

2.4 Examples of Operation

2.4.1 Example of Recent Introduction of Advanced Technology in Japan (Development and introduction of a power distribution geographic information system)

(1) Outline

The power distribution geographic information system, which was developed and introduced recently, unitarily controls information of electronic maps and information of distribution facilities and planned works drawn on the maps and provides such information visually. As a result, distribution duties ranging from planning, operation, maintenance to facilities management now can be done on a notebook type computer unitarily. This system is expected to provide good effects in many fields, such as enhanced efficiencies of business and customer services. The system comprises the following individual systems for supporting respective duties.

(a) Drawing management system

The system has functions to develop electronic data from distribution facilities management drawings, which have been managed on paper basis, and automatically updating distribution facilities management drawings after completion of a distribution line reinforcement work through computer processing based on the design drawings. The system also has functions to refer to any power distribution line chart or contents of facilities (electric wire size, circuit length, support type, etc.) from a notebook PC.

(b) Overhead transmission line design system

- ✓ The functions to input design contents into the distribution facilities management drawings, which have been converted into electronic data, and develop design drawings through computer processing.
- ✓ The functions to automatically develop optimal design drawings for simple works while considering economy.

(c) Pole accessory photographs management system

- ✓ The functions to register and refer to the pole accessory photographs taken by the digital camera etc. on the spot through a notebook personal computer after the completion.

(d) Power outage information display system

- ✓ The functions to transfer service interruption information real time from the distribution automation system remotely monitoring and controlling distribution lines to the power distribution geographic information system, and refer to service interruption contents and the area from a notebook PC.

(2) Characteristics of the System

- ◆ The design of distribution lines, construction, maintenance, and operation management can be supported by one system.
- ◆ In order to aim at shortening of a development period, and curtailment of expense, commercial software package and application software were utilized.

(3) Technical Level

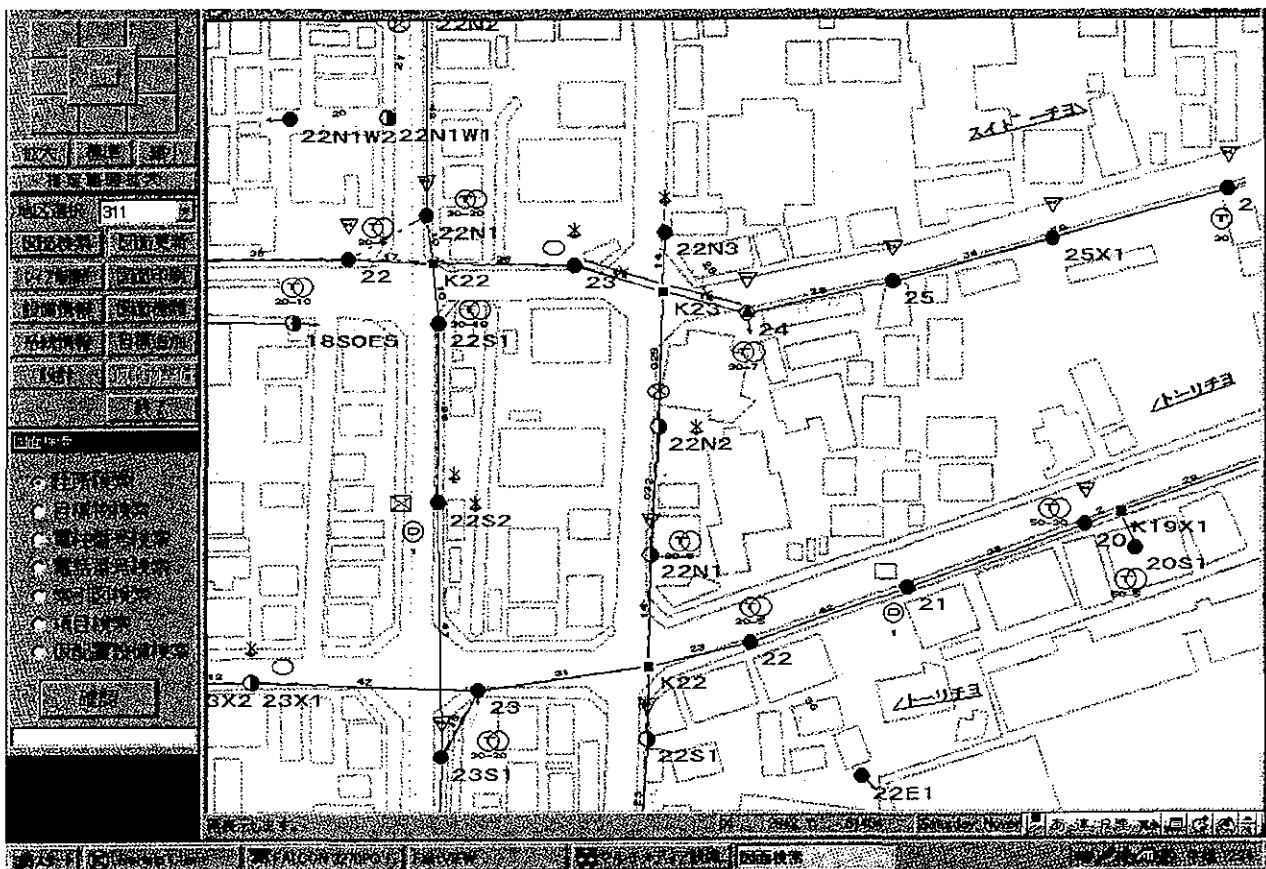
- ◆ There were inquiries from other power companies regarding the functions, configuration, applications, etc. of the system, and these companies are considering adoption of the system or development of a similar system.
- ◆ The "centralized reception center system" and the "communication equipment monitoring & control system" both utilizing the electronic maps are used by the business department and the information system department of the company. The system is appreciated highly.

(4) Effects

- ◆ Since correction of distribution facilities management drawings accompanying any work is automatically processed by computer after completion of the work on the basis of the data stored in advance, correction of the drawings can be done with less efforts.
- ◆ Since high voltage distribution system charts can be produced automatically from the distribution facilities management drawings, by area, by substation, etc., repeated corrections of various system charts are not required, and in turn, the drawings can be improved in precision.
- ◆ Laborsaving in the drawing duties can be attained.
- ◆ Needs of on-site inspection can be reduced for designing simple works by using the drawings produced automatically by the computer and pole assembly photographs.
- ◆ In response to an inquiry from a customer, a check can be easily and quickly done on an electronic map to tell the planned date of the work, etc. Thus the customer services can be enhanced.
- ◆ Since the distribution facilities management drawings and others on paper are abolished and they are replaced with electronic ones, paperless processing is promoted.
- ◆ Information concerning facilities, planned works, customers, etc. can be shared among the sections concerned.

Power Distribution Geographic Information System

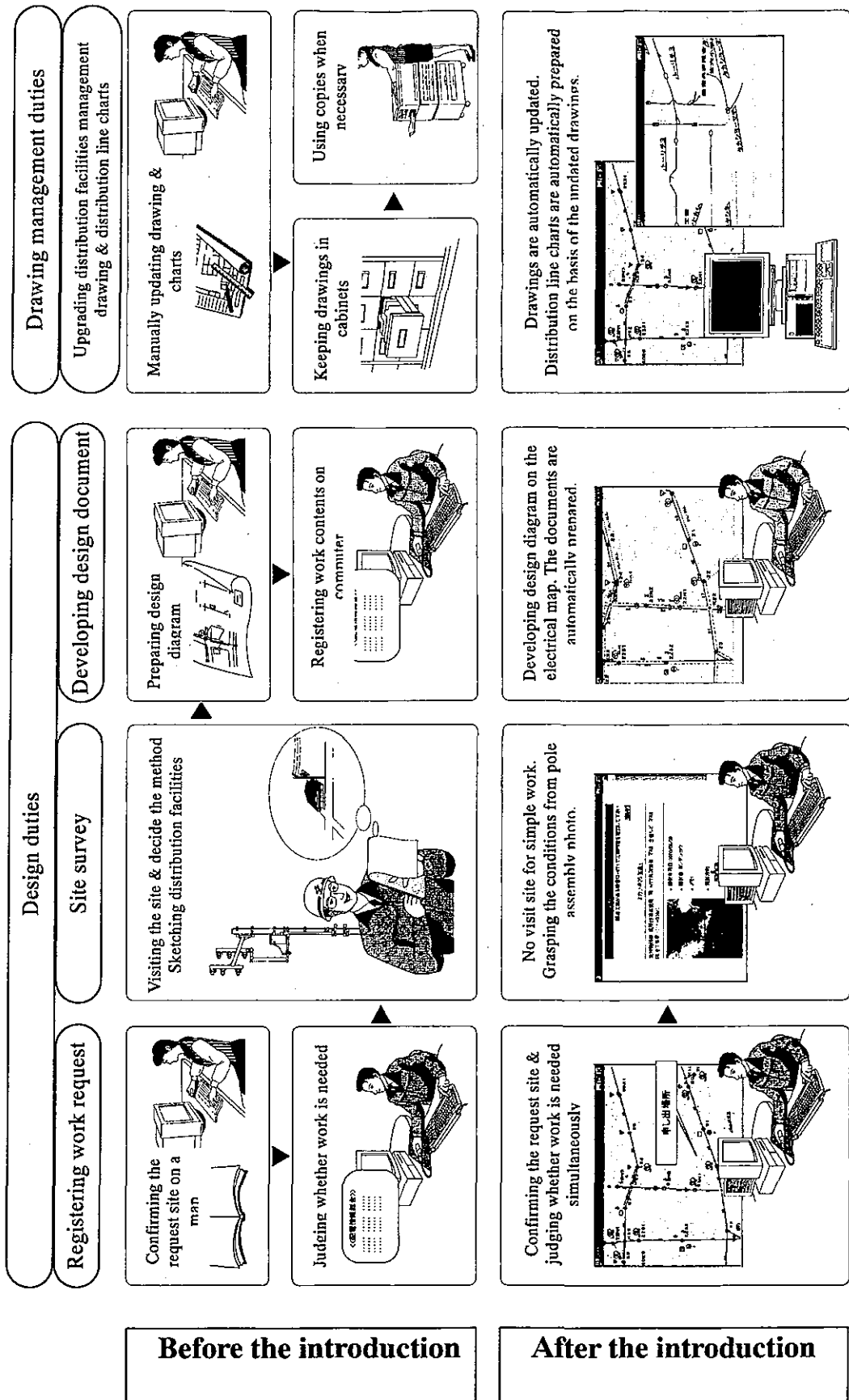
The power distribution geographical information system unitarily controls information contained in electronic maps and information of distribution facilities, work plans, etc. drawn on the electronic maps and provide such information visually. This system is highly expected to provide many good effects in many aspects, including higher efficiency in design duties and enhanced customer services.



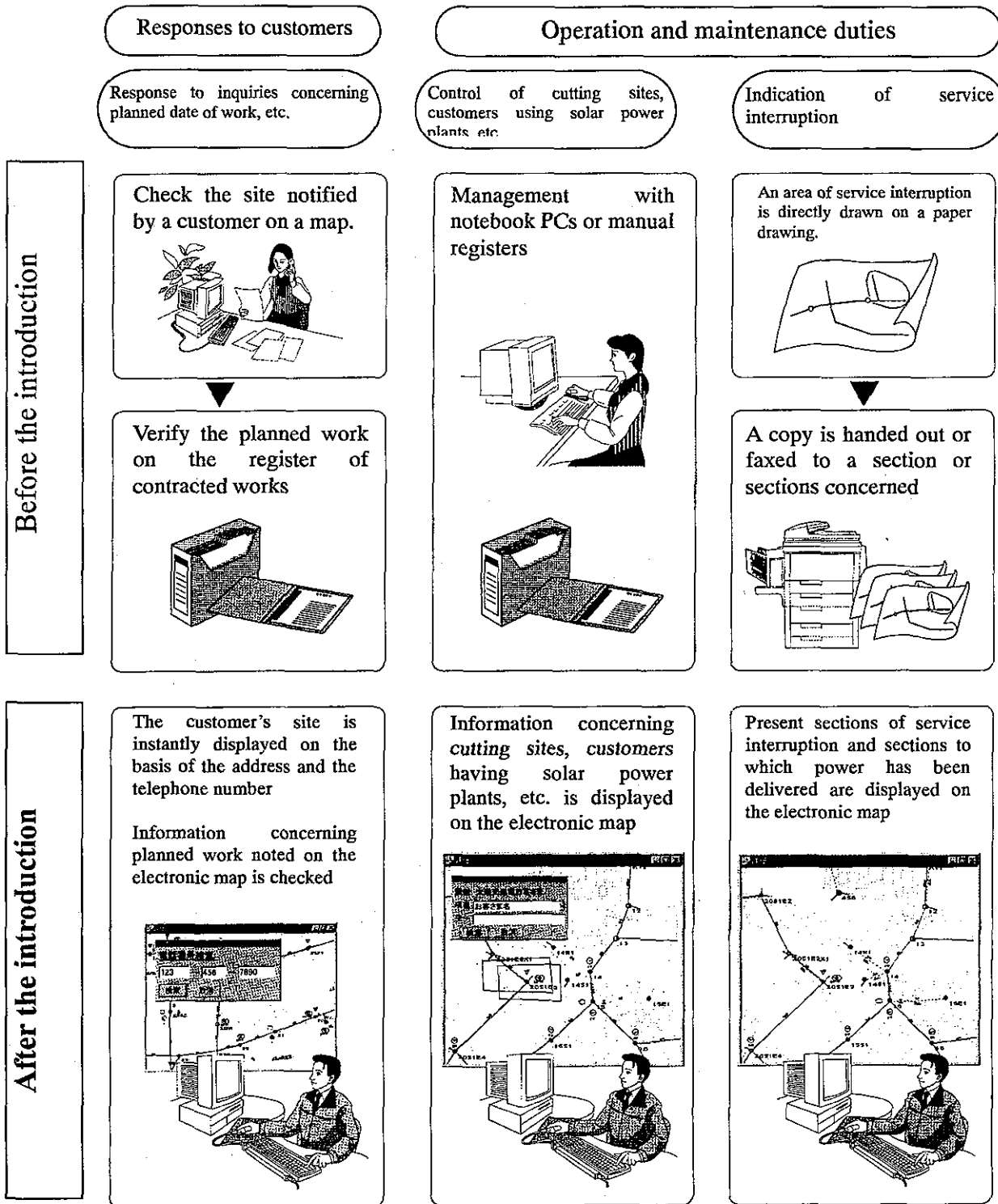
General view of the client machine



Outline of the Duties (Comparison of Before and After)



