Background Coarse Particulate Density (2.5): 2.5

Background Coarse Particulate Size Index (8): 8

Plume Particulate Density (2.5): 2.5

Plume Particulate Size Index (6): 6

Plume Soot Density (2.0): 2.0

Plume Soot Size Index (1): 1

Plume Primary SO<sub>4</sub> Density (1.5): 1.5

Plume Primary SO<sub>4</sub> Size Index (4): 4

Are you sure these are the values you want for particle densities and sizes (y/n)? Y

Enter Background Ozone (O<sub>3</sub>) Concentration in ppm  
(default = 0.04 ppm): 0.04

Enter the wind speed (in meters/sec): 2.0

Enter the stability index--  
(1=A; 2=B; 3=C; 4=D; 5=E; 6=F): 4

Enter the plume offset angle (i.e., the angle between  
the plume centerline and the line between the  
observer and the emissions source) in degrees.  
Default is 11.25 degrees (1/2 sector width): 11.25



# SUMMARY OF ALL EMISSIONS AND METEOROLOGICAL INPUT

Emissions for Power Plant in G /S :

Particulate = 25.000000  
NOx = 380.000000  
Primary NO2 = 0.000000E+00  
Soot = 0.000000E+00  
Primary SO4 = 0.000000E+00

Meteorological and Ambient Data for National Park

Wind speed (m/s) = 2.000000  
Stability Index = 4  
Visual Range (km) = 170.000000  
Ozone Conc. (ppm) = 4.000000E-02  
Plume Offset Angle= 11.250000 degrees

Distances Between Power Plant and National Park

Source-Observer = 70.000000 km  
Min. Source-Class I = 70.000000 km  
Max. Source-Class I = 90.000000 km

Are these input values ready for execution (y/n)? Y

Do you want to use the default screening threshold (y/n)? Y

Additional inputs will either be a "Y", "N", or just a press of the Enter key. You can use the vertical scroll bar to the right to follow along with the rest of this interactive session display.

#### OVERALL RESULTS OF PLUME VISIBILITY SCREENING

SOURCE: Power Plant  
CLASS I AREA: National Park

INSIDE class I area --  
Plume delta E EXCEEDS screening criterion for SKY background  
Plume delta E DOES NOT EXCEED screening criterion for TERRAIN background  
Plume contrast DOES NOT EXCEED screening criterion for SKY background  
Plume contrast DOES NOT EXCEED screening criterion for TERRAIN background

OUTSIDE class I area --  
Plume delta E EXCEEDS screening criterion for SKY background  
Plume delta E EXCEEDS screening criterion for TERRAIN background  
Plume contrast EXCEEDS screening criterion for SKY background  
Plume contrast EXCEEDS screening criterion for TERRAIN background


SCREENING CRITERIA: DELTA E = 2.0  
GREEN CONTRAST = .050

Do you want to see calculated results for lines of  
sight with maximum delta E (y/n)?

VIEW	ANGLES (DEGREES)			DIST (KM)		PLUME PERCEPTIBILITY	DELTA E(L*A*B*)
no	phi	alpha	psi	x	rp	forward	backward
----	---	-----	---	---	--	-----	-----

Line of sight with maximum perceptibility for plume viewed  
against a SKY background INSIDE class I area.

24	120.0	48.8	5.53	80.6	18.2	4.2 *	2.5 *
----	-------	------	------	------	------	-------	-------

The background of the slide is dark and textured, resembling a close-up of a rock surface or a similar natural formation. On the right side, there is a vertical strip of more vibrant, colorful patterns in shades of red, orange, yellow, and green, which could represent a different geological layer or a different type of rock. The overall effect is a high-contrast, visually complex background.

What you are about to see  
is an example of the file,  
EXAM2.SUM.





This is the summary report  
generated by VISCREEN.

This is a copy of the EXAM2.SUM file. You can use the vertical scroll bar to the right to review the output of an EXAM1 interactive session.

Visual Effects Screening Analysis for  
Source: power plant  
Class I Area: national park

\*\*\* User-selected Screening Scenario Results \*\*\*

Input Emissions for

Particulates	25.00	G	/S
NOx (as NO2)	380.00	G	/S
Primary NO2	.00	G	/S
Soot	.00	G	/S
Primary SO4	.00	G	/S

PARTICLE CHARACTERISTICS

Density	Diameter
---------	----------

=====

=====

Primary Part.	2.5	6
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The results of VISCREEN can be input  
into an Excel Spreadsheet.

