

Instructions for Detecting Sulfates using the Veris 3150

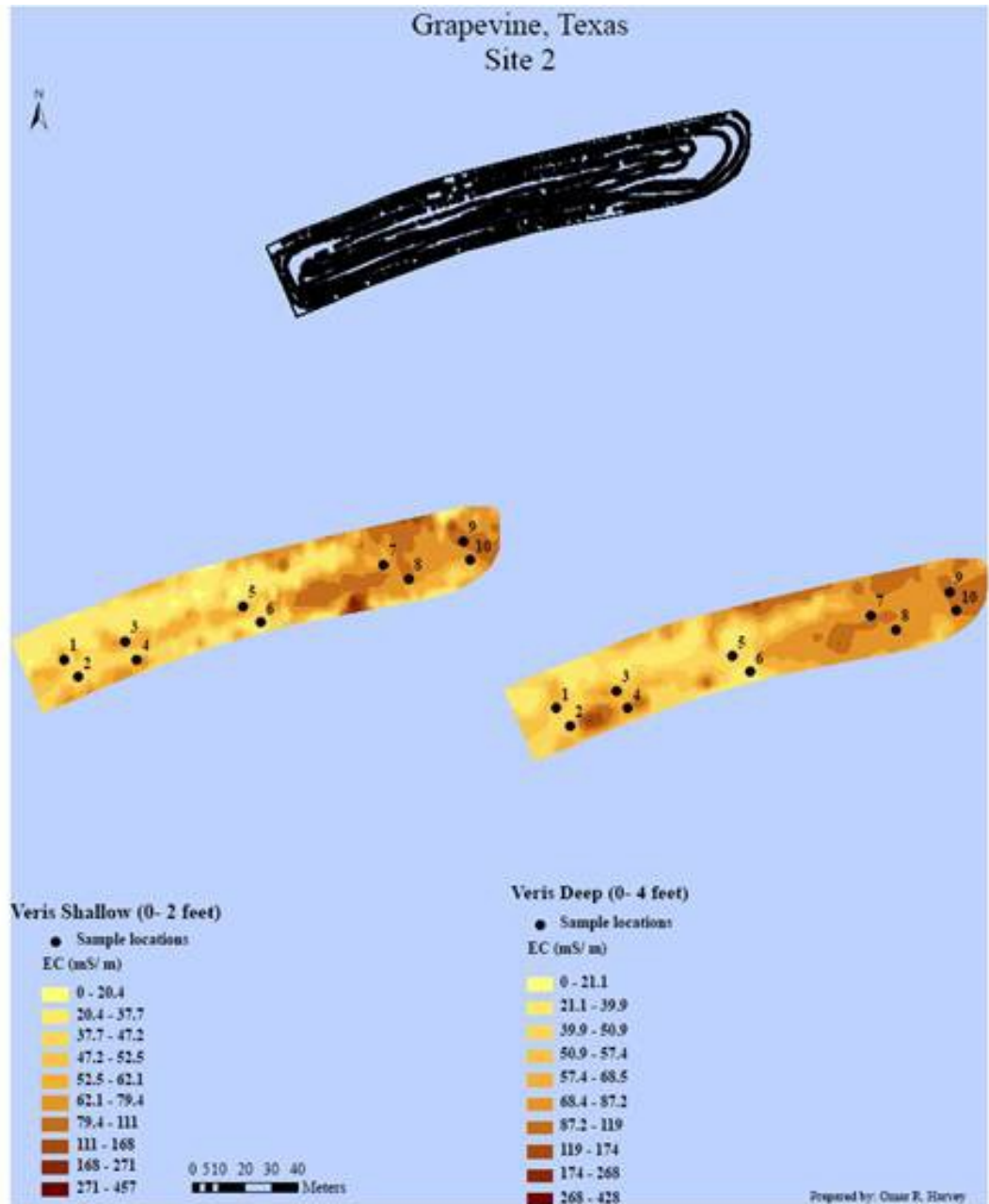
Product P1
Project 0-6362

- The following directions are for setting up the Veris 3150 Conductivity Device to collect data on a project with the data referenced to GPS coordinates.



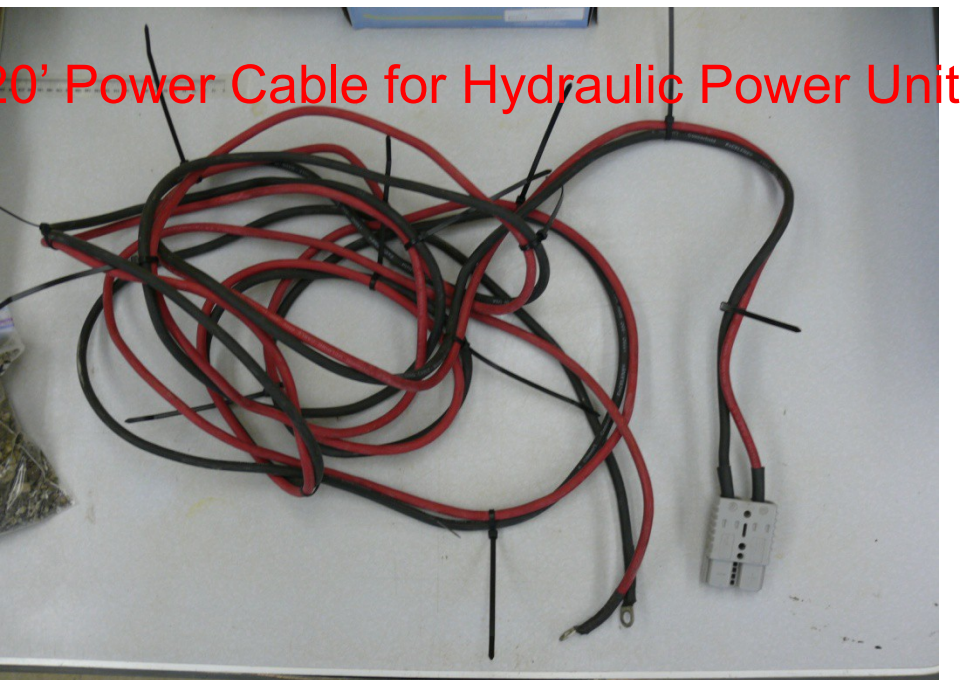
Conductivity Maps

- The final product will be a map like the one shown here that gives the shallow (0-2 ft) and deep (0-4 ft) conductivity of a site.