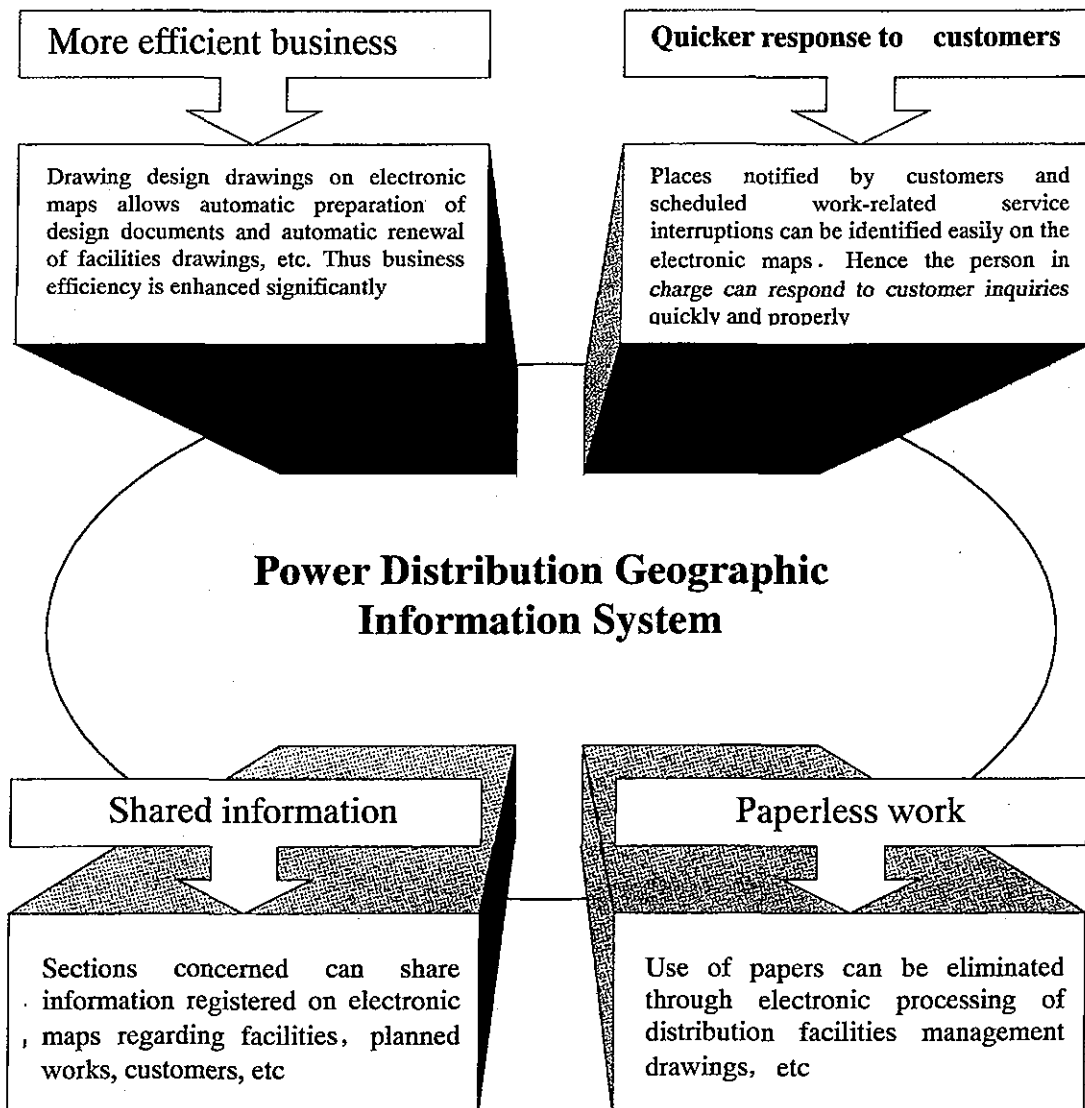
Outline of the Duties (Comparison of Before and After)



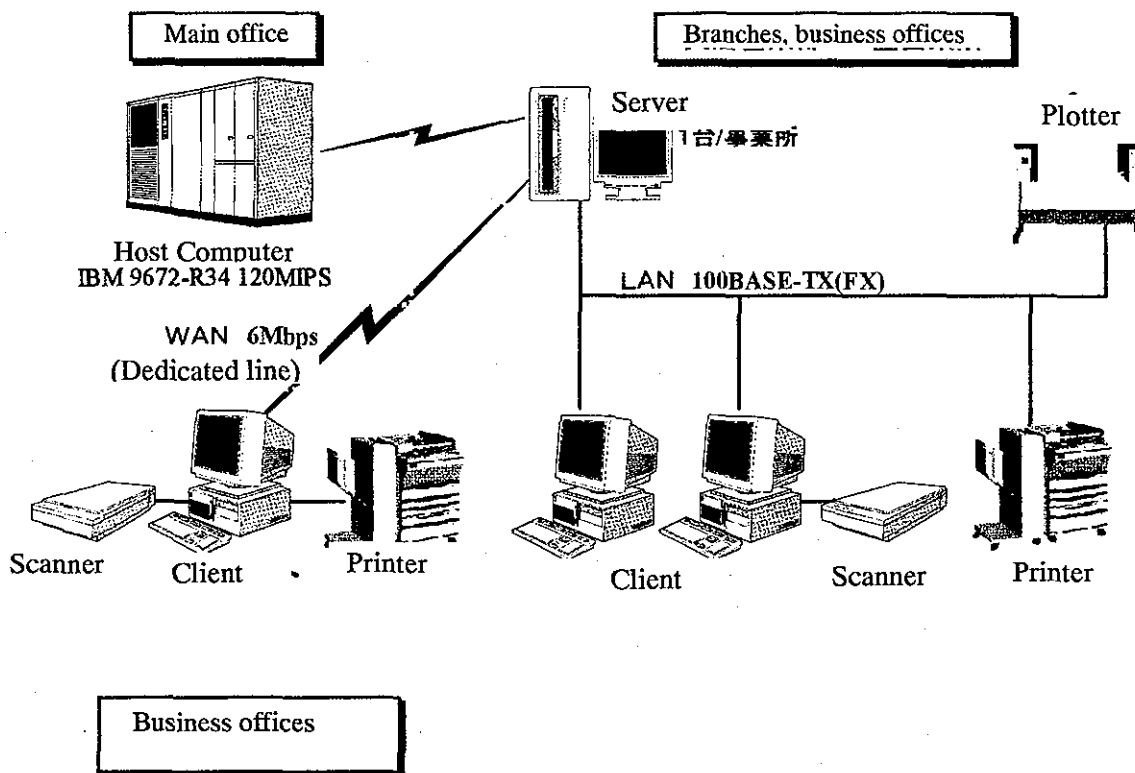
Features of the System

- As facilities information and design and work information are managed on electronic maps, the single system can support duties relating to facilities installation such as registering works, designing and management of drawings, and duties relating to operation and maintenance such as management of service interruption areas, cutting sites, etc.
- To reduce the time and cost required for the development of the system, PC servers have been adopted and commercial packaged software and application software are used

Effects of the Use of the System



System Configuration

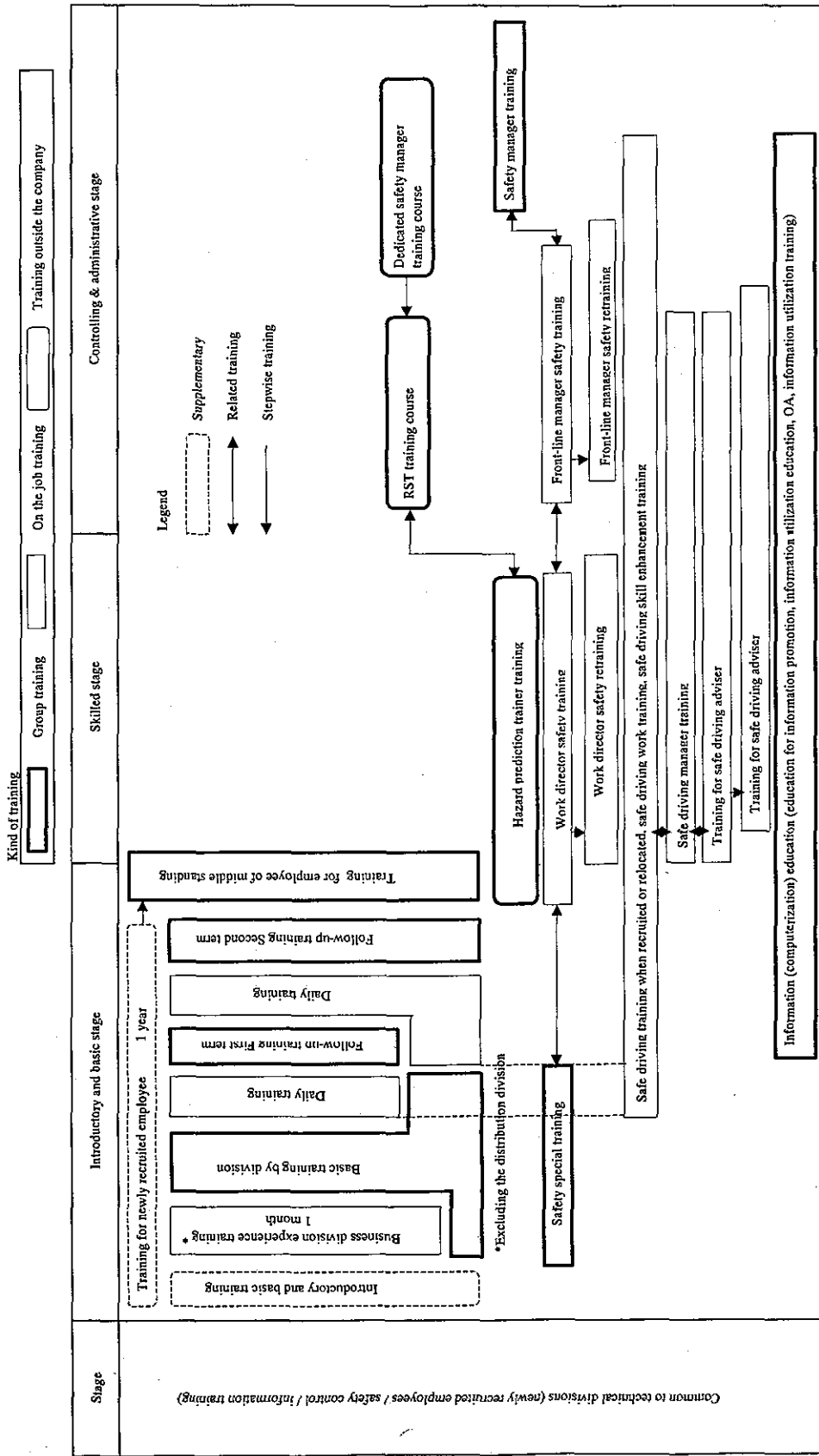


Equipment Specification	
Server	CPU: Pentium III Xeon 550MHz x 2 Memory: 640 MB HDD: 27 GB
Client	CPU: Pentium III 800 MHz Memory: 128 MB HDD: 10 GB Display: 17 inch
Printer	A3 color laser printer Resolution: 600 dpi Printing speed: A3 monochro 12 P/minute A3 color 3P/minute
Plotter	A0 color plotter Resolution: 360 dpi x 360 dpi, 720 dpi x 720 dpi Printing speed: 360 dpi standard mode A0 full color 1 P/4 minutes
Scanner	Resolution: 400 dpi (A4), 400 dpi, 1600 dpi (A3)

2.5 Training of Personnel

2.5.1 Training System of Distribution Division

10-3 Training System of Distribution Division



10-5 Training System of Distribution Division

Stage	Kind of training		
	Group training	On the job training	Training outside the company
Common to the distribution division	<p>Introductory and basic training</p> <p>-To acquire skills that are sufficient to conduct normal distribution line work safely and properly under specific guidance, except high-voltage hot line work</p> <p>-To learn basic knowledge of interior and outside wiring design, tour, inspection and measurement</p> <p>-High- and low-voltage electricity handling duties</p> <p>-Work under risk of oxygen deficiency</p> <p>-First-aid method and artificial respiration</p> <p>-Crane operating duties</p> <p>-Slinging duties</p> <p>-Hoist operating duties</p> <p>-Cutting and other duties</p> <p>-Chain saw duties</p> <p>-Elevated work vehicle operation training</p> <p>-Course for driver's license (motorcycle)</p>	<p>Daily training</p> <p>-To acquire skills that allows unaided work safety to execute frequently require jobs</p> <p>-To acquire knowledge and skills that allow execution of light works alone in the field in one's charge</p> <p>Follow-up training</p> <p>Emergency, recovery work/technique training</p> <p>Disaster recovery training</p> <p>Distribution automating equipment handling training</p> <p>Training for handling equipment installed on the ground</p> <p>Training is also given to newly recruited employees when necessary</p> <p>-Small-size movable crane operation training</p> <p>-Slinging skill training</p> <p>-Training for type 2 oxygen deficiency hazard work director skill</p> <p>-Training for 3 land special radio operator license</p>	<p>General technique training</p> <p>Electrical work director training</p> <p>High-voltage type A live technique training</p> <p>High-voltage type B live technique training</p> <p>Indirect live line technique training</p> <p>Special training</p> <p>-Movable dynamo operating training</p> <p>-Elevated work vehicle operating training</p> <p>-Heavily equipped work vehicle operating training</p> <p>-Movable transformer vehicle operation training</p>
	<p>Introductory and basic stage</p>	<p>Skilled stage</p>	<p>Controlling & administrative stage</p>

10-3 Training System of Distribution Division

Stage	Introductory and basic stage	Kind of training		
		Group training	On the job training	Training outside the company
Distribution operation	Comprehensive substation and distribution 22kV distribution tower handling training Training on communication of service interruption and damage condition Higher harmonics control technique training			
Distribution automation	Distribution minicomputer operator training Switch remote controller operator training Remote control cable and remote-controlled equipment work technique training			
Distribution work	Outside wiring design inspection training Underground wiring design inspection training Underground wiring design support system operating training Higher harmonics control technique training Remote control cable and remote-controlled equipment work technique training Underground wiring technique training Training for natural ground excavation work director skill Trench timbering work director skill training Form assembly director skill training Scaffolding work director skill training Underground distribution seminar			

10-3 Training System of Distribution Division

Stages	Kind of training		
	Introductory and basic stage	On the job training	Controlling & administrative stage
Distribution work	<p>Lead-in wire and interior wiring design inspection training</p> <p>Interior wiring inspection training</p> <p>High-voltage incoming facilities handling training</p>	<p>Group training</p> <p>On the job training</p> <p>Training outside the company</p>	
	<p>Tour, inspection and measurement training</p> <p>Cutting work training</p> <p>Outside wiring design inspection training</p> <p>Lead-in wire and interior wiring design inspection training</p> <p>Interior wiring inspection training</p> <p>High-voltage incoming facilities handling training</p> <p>Comprehensive substation and distribution operating training</p> <p>22KV distribution tower handling training</p>		
Distribution maintenance			
Distribution siting	<p>Distribution siting training for newly appointed employee</p>		<p>steel frame assembly work director skill training</p> <p>Forklift operating skill training</p> <p>Training for operation of construction work vehicles (for foundation work)</p>

2.5.2 Safety

To insure worker and public safety, electric utilities have set basic guidelines to be observed by those involved in designing, constructing or installing, maintaining or checking and repairing distribution facilities as well as conducting recovery in accordance with the Work Safety and Hygiene Act and its Enforcement Ordinance. Electric utilities are going to take a look at some of these guidelines now.

(1) Work Director

When a team of two or more people is formed to perform work on distribution facilities, a work director should be appointed to be in charge of making sure the work is done safely by overseeing, directing, and supervising his fellow workers. Only those with the required training may be appointed to this position.

(2) Elevated Work

(a) Use of a safety belt on the pole

Work performed at heights above 2 meters is called elevated work. If it is possible for workers to fall down accidentally, every worker should use an on-pole safety belt and an auxiliary rope to prevent falls.