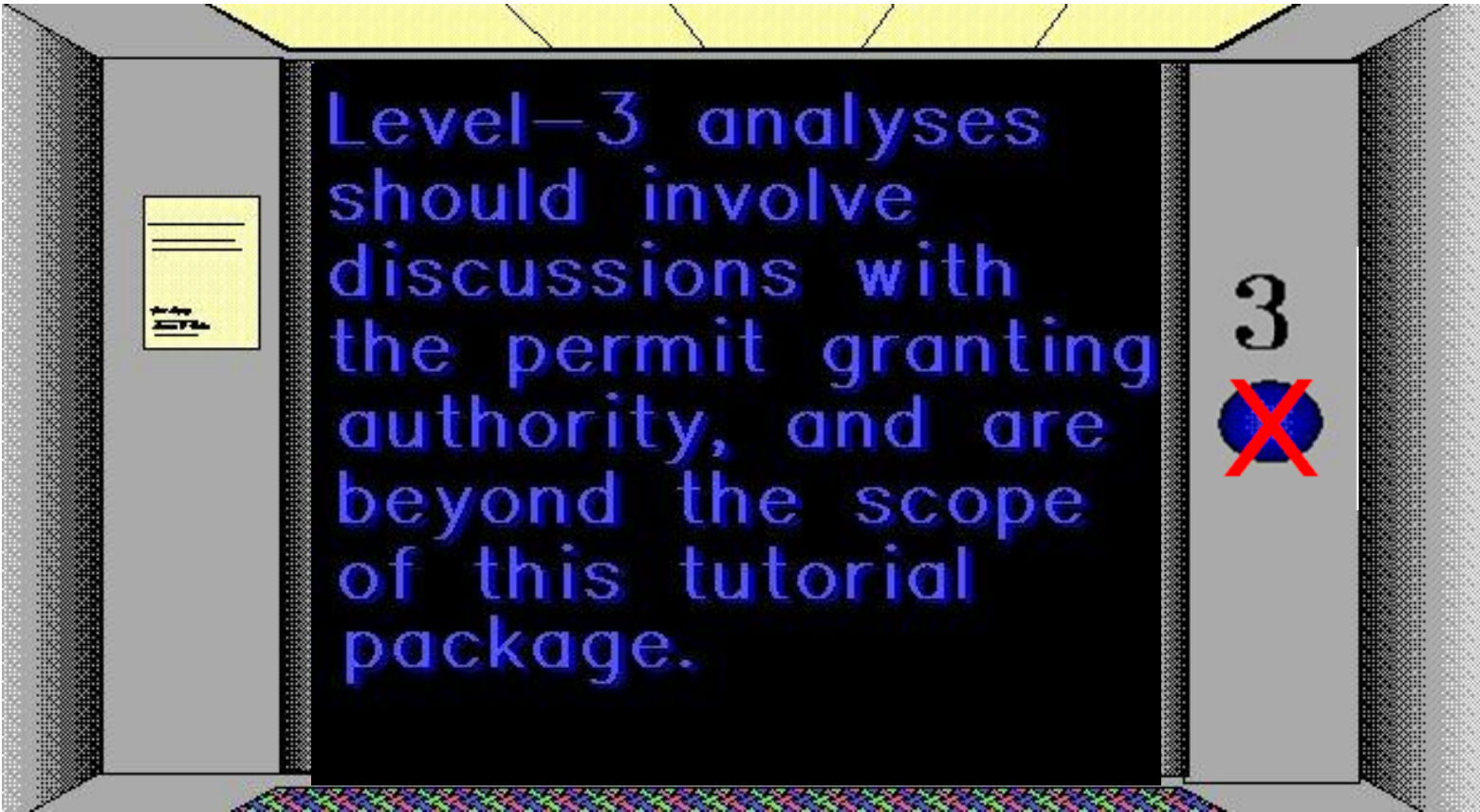


The results can then be output as  
graphics.

If the plume visual impact analysis performed by VISCREEN fails the Level-2 criteria, then a Level-3 analysis using PLUVUE-II may be appropriate.

3





Level-3 analyses  
should involve  
discussions with  
the permit granting  
authority, and are  
beyond the scope  
of this tutorial  
package.

3





Thank you for viewing  
the VISCREEN demo.

We hope it has been  
informative and helpful.

Please refer to the workbook  
for further instruction.