Equipment

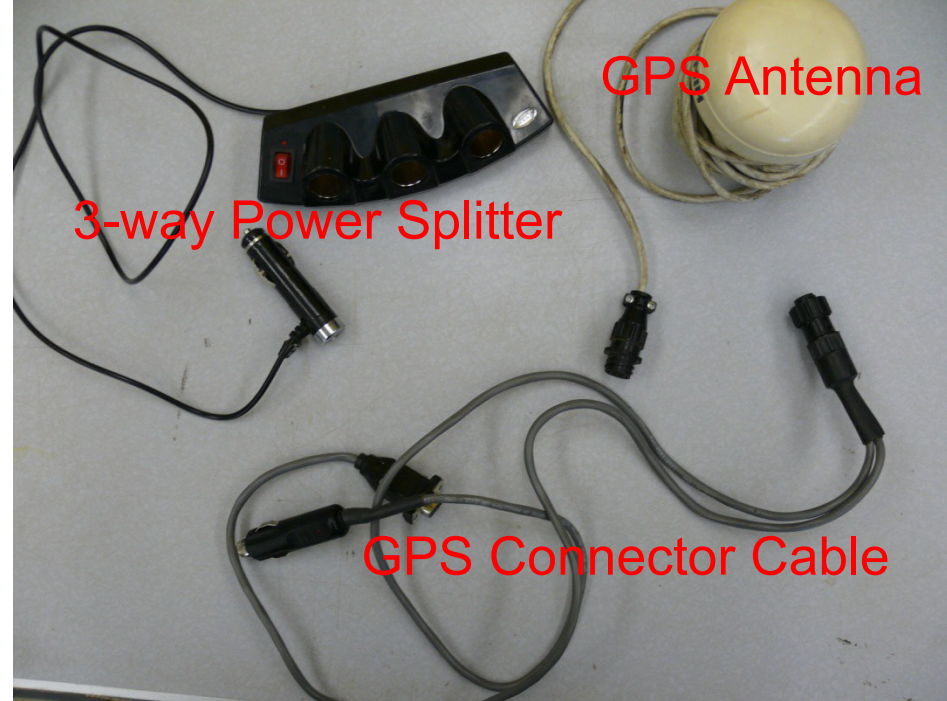
The next three slides show the accessories Attached to the Veris 3150 to collect the Conductivity data.



Electrical Conductivity (EC) Cable



GPS Antenna



3-way Power Splitter

GPS Connector Cable

Serial Cable



Power Cords EC Surveyor and Data Logger

Data Logger Rear



EC Surveyor Rear

Data Logger Box



EC Surveyor Box



Data Logger Front



EC Surveyor Front

SD Data Storage Card



Readying the Veris for

- Make sure the tongue of the Veris 3150 is attached to a trailer hitch on whatever vehicle that will be used to tow the instrument (Fig 1)



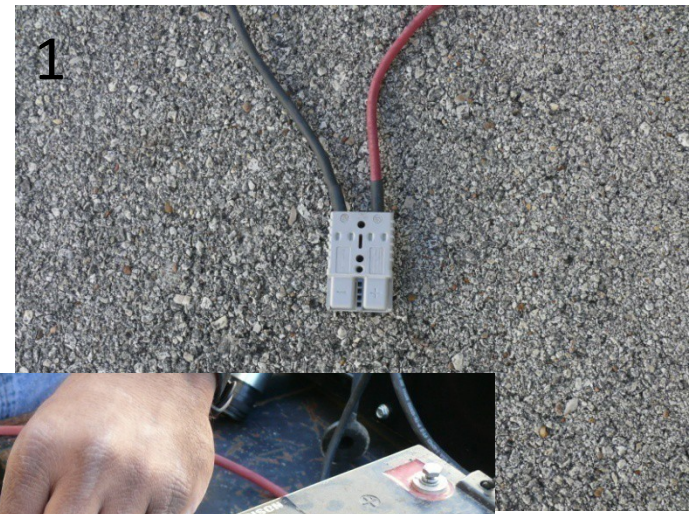
Connecting Hydraulic lines

- Select the hydraulic quick connect labeled UP on the Hydraulic power unit



Attaching Hydraulic Pump to

- Select the 20 ft red and black cables with the gray connector (Fig





Readying Veris by

- Use the yellow controller (Fig 1) that is connected to the hydraulic power unit (Fig 2) to remove the transport lock.



Adjusting Hydraulics

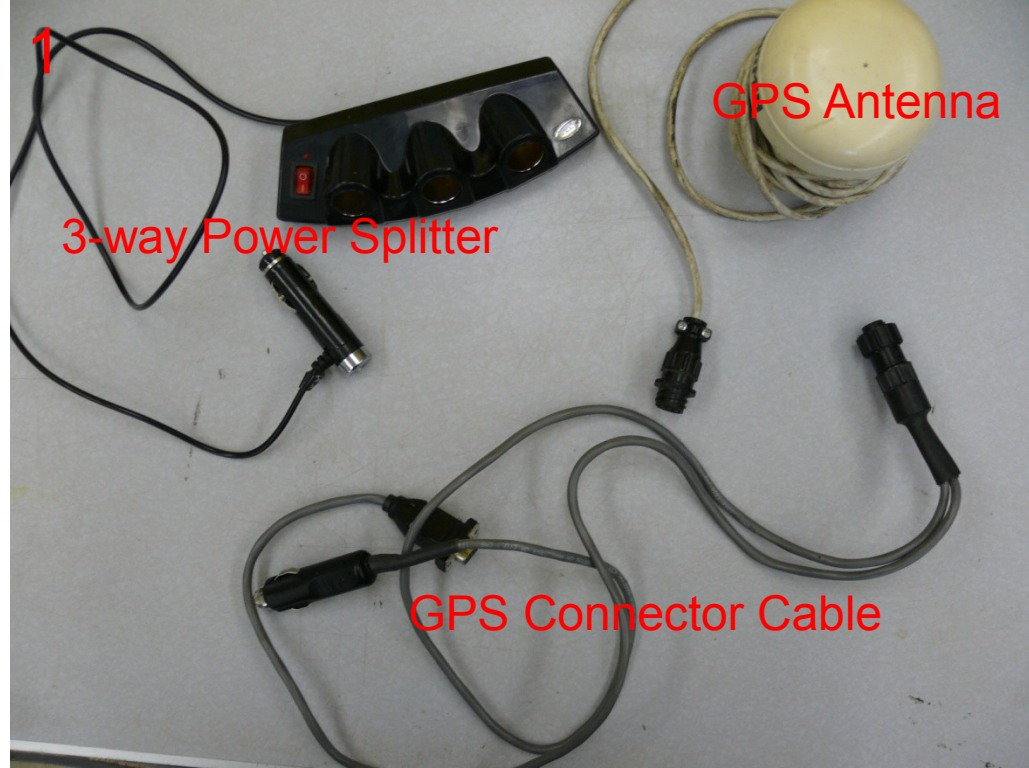
for Coulters placement

Remove the hydraulic cylinder transport lock and remove the transport lock

(Fig 1) Place the depth collars on the hydraulic

Attaching

- Take the Garmin GPS antenna (Fig 1) and unwrap the cable so that it extends far enough to reach the 3-way power splitter