(b) Using an auxiliary rope

When a worker needs to move his safety rope, he should always use an auxiliary rope while climbing up or down a pole or conducting on-pole work. Whenever possible, he must use both an on-pole belt and an auxiliary rope at the same time while performing work on a pole.

(c) Climbing up or down a pole

Except for solitary work, every worker should always climb up or down a pole under the supervision of a work director or a supervisor appointed by a work director who will remain on the ground. In these cases, the worker should point his finger at the object he is going to work on and say the name of the action he is going to take.

Each worker should climb up poles with extreme caution, using his voltage detector to see whether the pole and its metallic attachments have any electricity leakages.

(3) Hot-line Work and Work Performed Near Live Wires

(a) Forming a hot-line work team

As a general rule, hot-line work or work near live wires should be conducted by groups of three or more workers. Each work team should consist of a work director, a hot-line (proximity) worker(s), an on-pole worker(s) and an aboveground worker(s).

(b) Arrangements made before working

Before starting to work, the work director of each hot-line work team should ensure that the insulating protective gear (clothing), guards and hot-line work tools to be used are in perfect order by checking them thoroughly. He should also explain to all of his crew their assigned work, the work methods to be employed, who does what, and so forth.

(c) High voltage hot-line work**(i) Wearing insulating protective gear (clothing)**

Before getting down to installing guards and high voltage hot-line work, each worker should wear a piece of safety headgear, a pair of high voltage insulating gloves, insulating clothing, and a pair of insulating boots.

(ii) Installing guards

Guards should be installed on live high voltage lines that come near on-pole workers, to prevent them from accidentally coming into contact with those hot lines.

- Hot lines that come within an overhead clearance range of 30 cm or less from the tip of a metal tool being held out by a worker stretching his limbs during his on-pole work
- Hot lines that come within a side clearance range of 60 cm or less from the tip of a metal tool held out by a worker with his arm stretched horizontally who is bending backward with the help of his safety rope while performing on-pole work
- Hot lines that come within a lower clearance range of 60 cm or less from a position where a worker will probably stop falling if he accidentally slips out of his on-pole work position

(d) Working near live high voltage lines

When a worker has to work near live high voltage lines (namely, within the ranges mentioned in the previous subsection), the worker should put on insulating protective gear (clothing) and install guards before starting to work, just as in the case of high voltage hot-line work.

(e) Low voltage hot-line work

If there is a possibility that electrical shocks could occur, all workers should wear safety headgear, low voltage insulating gloves, low voltage insulating clothing, and insulating half-boots. If places where work is to be performed are wet or work must be performed on a highly conductive object, guards should be installed on low voltage lines and grounding bodies.

(4) Dead-line Work**(a) Manipulating high voltage section switches**

When high voltage section switches must be manipulated to prepare for dead-line work, each switch should be manipulated on a one-instruction-one-manipulation basis. All workers manipulating switches should point their fingers at the object they are going to work on, while at the same time saying the action he is going to take next.

(b) Locking up high voltage section switches

Section switches that have been opened to prepare for dead-line work in addition to high voltage section switches opened normally that are hooked up to the section whose service is currently interrupted should be securely locked up. Signs reading "Switch Opened for Dead-Line Work" should be put on each switch.

(c) Preventing distribution lines from getting power surges from non-utility power-generating facilities via the low voltage windings of a pole-mounted transformer

If dead-line work has to be performed within a section accommodating a customer with non-utility power generating facilities, the customer's section switch(es) or the primary switch(es) of the pole-mounted transformer(s) powering the customer's facilities should be opened. If work has to be done in the downstream reaches (load-side) of a pole-mounted

transformer's primary switch, the transformer's secondary windings should be short-circuited by grounding.

(d) Checking for the absence of electricity

Open-circuited high voltage distribution lines or wires coming from the secondary windings of a pole-mounted transformer should be checked for the absence of electricity phase by phase with a voltage detector before starting dead-line work.

(e) Installing grounding fittings

Grounding fittings should be mounted on the power-supply side of open-circuited high voltage lines in the vicinity of a work site. This measure is taken to prevent electrical shocks from occurring when power is supplied from the power-generating facilities of a customer, when power is inadvertently supplied during work or when any of the open-circuited high voltage lines comes into contact with another live line or these lines develop voltages due to power surges from other lines.

(f) Running post-work confirmation checks

After completing dead-line work, the responsible work director should personally run checks to make certain that electrical-wire connections have been made correctly and that there are no missing connections and all grounding fittings have been removed. Then, the work director takes a roll call of his crew to make sure that everyone is now back on the ground and that the section they worked on is now ready to receive power. After everything is determined to be in order, he informs his headquarters that the dead-line work is completed.

3. Basic Manual for ArcMap

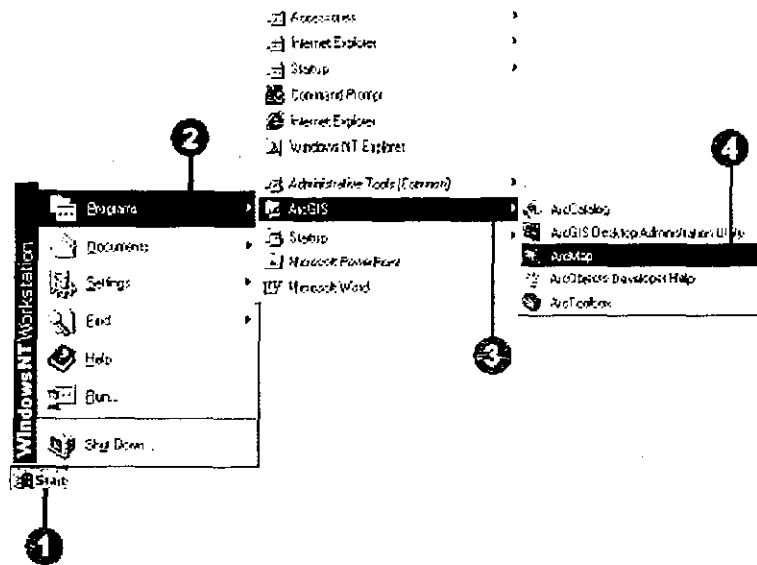
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1. Starting ArcMap

ArcMap lets you explore your geographic data and create maps for display.

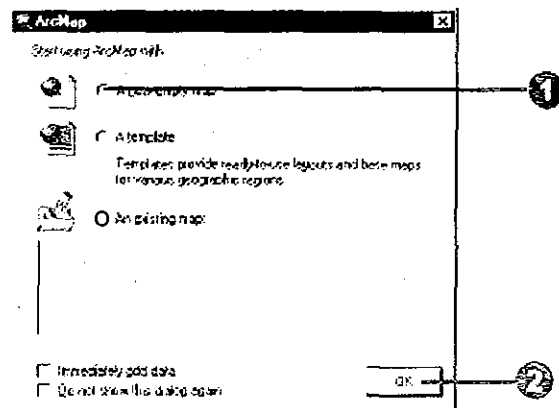
1. Click the Start button on the Windows taskbar.
2. Point to Programs.
3. Point to ArcGIS.
4. Click ArcMap.



2. Opening a new empty map

The first time you start ArcMap, the Startup dialog box appears. The Startup dialog box offers you several options for starting your ArcMap session. For this exercise, you want to open a new empty map document.

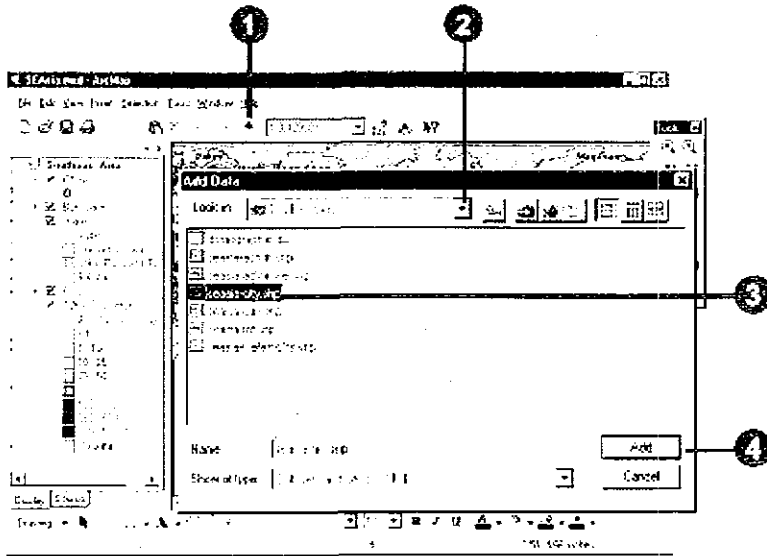
1. Click A new empty map
2. Click OK



3. Adding data in ArcMap

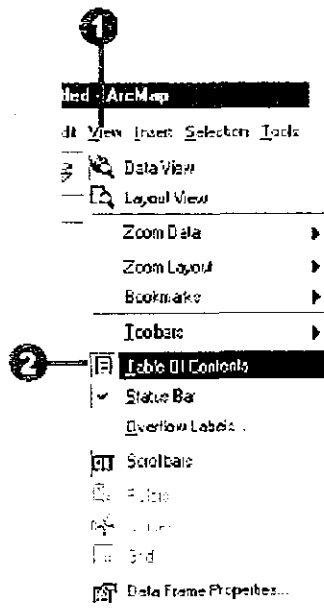
1. Click the Add Data button on the Standard toolbar.
2. Click the Look in dropdown arrow and navigate to the folder that contains the data source.
3. Click the data source.
4. Click Add.

ArcMap creates a new layer on the map that references the data source.



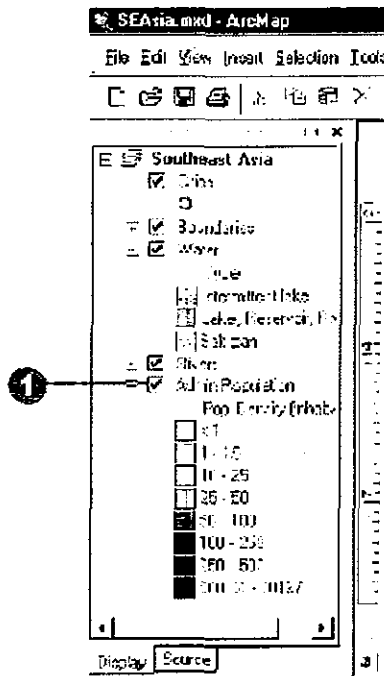
4. Showing the table of contents

1. Click the View menu on the Standard toolbar.
2. Click Table Of Contents.



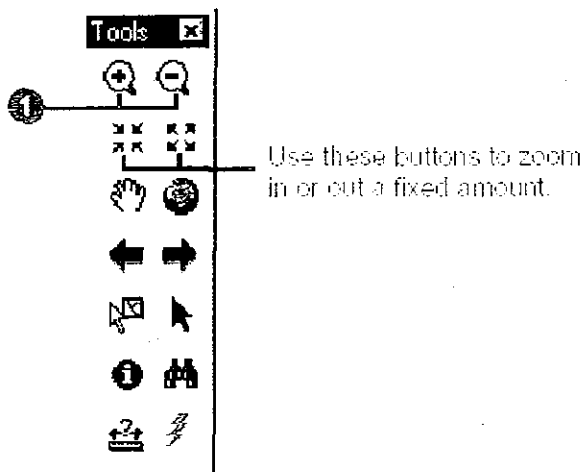
5. Turning a layer on or off

1. In the table of contents, check the box next to the layer's name. The layer should appear on your map. If you can't see the layer, it may be hidden by another layer or display only at a particular scale.



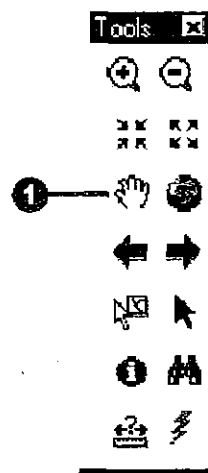
6. Zooming in or out

1. Click the Zoom In or Zoom Out button on the Tools toolbar.
2. Move the mouse pointer over the map display and click once to zoom around a point.
Alternatively, click and drag a rectangle defining the area you want to zoom in or out on.



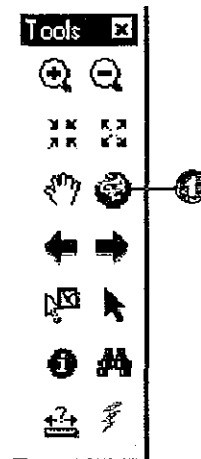
7. Panning

1. Click the Pan button on the Tools toolbar.
2. Move the mouse pointer over the map display and click and drag the pointer.



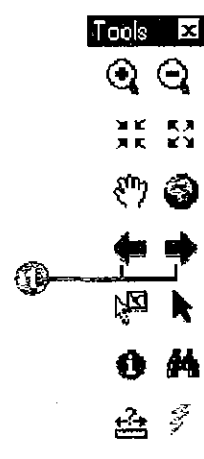
8. Zooming to the full extent of the data

1. Click the Full Extent button on the Tools toolbar.



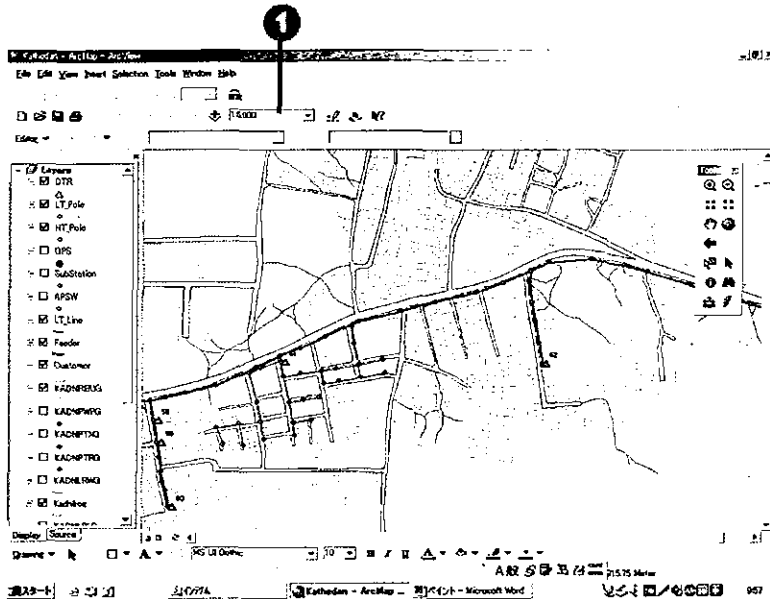
9. Moving back or forward one display

1. Click the Back or Forward Extent buttons on the Tools toolbar.



10. Zooming to a specific scale

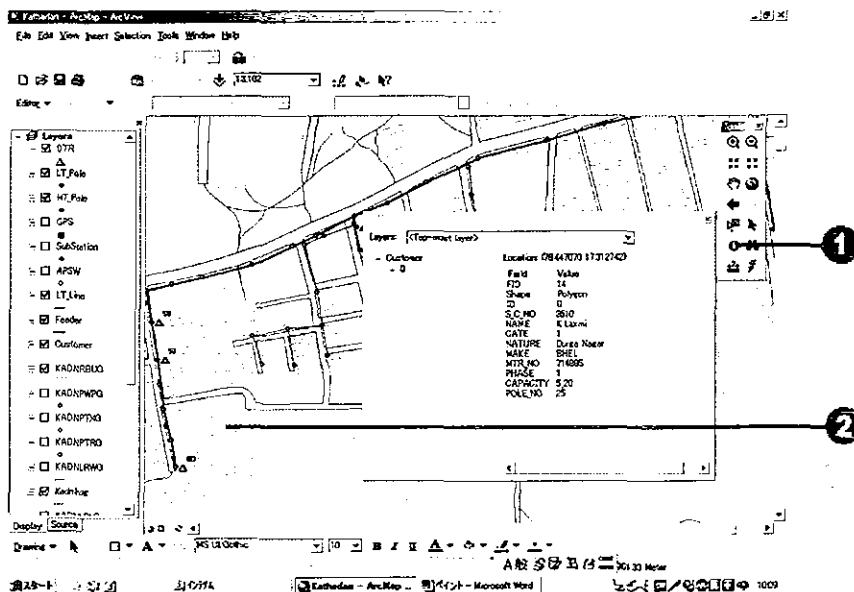
1. Type the desired scale on the Standard toolbar.



11. Identifying features by pointing at them

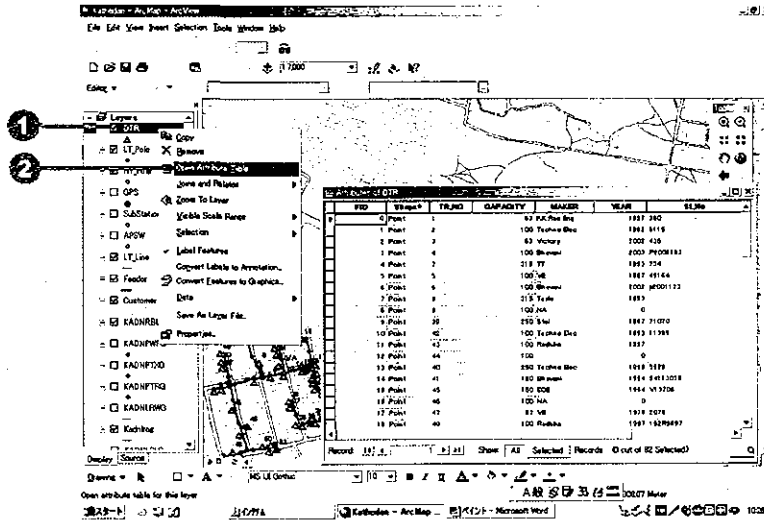
1. Click the Identify button on the Tools toolbar.
 2. Click the mouse pointer over the map feature you want to identify.
- The features in all visible layers under the pointer will be identified.

(Note) This function is useful to know individual information such as transformer, customer, pole, etc.



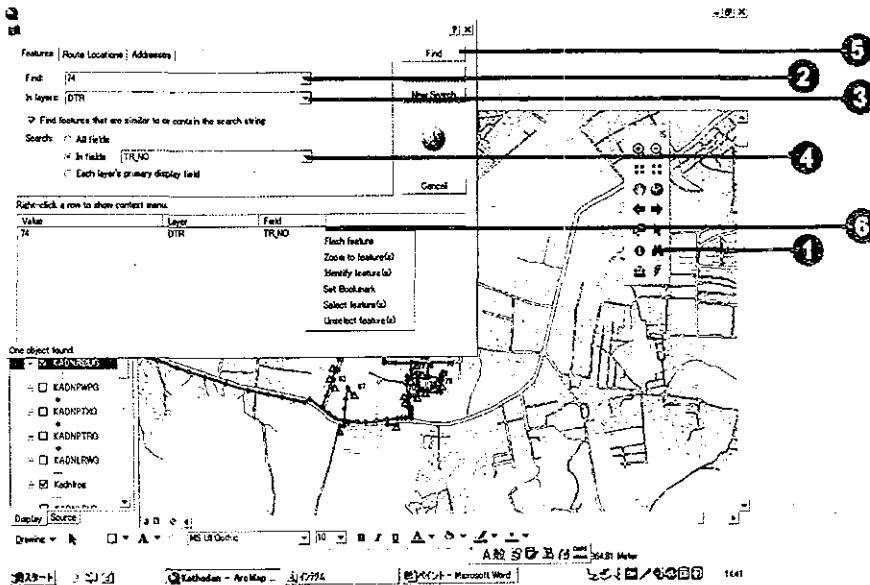
12. Viewing a layer's attribute table

1. In the table of contents, right-click the layer for which you want to display the attribute table.
 2. Click Open Attribute Table.
- (Note) This function is useful to know all information of facilities and customers.



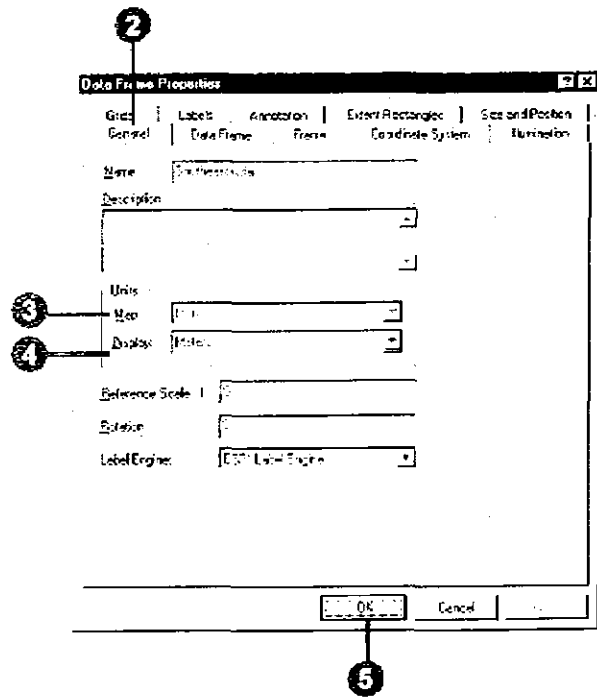
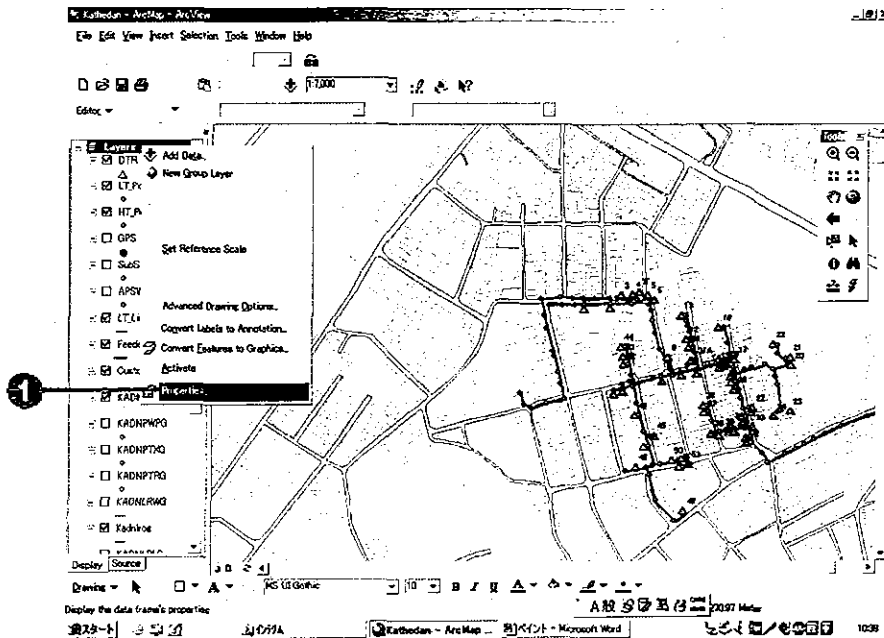
13. Finding features with particular attributes

1. Click the Find button on the Tools toolbar.
 2. Type the string you want to find in the Find text box.
 3. Click the In layers dropdown arrow and click the layer you want to search.
 4. Search for the string in all fields, in a specific field, or in the primary display field.
 5. Click Find.
 6. Right-click a row to show context menu.
- (Note) This function is useful to know a location of facilities and customers by inputting name, transformer number, etc.



14. Setting the units for reporting lengths and displaying coordinates

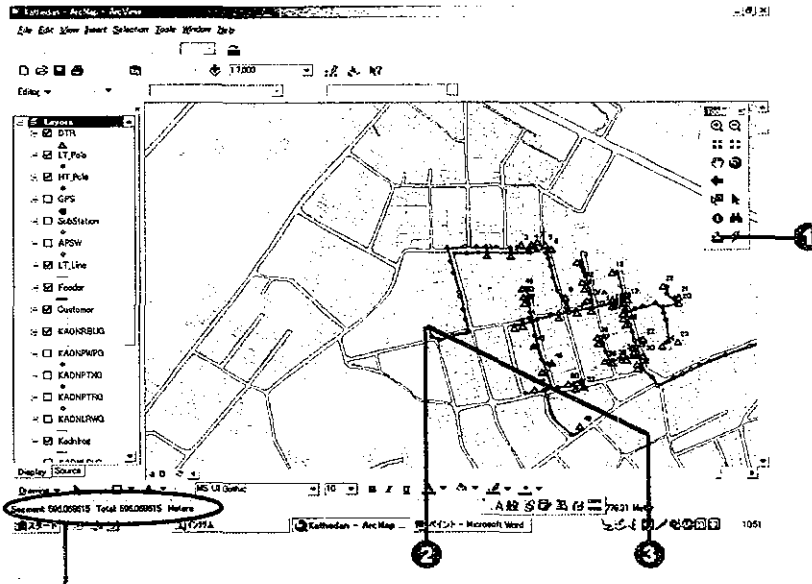
1. Right-click the data frame in the table of contents and click Properties.
2. Click the General tab.
3. Click the Map dropdown arrow and click the appropriate units. The map units option is only available when your data has no coordinate system information associated with it.
4. Click the Display dropdown arrow and click the appropriate units.
5. Click OK.



15. Measuring distance

1. Click the Measure button on the Tools toolbar.
2. Use the mouse pointer to draw a line representing the distance you want to measure. The line can have more than one line segment.
3. Double-click to end the line.

(Note) This function is useful to measure a distance between poles.

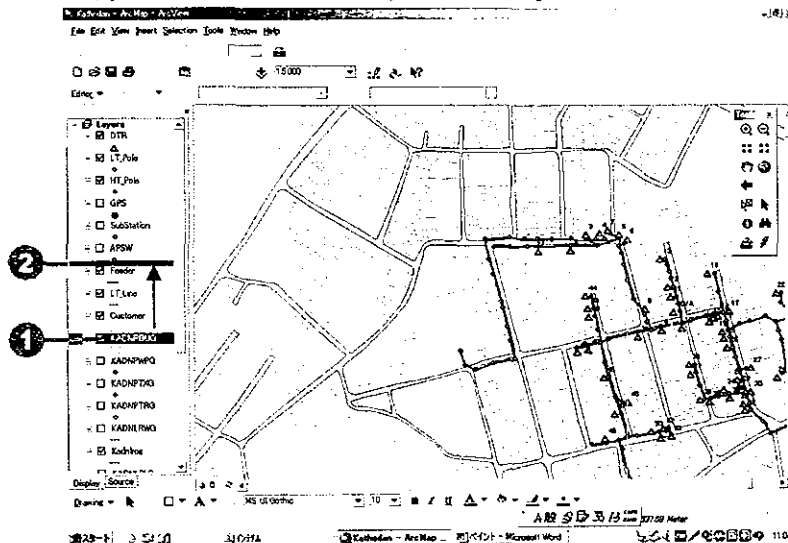


The measurement displays here on the status bar.

16. Moving a layer to change its drawing order

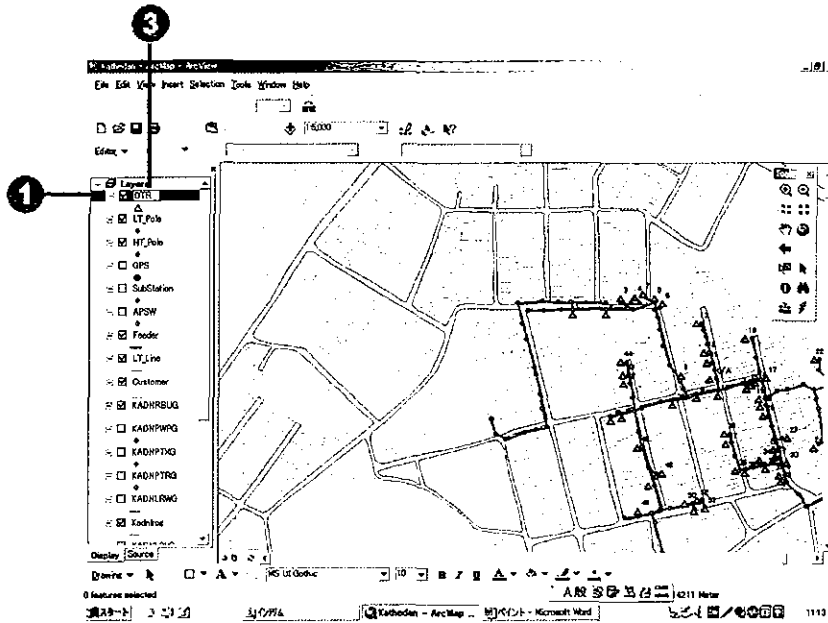
1. In the table of contents, click and drag the layer up or down. A black line indicates where the layer will be placed.
2. Release the mouse pointer to drop the layer in its new position.

(Note) Sometimes you cannot find a layer because another layers are covered with the layer. In this case, you should move the layer to the top.



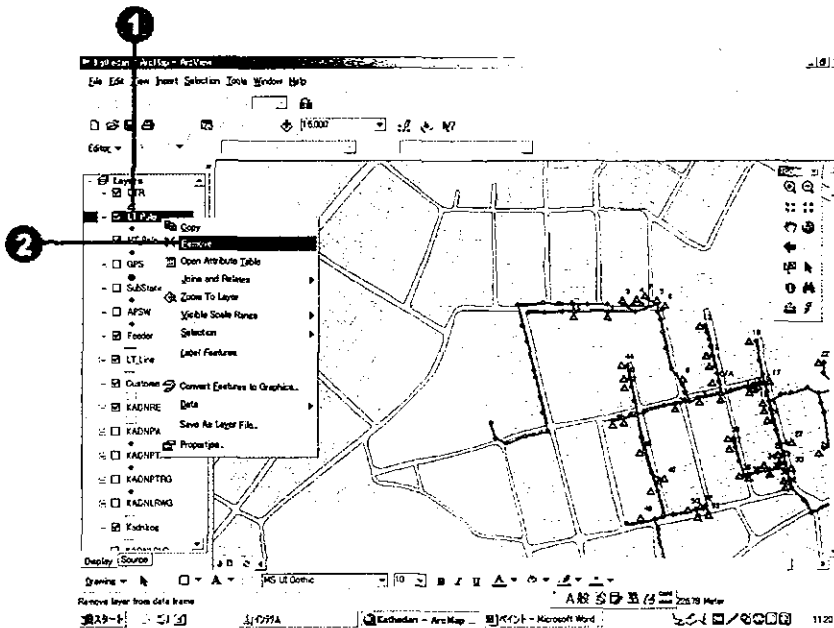
17. Changing the name of a layer

1. In the table of contents, click the layer to select it.
 2. Click again over the name.
- This will highlight the name and allow you to change it.
3. Type the new name and press enter.