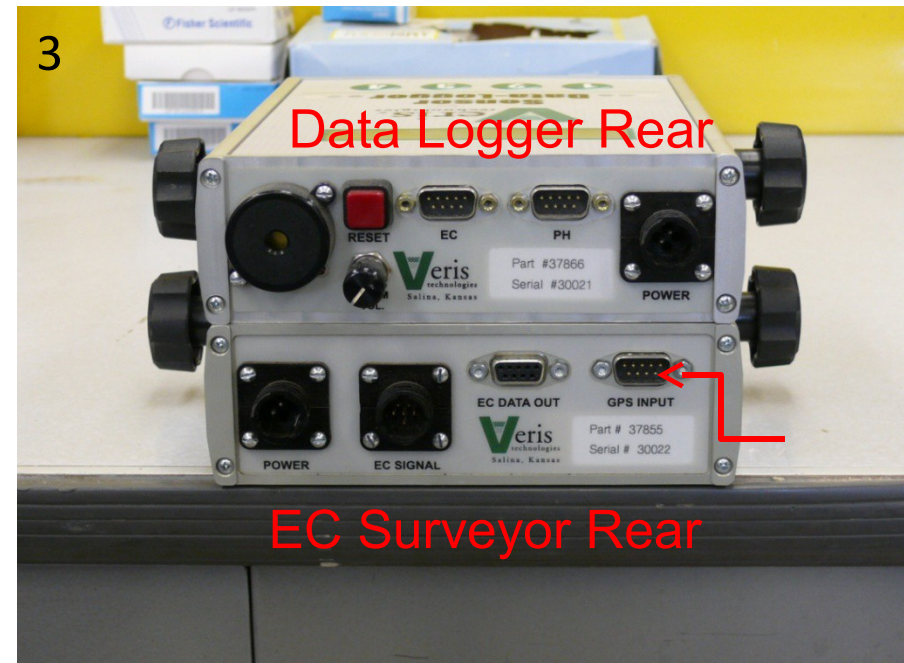


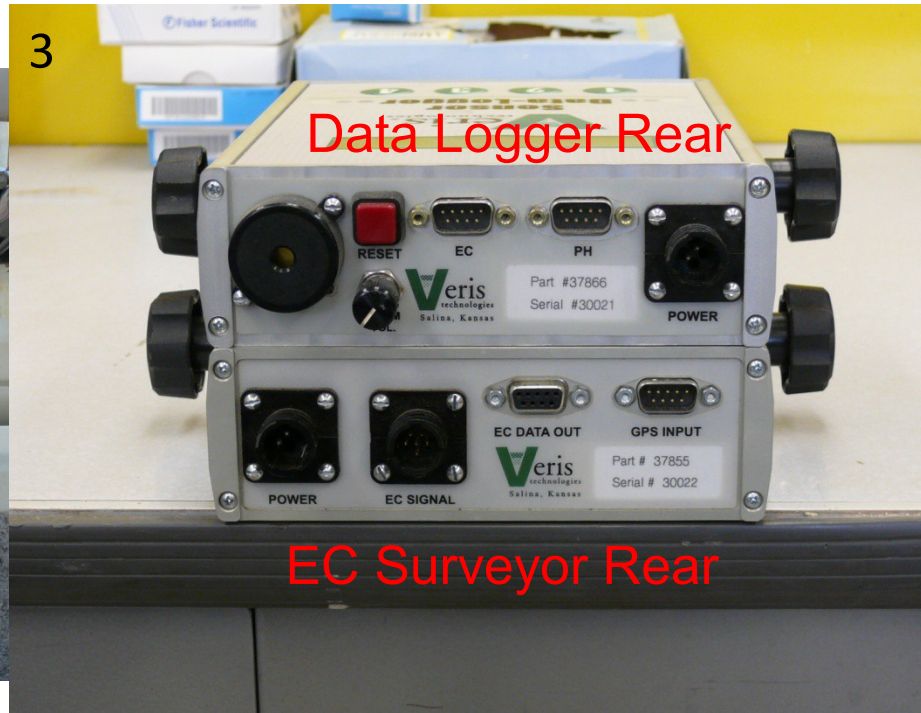
antenna on the Veris



GPS Connections

- Connect the GPS connector cable to the GPS antenna





Establish
 Communication
 between EC Surveyor
 and Veris

- Connect the metal plug on the EC Cable to the female outlet on the Veris (Figs 1&2) feed the cable along



Power up EC Surveyor

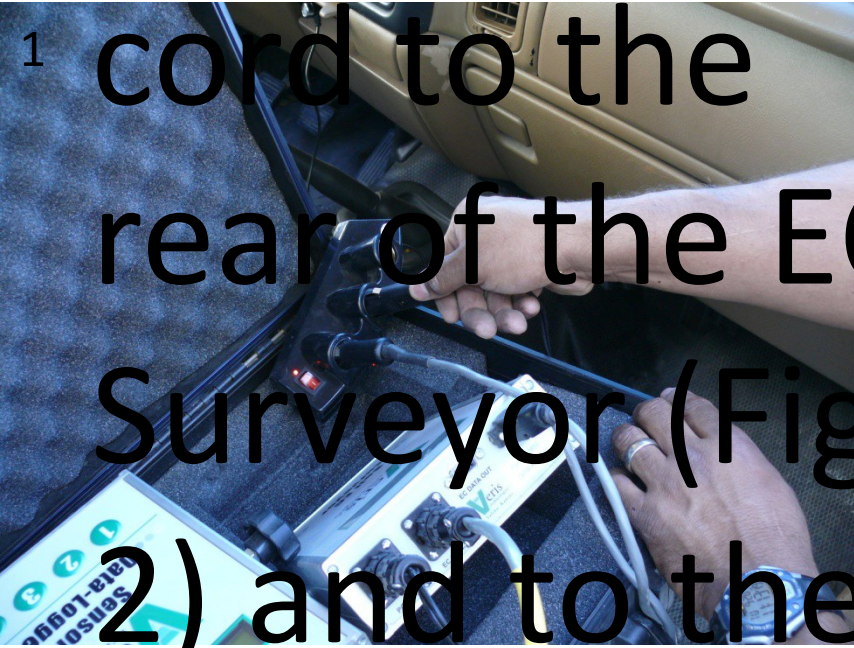
2

- Attach one Logger black power cord to the



1

cord to the rear of the EC Surveyor (Fig 2) and to the 3-way power



3



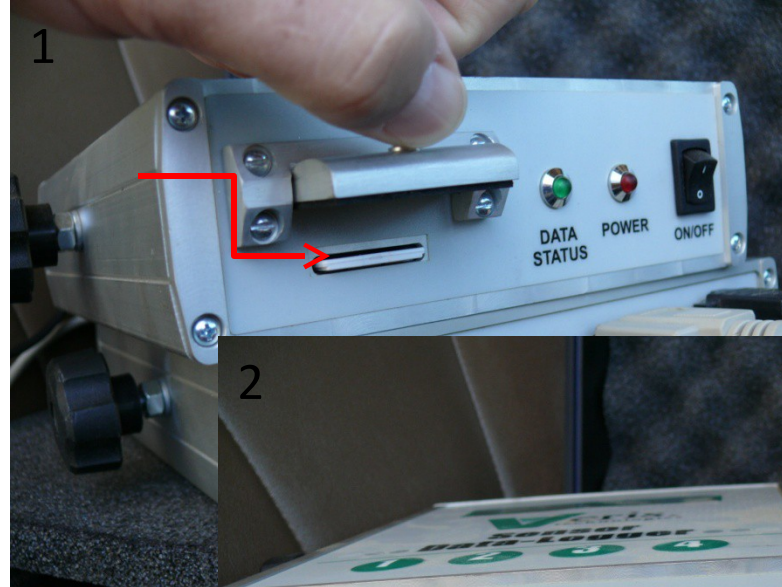
Connecting

g EC
Take the
Surveyor
serial cable
(to Data
attach it to
Logger
the rear of



Power up the Veris

- Make sure that the SD data storage card is inserted in the Data Logger (red arrow Fig 1). **Note: if SD data storage card is absent, then no data**



Data

Collection

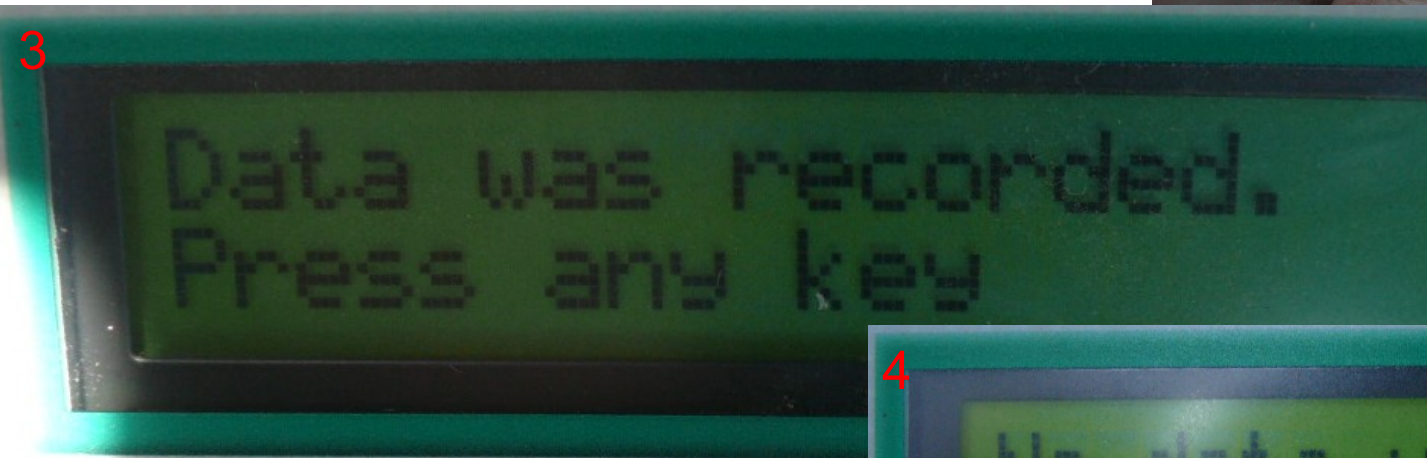
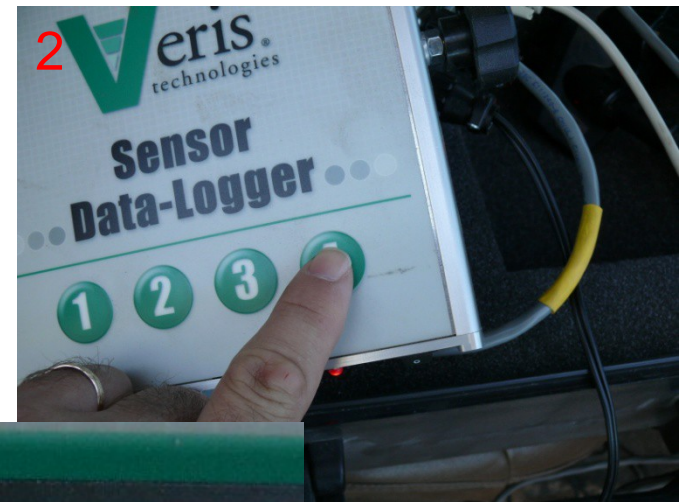
- When data
Logger and EC
Surveyor are
turned on the
following
Setup





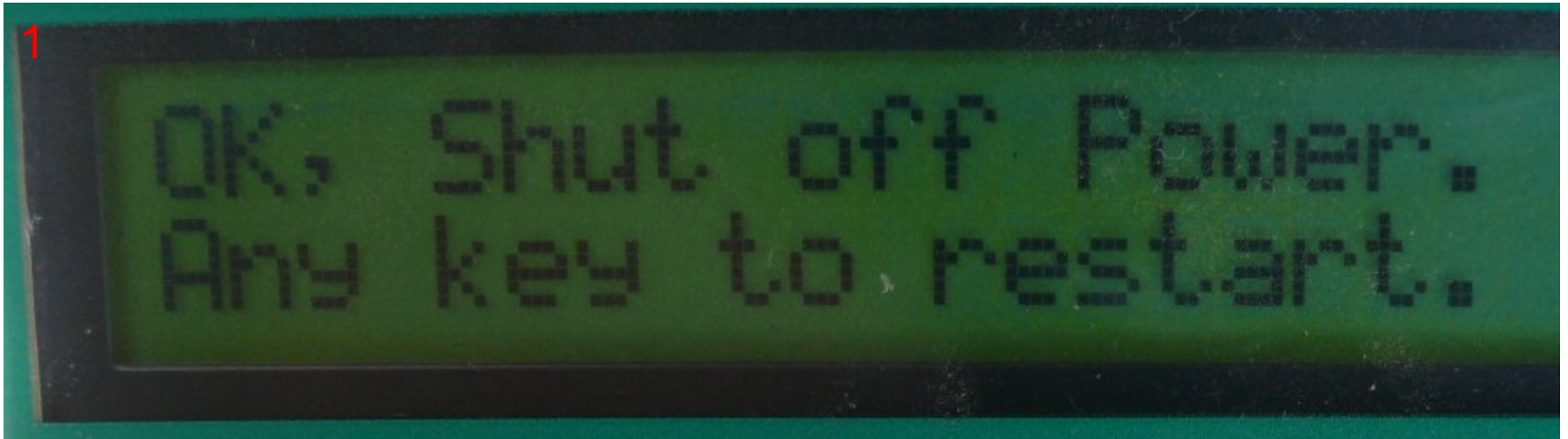
Data Collection Setup

- The screen shown in Fig 1 will appear, we want to measure EC so Press "1" (Fig 2) and the screen
- (Cont.)