18. Removing a layer

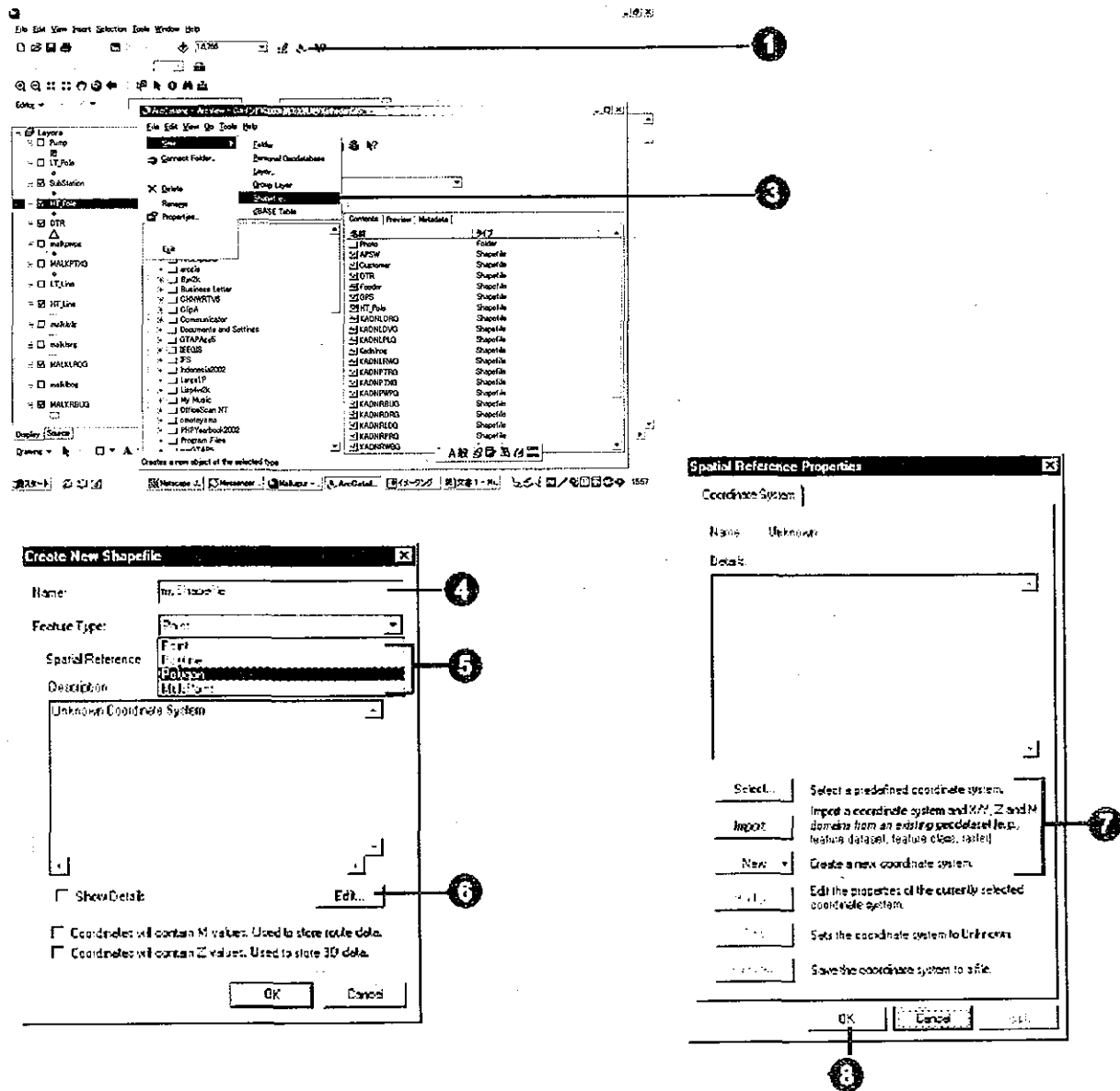
1. In the table of contents, right-click the layer you want to remove.
2. Click Remove.



19. Creating a new shape file

1. Click the ArcCatalog button on the Standard toolbar.
2. Select a folder which a new shapefile is stored in the Catalog tree.
3. Click the File menu, point to New, and click Shapefile.
4. Click in the Name text box and type a name for the new shapefile.
5. Click the Feature Type dropdown arrow and click the type of feature the shapefile will contain.
6. Click Edit to define the shapefile's coordinate system.
7. In the Spatial Reference Properties dialog box, click Select and choose a predefined coordinate system. Or click Import and choose the data source whose coordinate system you want to copy. Or click New and define a new, custom coordinate system.
8. Click OK.

(Note) When you want to add new layer, you have to create new shapfile in advance.



20. Creating features on layers

An overview of the editing process

The following is a general overview of how to use ArcMap and the Editor toolbar to edit your data.

1. Start ArcMap.
2. Create a new map or open an existing one.



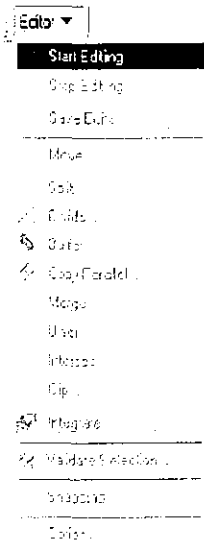
3. Add the data you want to edit to your map.



4. Add the Editor toolbar to ArcMap.

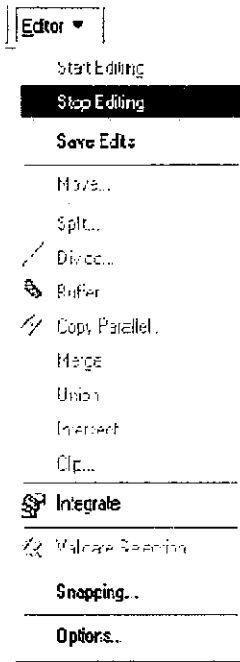


5. Choose Start Editing from the Editor menu.

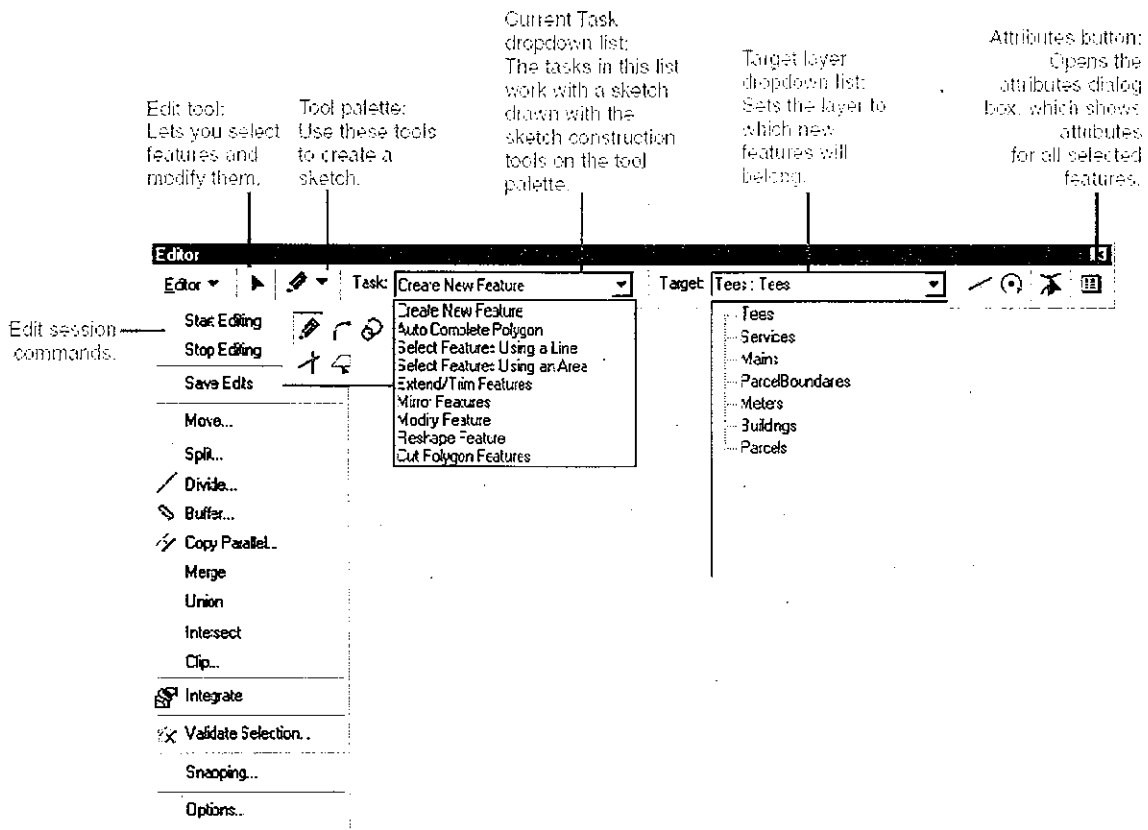


6. Create or modify features and /or their attributes.

7. Choose Stop Editing from the Editor menu and click Yes when prompted to save your edits.

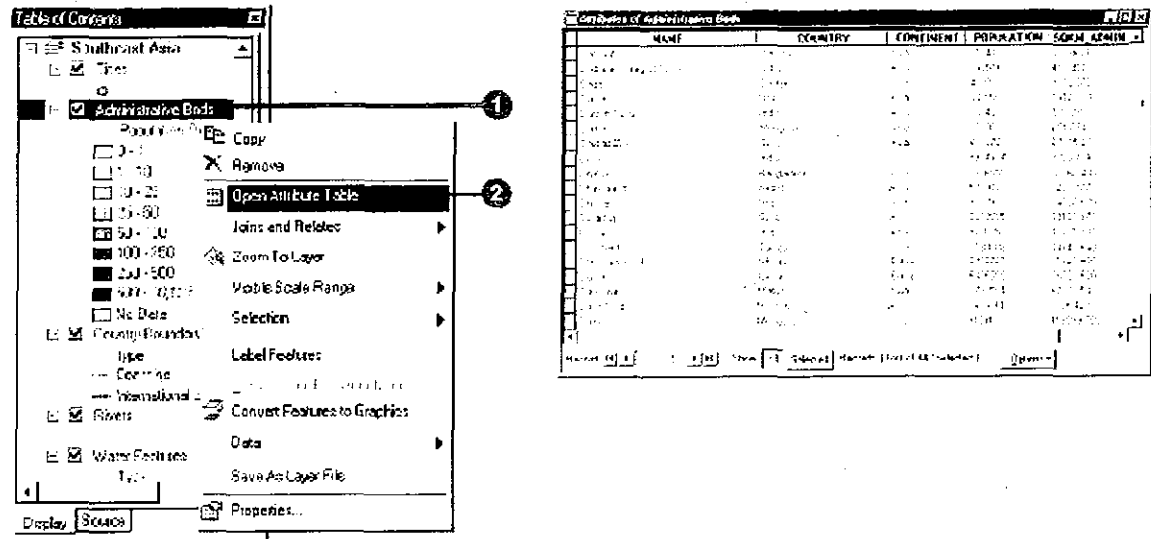


The Editor toolbar



21. Opening a layer's attribute table

1. In the table of contents, right-click the layer for which you want to display a table.
 2. Click Open Attribute Table.
- The layer's attribute table opens.

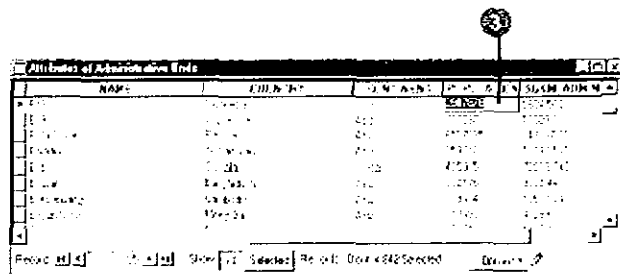


22. Editing text in records

1. If you haven't started an edit session, click the Editor menu on the Editor toolbar and click Start Editing.
2. Open the table you want to edit (Refer to 21. Opening a layer's attribute table)
3. Click the cell containing the attribute value you want to change.
4. Type the values and press Enter.

The table is updated.

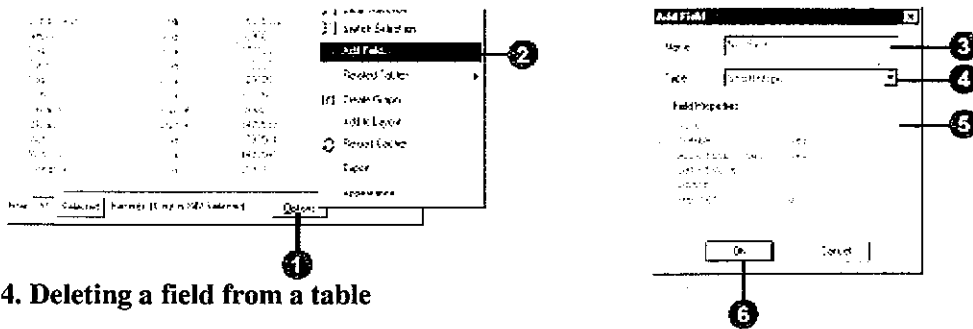
(Note) This function is useful to change information, for example, when you replace facilities such as transformer, meter, etc.



23. Adding a field to a table

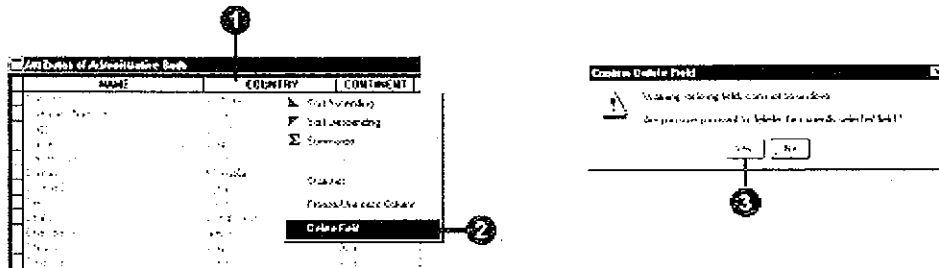
1. Click Options in the table you want to add a field to.
2. Click Add Field.
3. Type the name of the field.
4. Click the Type dropdown arrow and click the field type.
5. Set any other field properties, such as a field alias, as necessary.
6. Click OK.

(Note) This function is useful to add new information to attribute table.



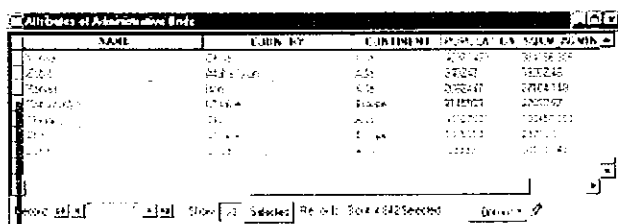
24. Deleting a field from a table

1. In the table window, right-click over the field header of the field you want to delete.
 2. Click Delete Field.
 3. Click Yes to confirm the deletion.
- Deleting a field cannot be undone.



25. Deleting records

1. If you haven't started an edit session, click the Editor menu on the Editor toolbar and click Start Editing.
 2. Open the table you want to edit.
 3. Select the records you want to delete. Press and hold the Ctrl key while clicking to select more than one record.
 4. Press the Delete key on the keyboard.
- Any geographic features associated with the records are also deleted.



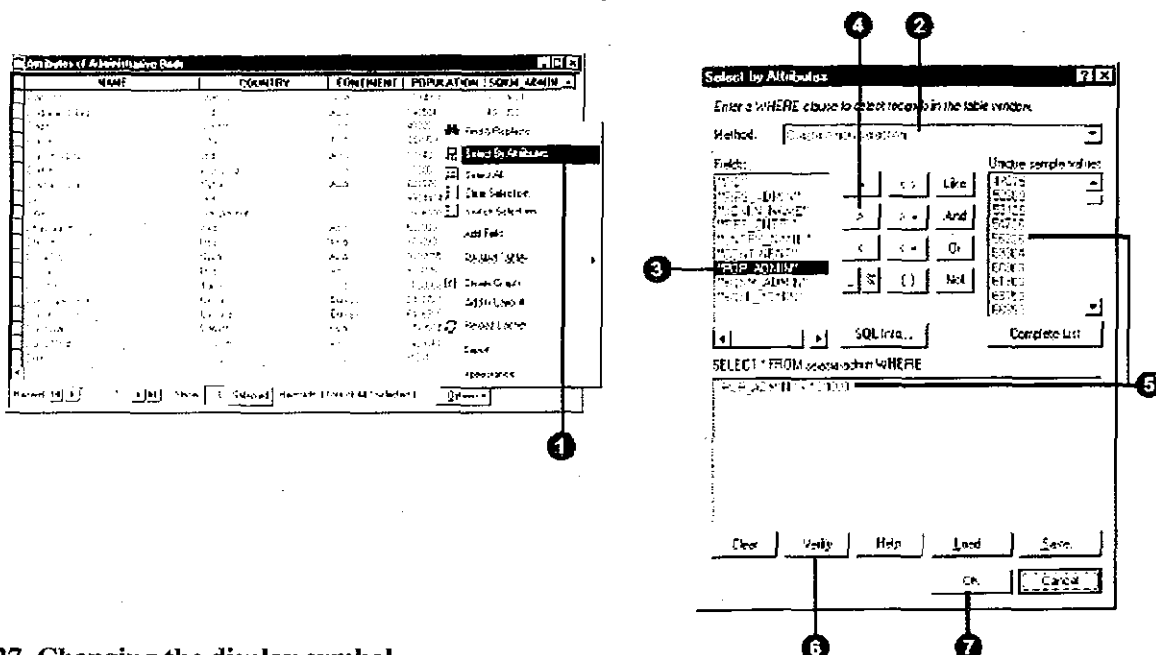
3 To select a record, click in the first column adjacent to the record you want to select.

26. Selecting records by attributes

1. Click Options in the table you want to query and click Select By Attributes.
 2. Click the Method dropdown arrow and click the selection procedure you want to use.
 3. Double-click the field from which you want to select.
 4. Click the logical operator you wish to use.
 5. Scroll to and double-click the value in the Unique sample values list you wish to select.
- Alternatively, you can type a value directly into the text box.
6. Click Verify to verify your selection.
 7. Click OK.

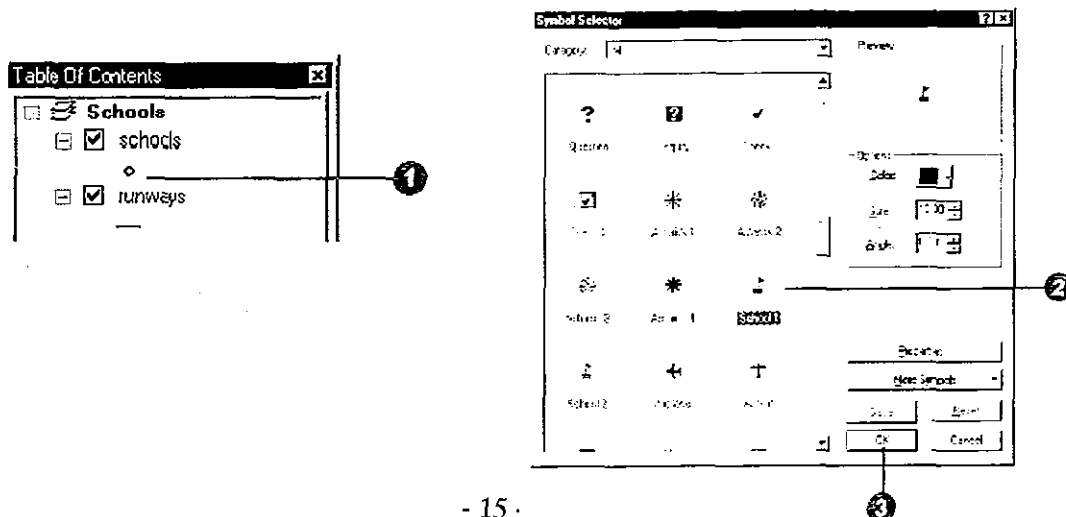
Your selection is highlighted in the table.

(Note) This function is useful to find information you want to know.



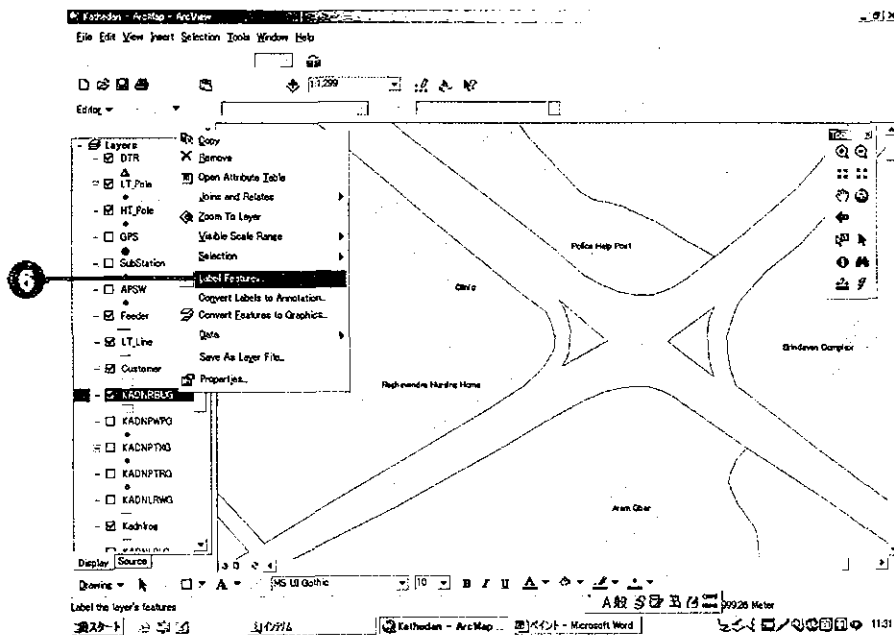
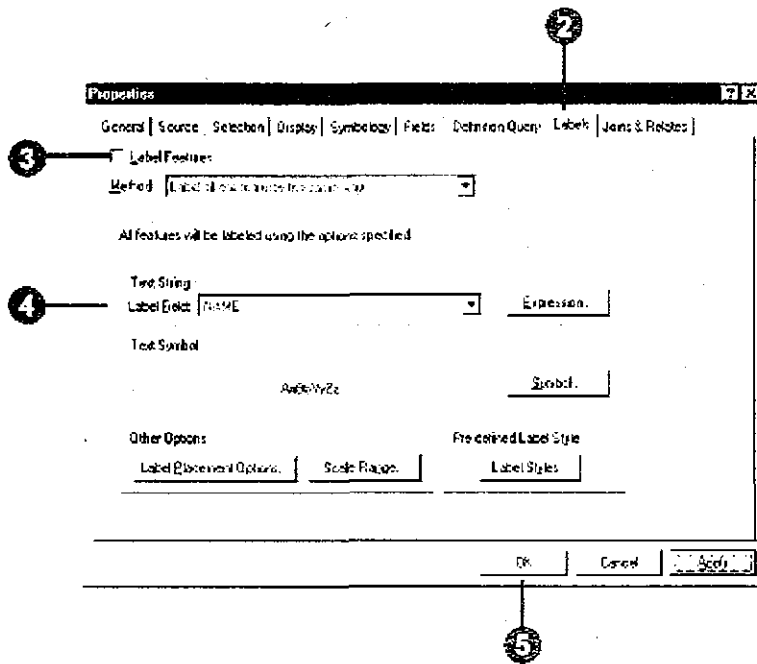
27. Changing the display symbol

1. Click the dot symbol in the table of contents to display the Symbol Selector window.
2. Scroll down until you find the School 1 symbol. Click it.
3. Click OK. The schools are drawn with the new symbol.



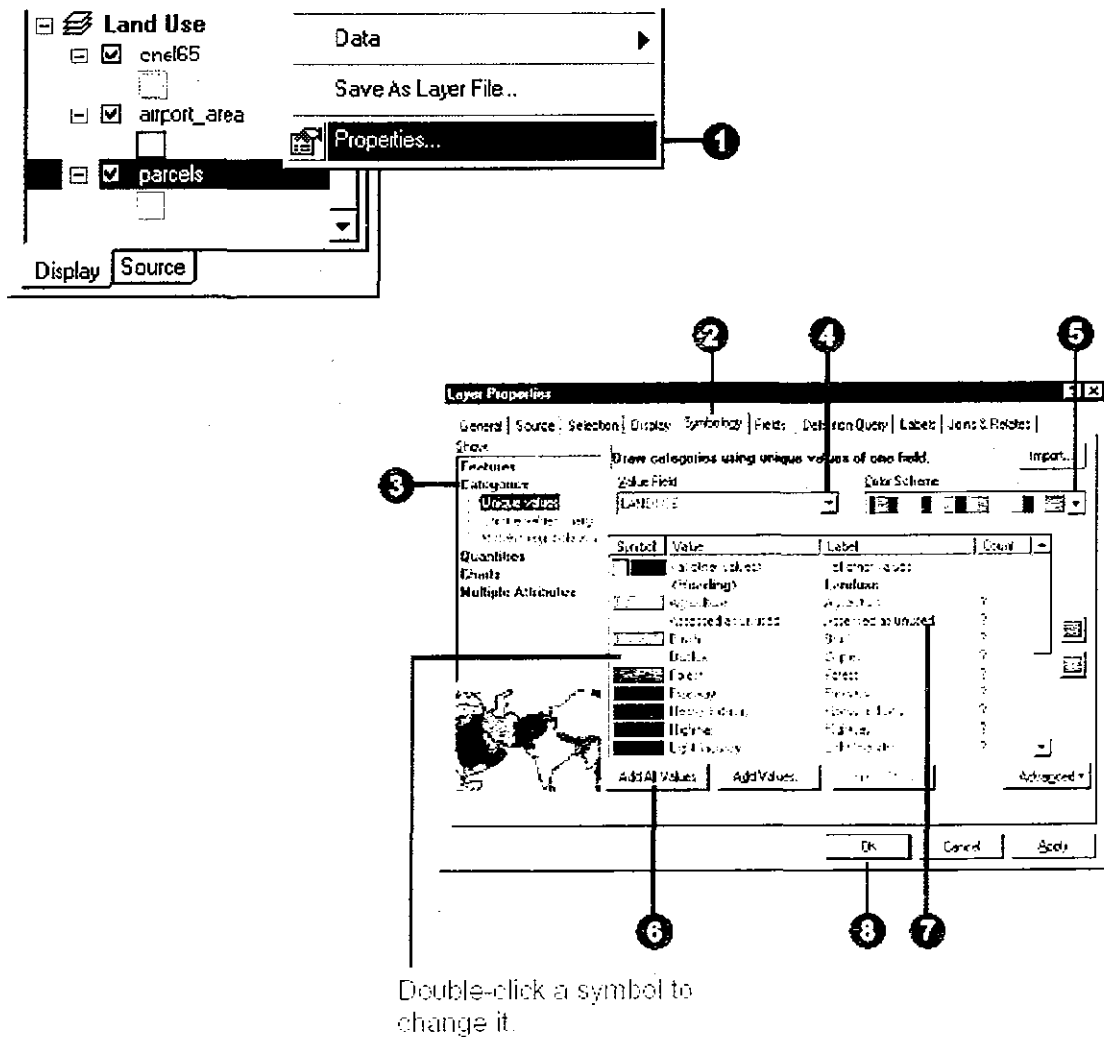
28. Labeling all features in a layer dynamically

1. In the table of contents, right-click the layer you want to label and click Properties.
2. Click the Labels tab.
3. Check Label Features.
4. Click the Label Field dropdown arrow and click the field you want to use as a label.
5. Click OK.
6. In the table of contents, right-click the layer and check Label Features to turn dynamic labels on. Uncheck Label Features to turn them off.



29. Displaying features by category

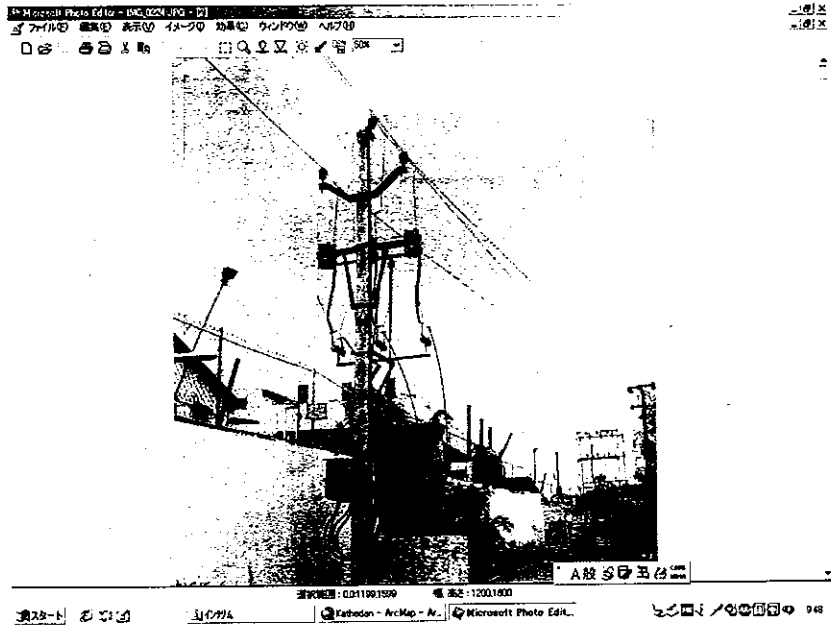
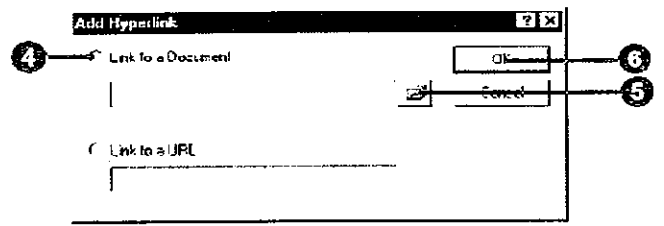
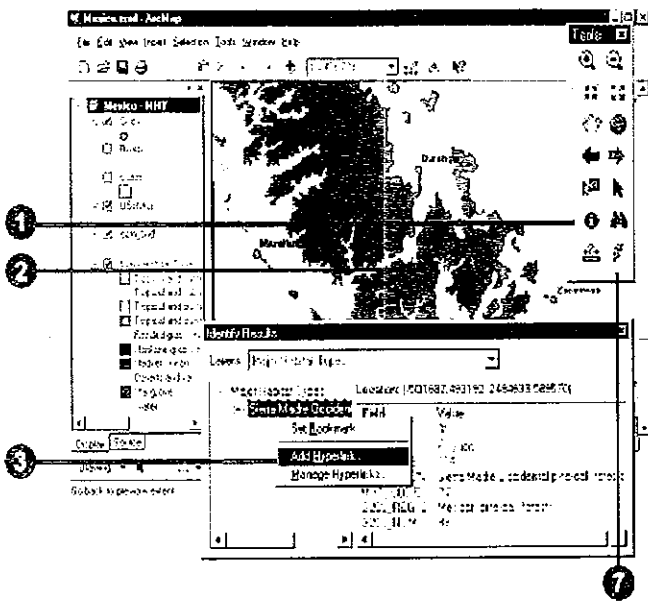
1. In the table of contents, right-click the layer you want to draw showing unique values and click Properties.
2. Click the Symbology tab.
3. Click Categories.
4. Click the Value Field dropdown arrow and click the field that contains the values you want to map.
5. Click the Color Scheme dropdown arrow and click a color scheme.
6. Click Add All Values.
7. If you want to have more descriptive labels, click a label in the Label column and type a new one.
8. Click OK.