Data Collection

- Fig 1 shows the signal from the Veris. The DGPS shows that we are recording GPS, (if there is not



Instrument Shutdown

- After data are recorded and you press any key "1", "2", "3", or "4" the message



Data Retrieval

- Once you have shut down the instrument, you need to take the SD card from the Data

Data Processing

- Data processing can be done

using Microsoft Excel with

Step 1: Preparing the data for processing (Pre-processing)
any spatial interpolation

Three aspects:

- a. Retrieving/importing data
- b. Combining and labeling data
- c. Removal/exclusion of anomalous data

software. The steps described

here are specific for the

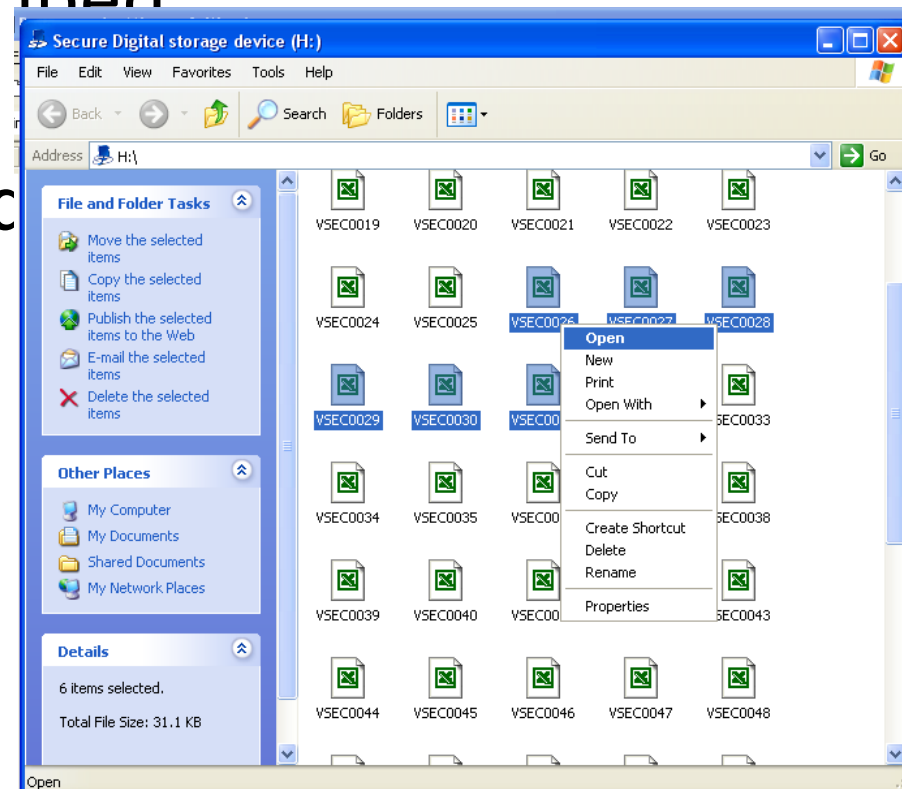
step 1: Retrieving/importing data (Gold

Software Inc.).

Insert SDcard into the SD drive on the computer (Fig. 1) and navigate to the data files (if necessary).

Files names are of the form "VSECO" plus 3 numbers (e.g. VSEC0066). The 3 numbers represent the file ID (mentioned in slide 19). Data is stored in the ".dat" file format and can be opened directly in Microsoft Excel.

One or more data files can be viewed by "selecting" the files, "right click" the mouse and selecting "open" (Figure 2).



Step 1b: Combining and labeling data

We recommend that data be collected as single longitudinal transects (3 - 4 transects across a two lane road) along the area of interest.

During pre-processing, data from all transects should be combined into a single data file. To do this **copy and paste data for all transects (end to end) into a single Excel sheet.**

The new Excel sheet should also have 5 columns. **Label** the columns as: **X-location, Y-location, EC_SH, EC_DP** and **ELEV_ft**, respectively.

- X- and Y- location** are the GIS locations;
- EC_SH** and **EC_DP** are electrical conductivity readings to a depth of 2 and 4 feet, respectively;
- ELEV_ft** is the elevation in feet.

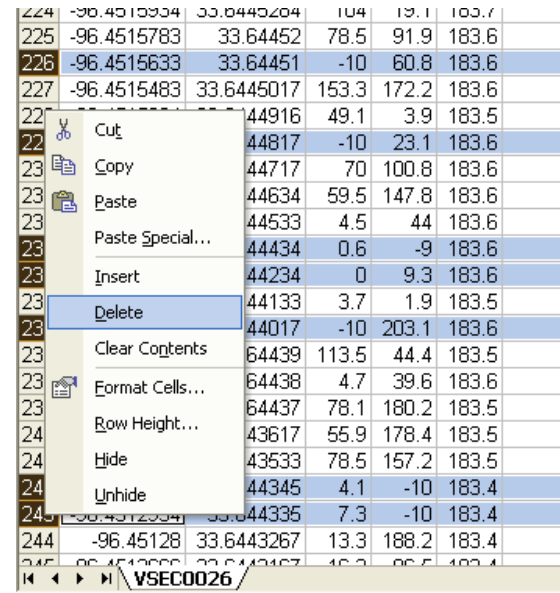
	A	B	C	D	E	F	G
1	-96.4521	33.64487	0	249.1	183		
2	-96.452	33.64486	252.3	320.7	183		
3	-96.452	33.64485	376.2	322.5	183		
4	-96.452	33.64484	0	41.7	183		
5	-96.452	33.64483	270.8	303.1	183		
6	-96.452	33.64482	210	281.1	182.9		
7	-96.452	33.64481	251.6	245.3	182.9		
8	-96.452	33.6448	124.6	12.1	182.9		
9	-96.4519	33.64479	281.6	221.7	182.9		
10	-96.4518	33.64478	0	24.2	182.9		

	A	B	C	D	E	F	G
1	X-location	Y-location	EC_SH	EC_DP	ELEV_ft		
2	-96.4521	33.64482	171.9	239.9	183.5		
3	-96.4521	33.64481	0	73.2	183.5		
4	-96.4521	33.64481	52.2	32.4	183.5		
5	-96.4521	33.6448	49	22.8	183.5		
6	-96.4521	33.64479	105.1	54.1	183.4		
7	-96.4521	33.64479	78.5	4.8	183.4		
8	-96.4521	33.64478	201.1	10.3	183.4		
9	-96.452	33.64477	5.8	11.3	183.4		
10	-96.452	33.64477	212.4	45.3	183.4		
11	-96.452	33.64476	241.7	108	183.4		
12	-96.452	33.64475	27.7	1	183.4		