30. Creating and accessing hyperlink

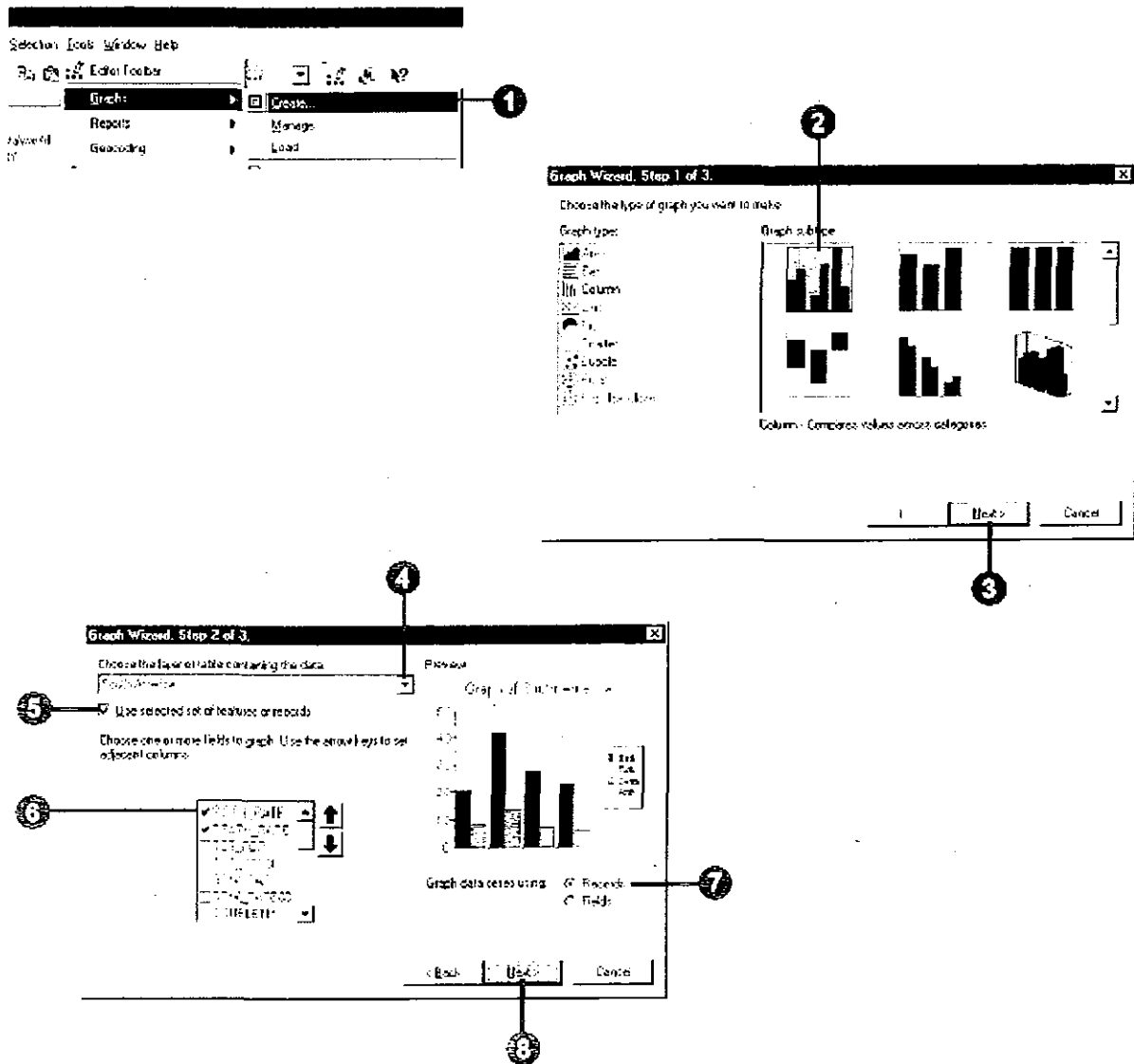
1. Click the Identify Features button on the Tools toolbar.
2. Click a feature you want to create hyperlink.
3. In the Identify Results window, right-click the feature you want to set a hyperlink for and click Add Hyperlink.
4. To link to a document, click Link to a Document.
5. Choose a document on your holder.
6. Click OK.
7. Click the Hyperlink tool on the Tools toolbar and click a feature.

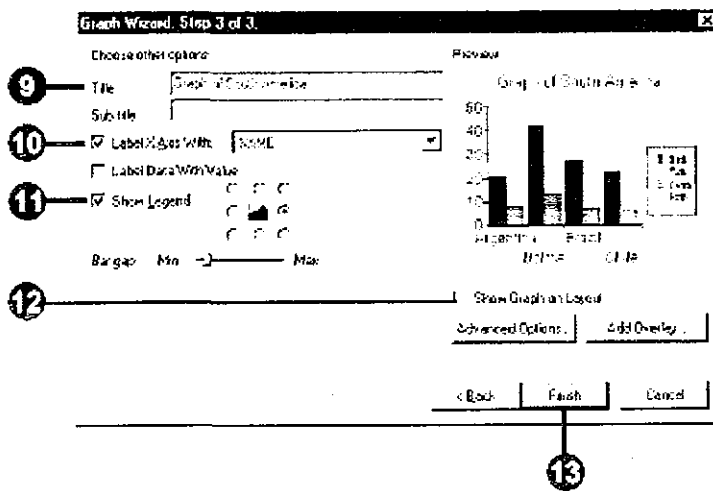
(Note) This function is useful to know a situation of facilities' installation.



31. Creating a graph and adding it to a layout

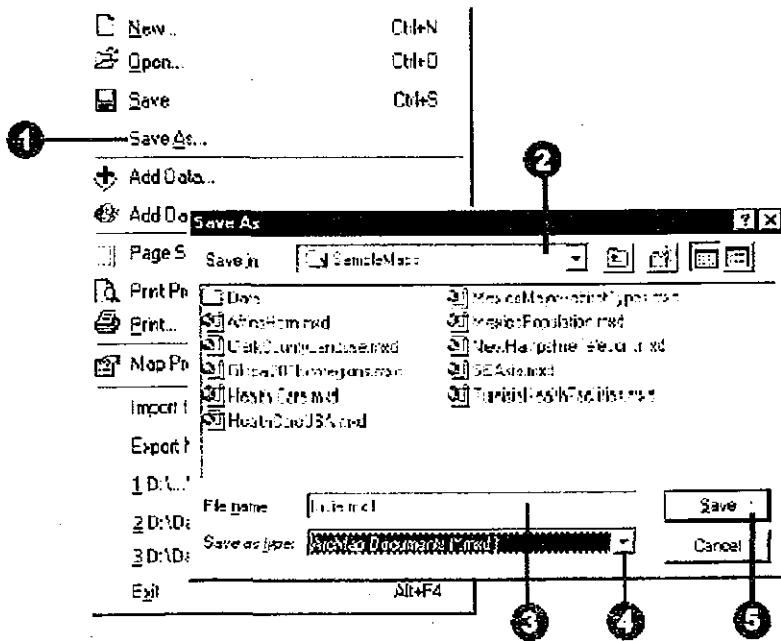
1. Click the Tools menu, point to Graphs, and click Create.
 2. Click the Graph type and subtype you want.
 3. Click Next.
 4. Click the dropdown arrow and click the layer or table you want to graph.
 5. Check to graph only the selected features or records.
 6. Check the fields you want to graph.
 7. Click an option to graph data series using Records or Fields.
 8. Click Next. u
 9. Type a title for the graph.
 10. Check Label X Axis With, then click the dropdown arrow and click a field.
 11. Check Show Legend.
 12. Check Show Graph on Layout.
- You can add the graph to the layout later if necessary.
13. Click Finish.





32. Saving a map as a new map

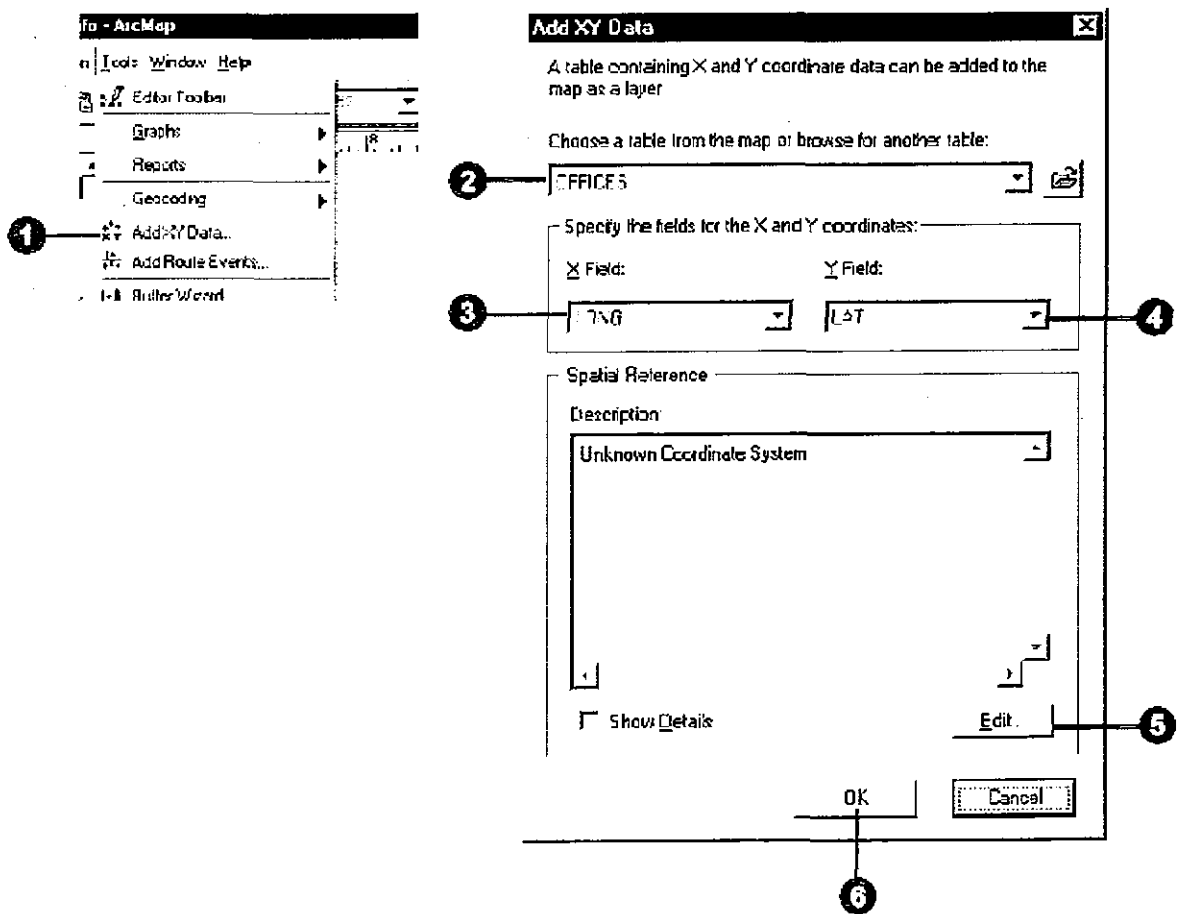
1. Click the File menu and click Save As.
2. Navigate to the location to save the map document.
3. Type a file name.
4. Click the Save as type dropdown arrow and click ArcMap Documents.
5. Click Save.



33. Adding a table with x,y coordinates

1. Click the Tools menu on the Standard toolbar and click Add XY Data.
2. Click the table dropdown arrow and click a table that contains x,y coordinate data.
If the table is not on the map, click the browse button to access it from disk. File format of table should be dbf file format. Please refer to next item 34 if you do not know how to make dbf file.
3. Click the X Field dropdown arrow and click the field containing x-coordinate values.
4. Click the Y Field dropdown arrow and click the field containing y-coordinate values.
5. Click Edit to define the coordinate system and units represented in the x and y fields.
6. Click OK.

(Note) This function is useful to display locations for facilities when you do not have enough landmarks on your map.



34. Creating DBF file for x,y coordinates

You can create DBF file using Microfoft Excel.