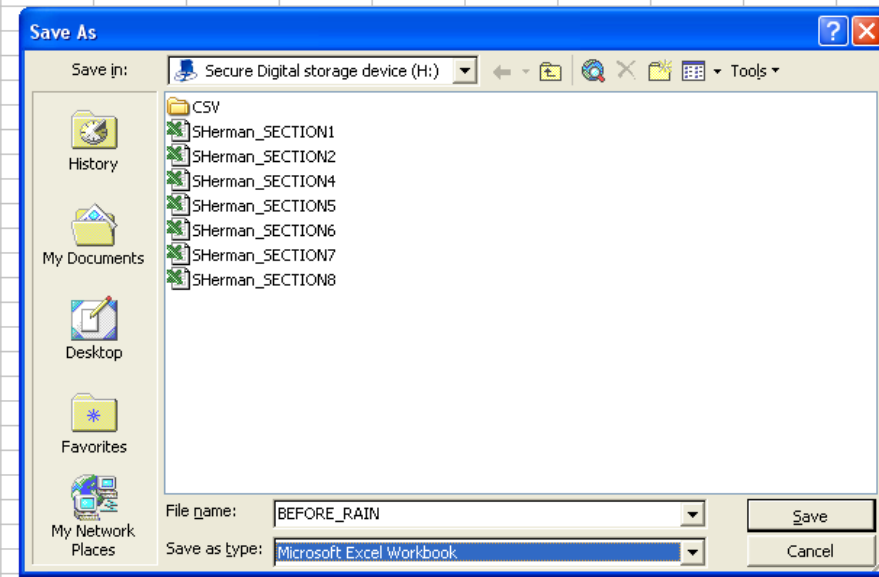
Step 1c:

- Removal/exclusion of values that be in the form of zero or anomalous data or negative values. It is recommended that these values be removed.

- To remove these values:
- Select the row(s) (hold down on Ctrl key for multiple selections)

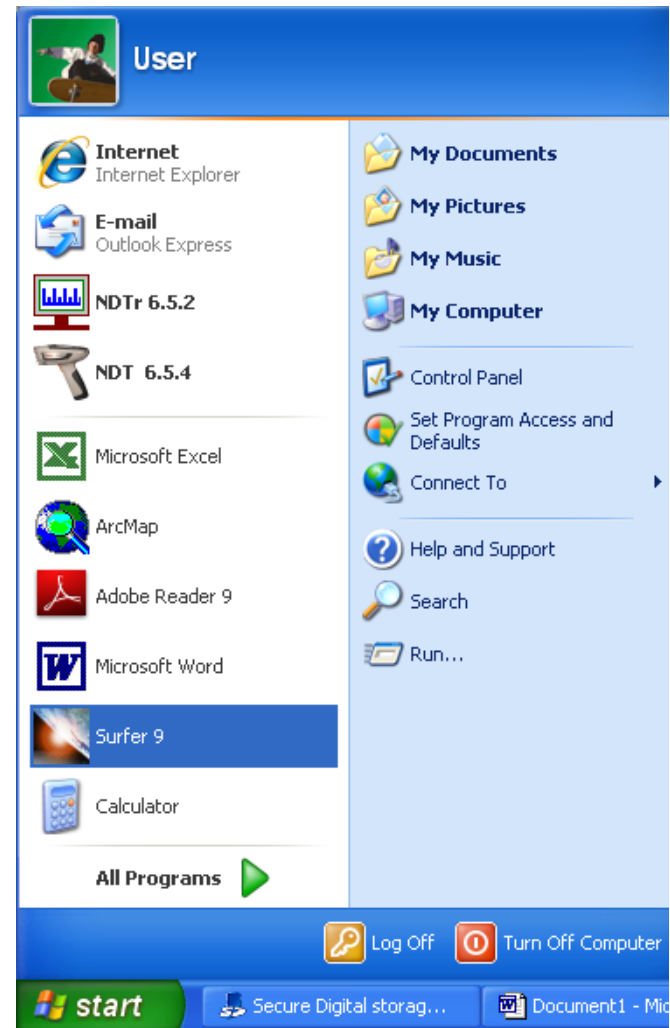


224	-96.4515954	33.6445204	104	19.1	103.7
225	-96.4515783	33.64452	78.5	91.9	183.6
226	-96.4515633	33.64451	-10	60.8	183.6
227	-96.4515483	33.6445017	153.3	172.2	183.6
22		44916	49.1	3.9	183.5
22		44817	-10	23.1	183.6
23		44717	70	100.8	183.6
23		44634	59.5	147.8	183.6
23		44533	4.5	44	183.6
23		44434	0.6	-9	183.6
23		44234	0	9.3	183.6
23		44133	3.7	1.9	183.5
23		44017	-10	203.1	183.6
23		64439	113.5	44.4	183.5
23		64438	4.7	39.6	183.6
23		64437	78.1	180.2	183.5
24		43617	55.9	178.4	183.5
24		43533	78.5	157.2	183.5
24		44345	4.1	-10	183.4
24		44335	7.3	-10	183.4
244	-96.45128	33.6443267	13.3	188.2	183.4
245	-96.4513000	33.6443167	16.2	86.5	183.4



Step 2: Data

- The processing/analysis processing is to obtain an insight into how soil EC vary spatially. Any spatial analysis software can be used for processing and data analysis.



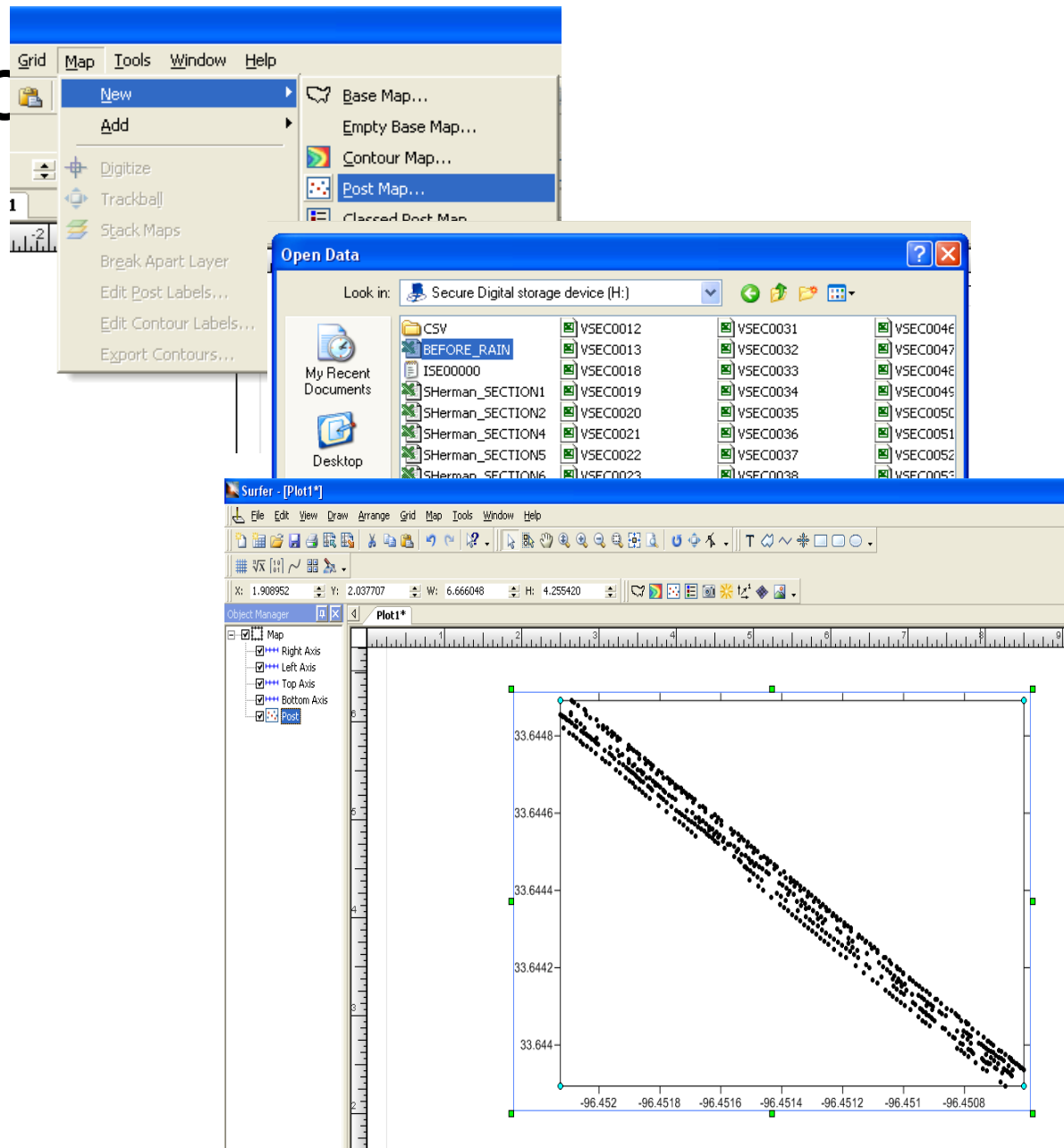
- Here, we describe data processing using the

Creating a post map

- Open Surfer 9

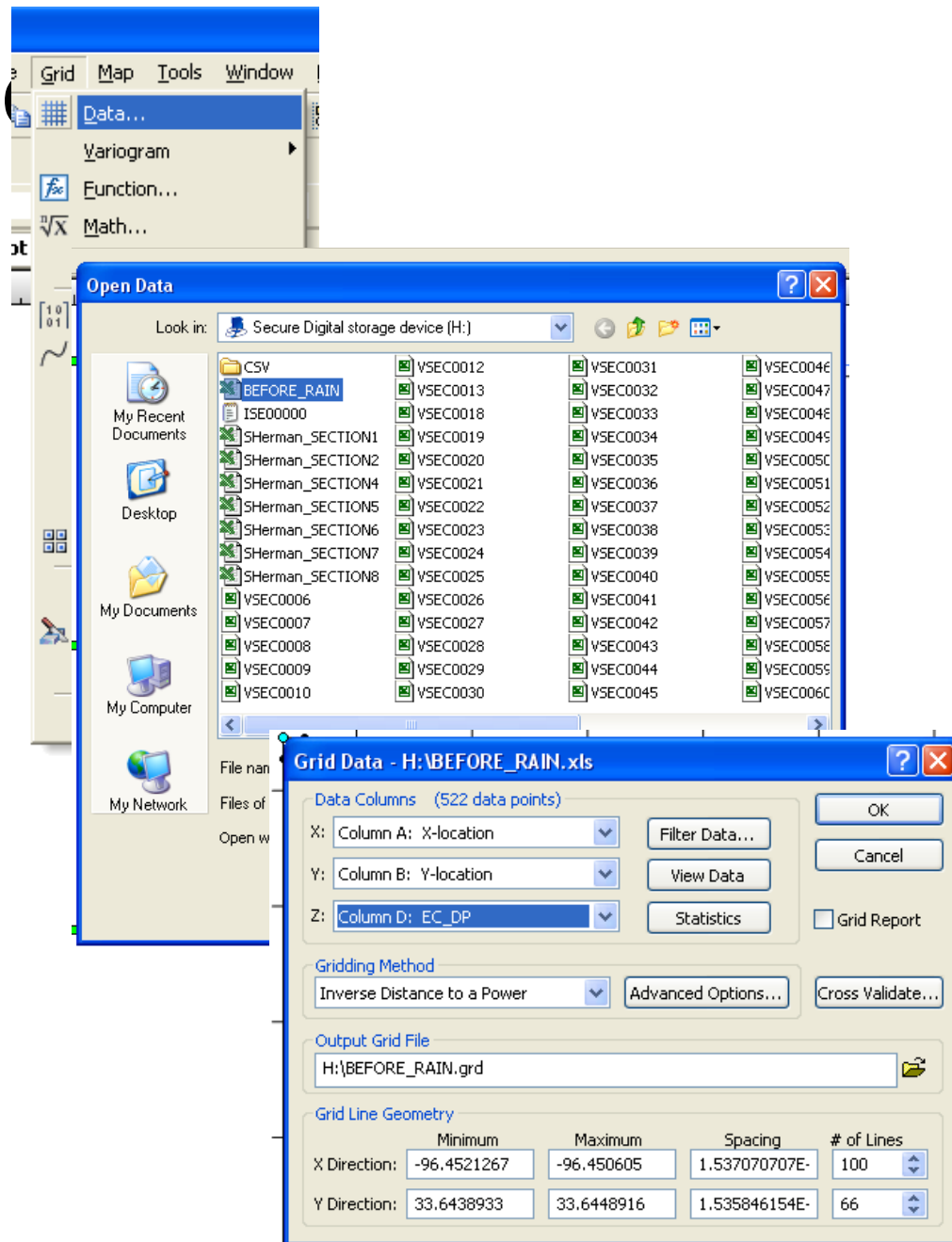
- Click Map >> New >> Post Map

- Select appropriate file
– here the



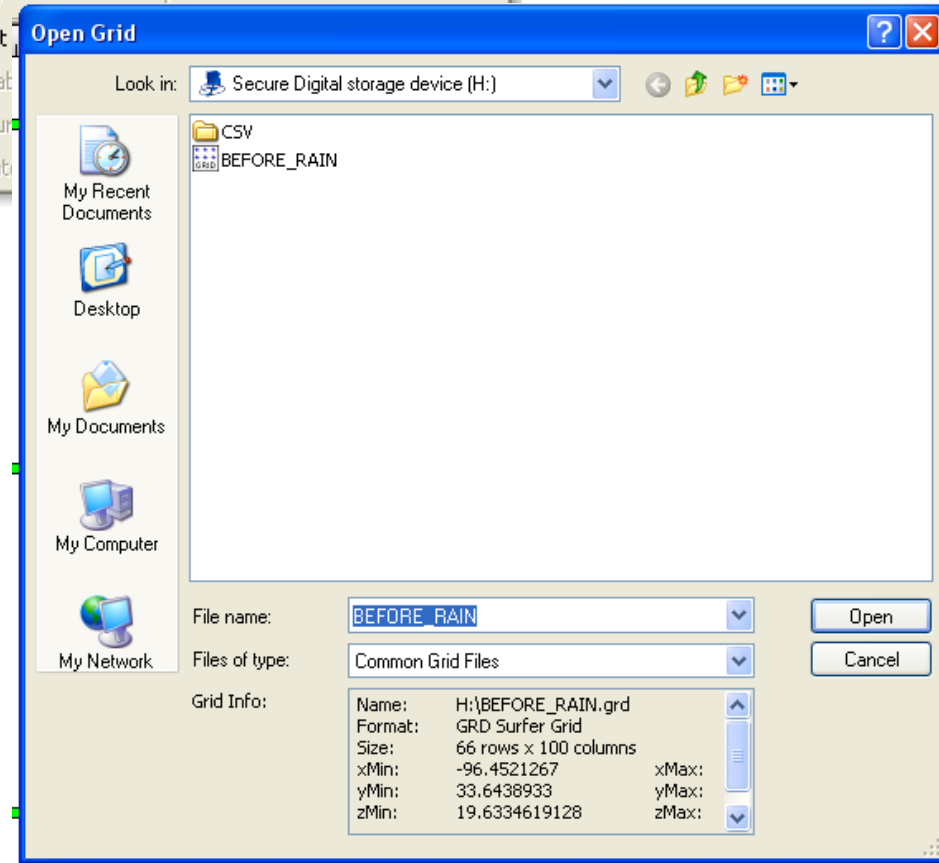
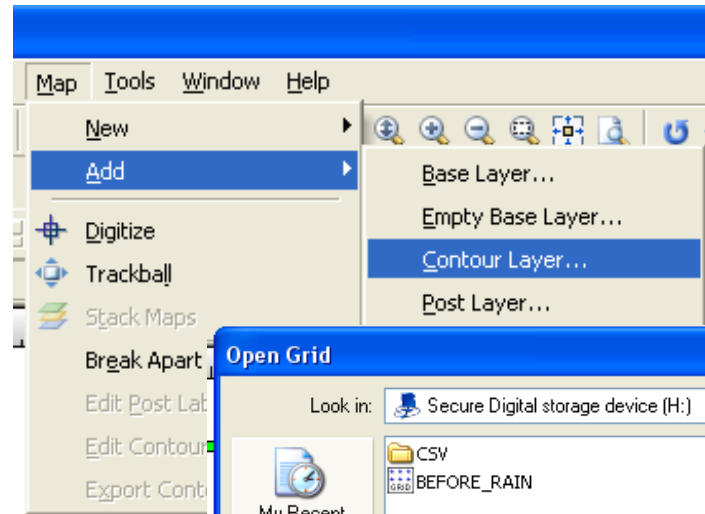
Creating a contour map

- Click **Grid** >> **Data**
- **Select** appropriate data (see Slide 25)
- In the “Grid Data” window check to ensure the following matches:



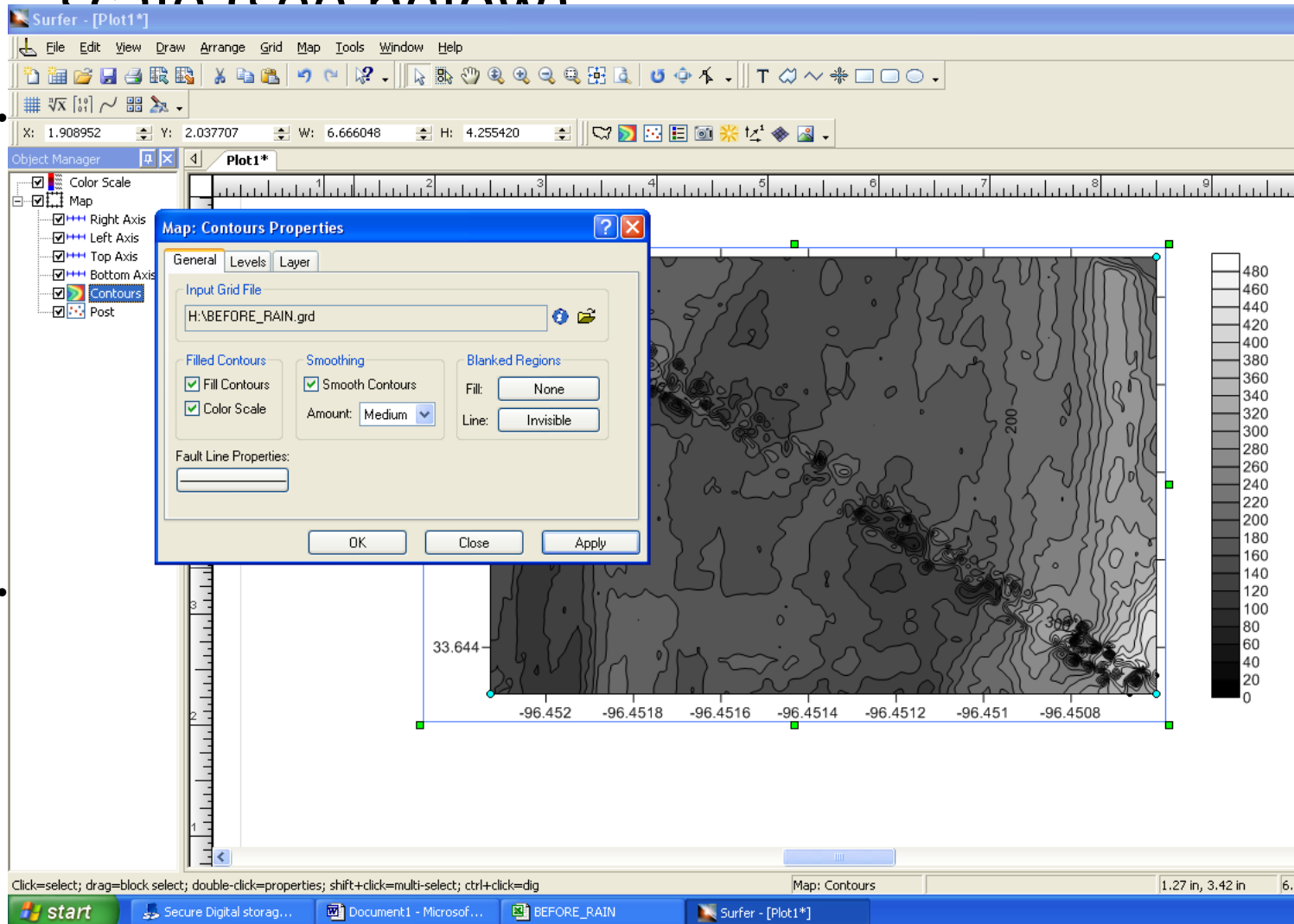
Creating a contour map (cont'd)

Click **Map** >> **Add** >> **Contour Layer**



Select grid (from Slide 28)

- The final contour map should show filled contour areas of different shades and a color scale (see below)



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of