1. Input longitude and latitude data that were obtained by GPS to Excel file.

	Longitude			Latitude		
	degree	minutes	seconds	degree	minutes	seconds
3	78	3	55.1	17	35	24.1
4	78	3	54.4	17	35	23.5
5	78	3	52.7	17	35	22.5
6	78	3	50.5	17	35	21.2
7	78	3	49.9	17	35	19.5
8	78	3	49.6	17	35	17.9
9	78	3	49.3	17	35	16.4
10	78	3	52	17	35	16.9
11	78	3	47.2	17	35	15.9
12	78	3	44.2	17	35	15
13	78	3	42.5	17	35	14.3
14	78	3	43.6	17	35	12.2
15	78	3	43.1	17	35	10.3

2. You have to convert all data from 60 system to decimal system.

Equation = (seconds/60 + minutes)/60 + degree

	Longitude			Latitude			
	degree	minutes	seconds	degree	minutes	seconds	
3	78	3	55.1	17	35	24.1	$= (C3/60 + B3)/60 + A3$
4	78	3	54.4	17	35	23.5	
5	78	3	52.7	17	35	22.5	
6	78	3	50.5	17	35	21.2	
7	78	3	49.9	17	35	19.5	
8	78	3	49.6	17	35	17.9	
9	78	3	49.3	17	35	16.4	
10	78	3	52	17	35	16.9	
11	78	3	47.2	17	35	15.9	
12	78	3	44.2	17	35	15	
13	78	3	42.5	17	35	14.3	
14	78	3	43.6	17	35	12.2	
15	78	3	43.1	17	35	10.3	
16	78	3	43.1	17	35	8.3	
17	78	3	42.8	17	35	8.5	
18	78	3	42.3	17	35	3.4	
19	78	3	41.2	17	35	1.4	
20	78	3	41.4	17	34	59.8	
21	78	3	41.2	17	34	58.7	

3. Select data that you converted.
4. Click copy.

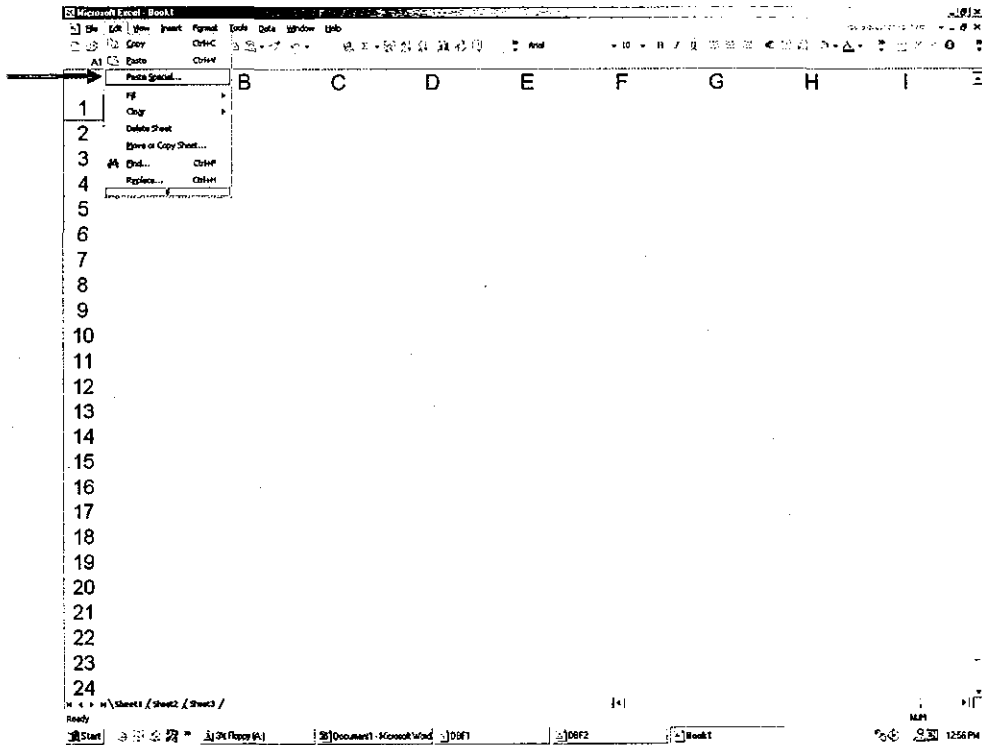
			C	D	E	F	G	H
			Latitude				Longitude	Latitude
			seconds	degree	minutes	seconds		
1								
2								
3			55.1	17	35	24.1	78.06531	17.59003
4			54.4	17	35	23.5	78.06511	17.58986
5			52.7	17	35	22.5	78.06464	17.58958
6			50.5	17	35	21.2	78.06403	17.58922
7			49.9	17	35	19.5	78.06386	17.58875
8			49.6	17	35	17.9	78.06378	17.58831
9	78	3	49.3	17	35	16.4	78.06369	17.58789
10	78	3	52	17	35	16.9	78.06444	17.58803
11	78	3	47.2	17	35	15.9	78.06311	17.58775
12	78	3	44.2	17	35	15	78.06228	17.5875
13	78	3	42.5	17	35	14.3	78.06181	17.58731
14	78	3	43.6	17	35	12.2	78.06211	17.58672
15	78	3	43.1	17	35	10.3	78.06197	17.58619
16	78	3	43.1	17	35	8.3	78.06197	17.58564
17	78	3	42.8	17	35	8.5	78.06189	17.58569
18	78	3	42.3	17	35	3.4	78.06175	17.58428
19	78	3	41.2	17	35	1.4	78.06144	17.58372

5. Open new file.

			C	D	E	F	G	H
			Latitude				Longitude	Latitude
			seconds	degree	minutes	seconds		
3	78	3	55.1	17	35	24.1	78.06531	17.59003
4	78	3	54.4	17	35	23.5	78.06511	17.58986
5	78	3	52.7	17	35	22.5	78.06464	17.58958
6	78	3	50.5	17	35	21.2	78.06403	17.58922
7	78	3	49.9	17	35	19.5	78.06386	17.58875
8	78	3	49.6	17	35	17.9	78.06378	17.58831
9	78	3	49.3	17	35	16.4	78.06369	17.58789
10	78	3	52	17	35	16.9	78.06444	17.58803
11	78	3	47.2	17	35	15.9	78.06311	17.58775
12	78	3	44.2	17	35	15	78.06228	17.5875
13	78	3	42.5	17	35	14.3	78.06181	17.58731
14	78	3	43.6	17	35	12.2	78.06211	17.58672
15	78	3	43.1	17	35	10.3	78.06197	17.58619
16	78	3	43.1	17	35	8.3	78.06197	17.58564
17	78	3	42.8	17	35	8.5	78.06189	17.58569
18	78	3	42.3	17	35	3.4	78.06175	17.58428
19	78	3	41.2	17	35	1.4	78.06144	17.58372

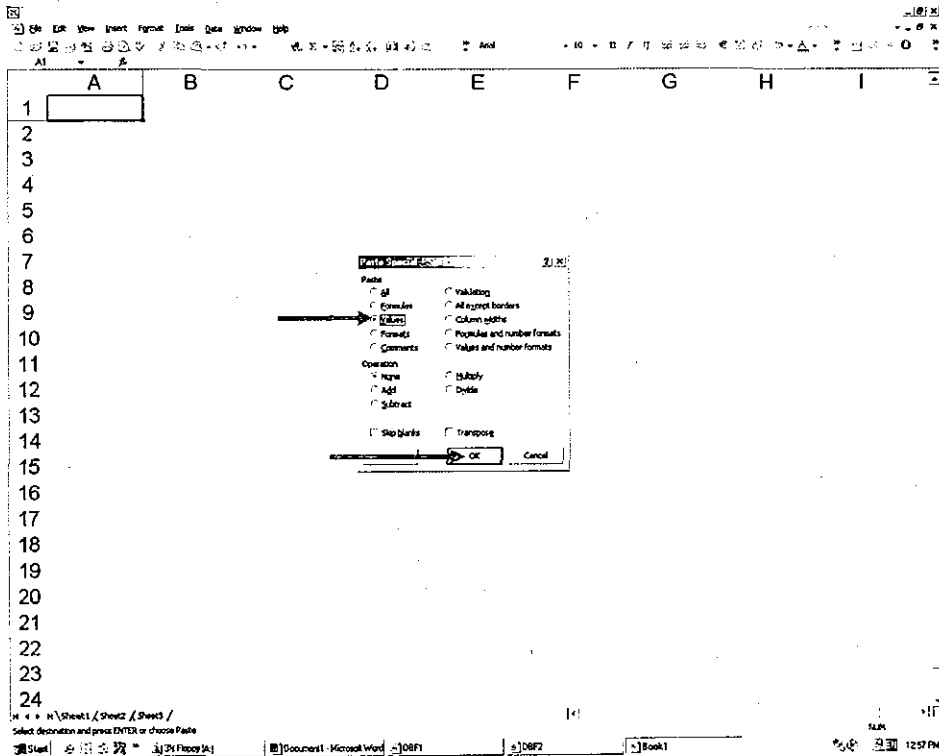
Reference 3. Basic Manual for ArcMap

6. Click Paste Special.

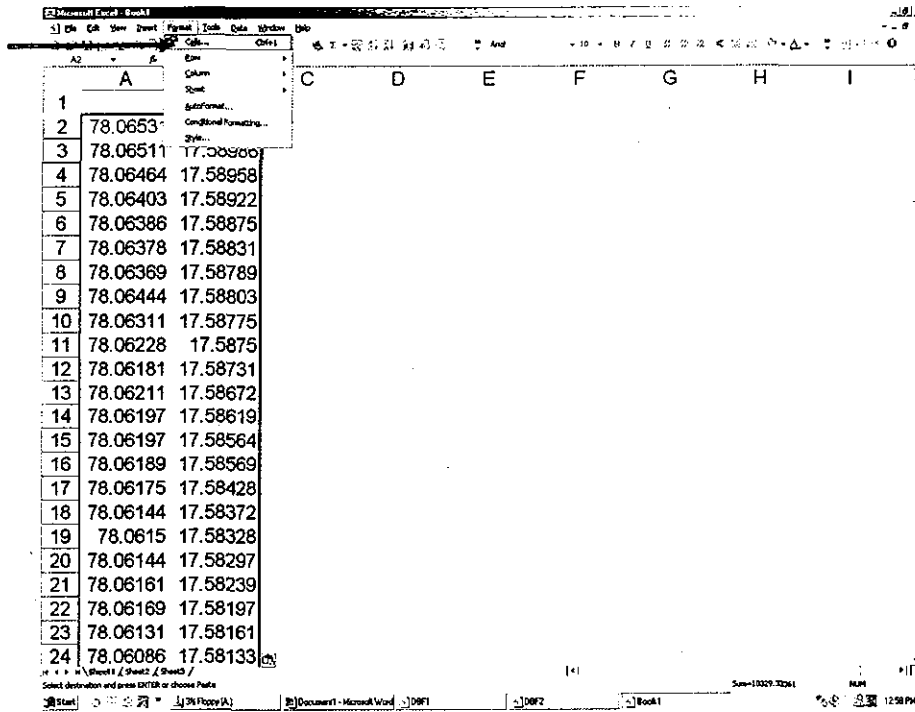


7. Click value.

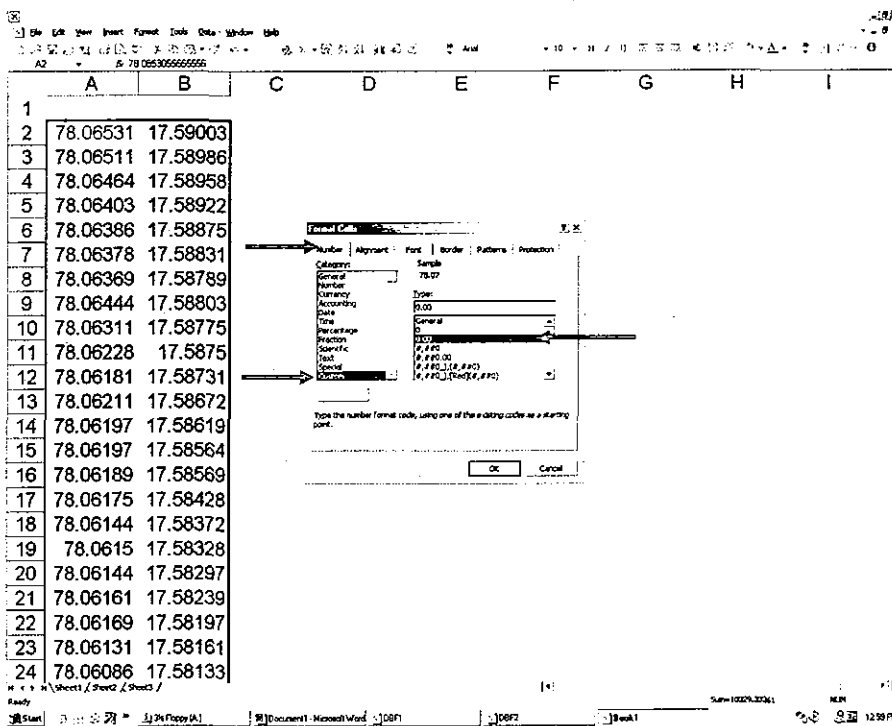
8. Click OK.



9. Select data.
10. Click Cell.



11. Click Number
12. Click Custom
13. Click 0.00



Reference 3. Basic Manual for ArcMap

14. Add 0 down to 5th or 6th places of decimals.

15. Click OK.

The screenshot shows an Excel spreadsheet with columns A through I and rows 1 through 24. The data in columns A and B consists of decimal values. A 'Format Cells' dialog box is open, showing the 'Number' category. The 'Type' field is set to 'General', and the 'Decimal places' field is set to 0. An arrow points to the 'Decimal places' field.

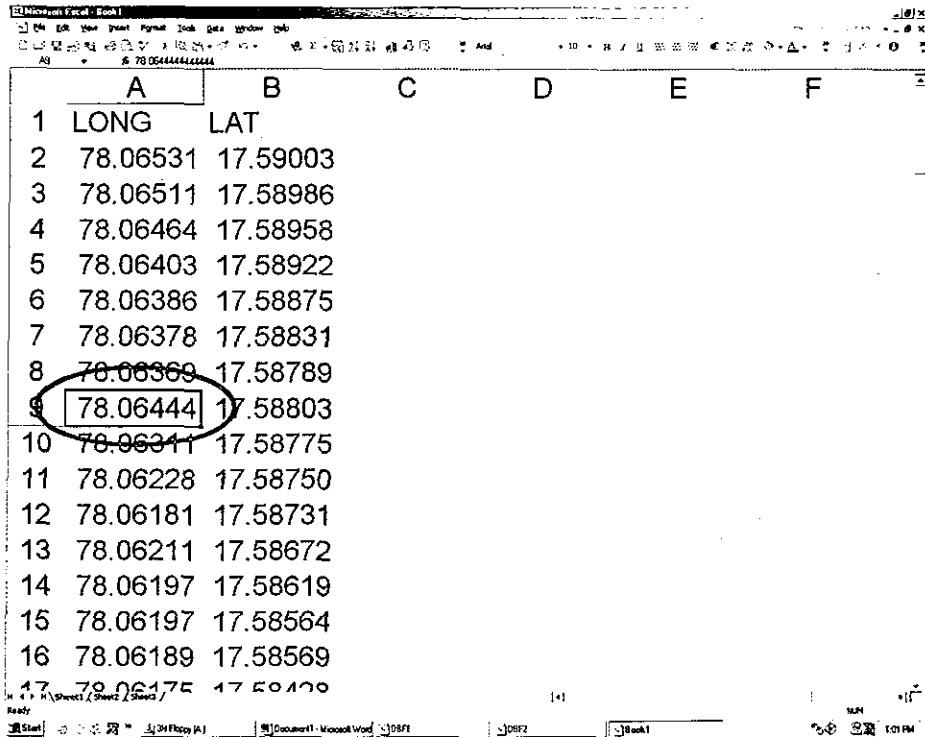
	A	B	C	D	E	F	G	H	I
1									
2	78.06531	17.59003							
3	78.06511	17.58986							
4	78.06464	17.58958							
5	78.06403	17.58922							
6	78.06386	17.58875							
7	78.06378	17.58831							
8	78.06369	17.58789							
9	78.06444	17.58803							
10	78.06311	17.58775							
11	78.06228	17.5875							
12	78.06181	17.58731							
13	78.06211	17.58672							
14	78.06197	17.58619							
15	78.06197	17.58564							
16	78.06189	17.58569							
17	78.06175	17.58428							
18	78.06144	17.58372							
19	78.0615	17.58328							
20	78.06144	17.58297							
21	78.06161	17.58239							
22	78.06169	17.58197							
23	78.06131	17.58161							
24	78.06086	17.58133							

16. Input LONG and LAT in cell A1 and B1.

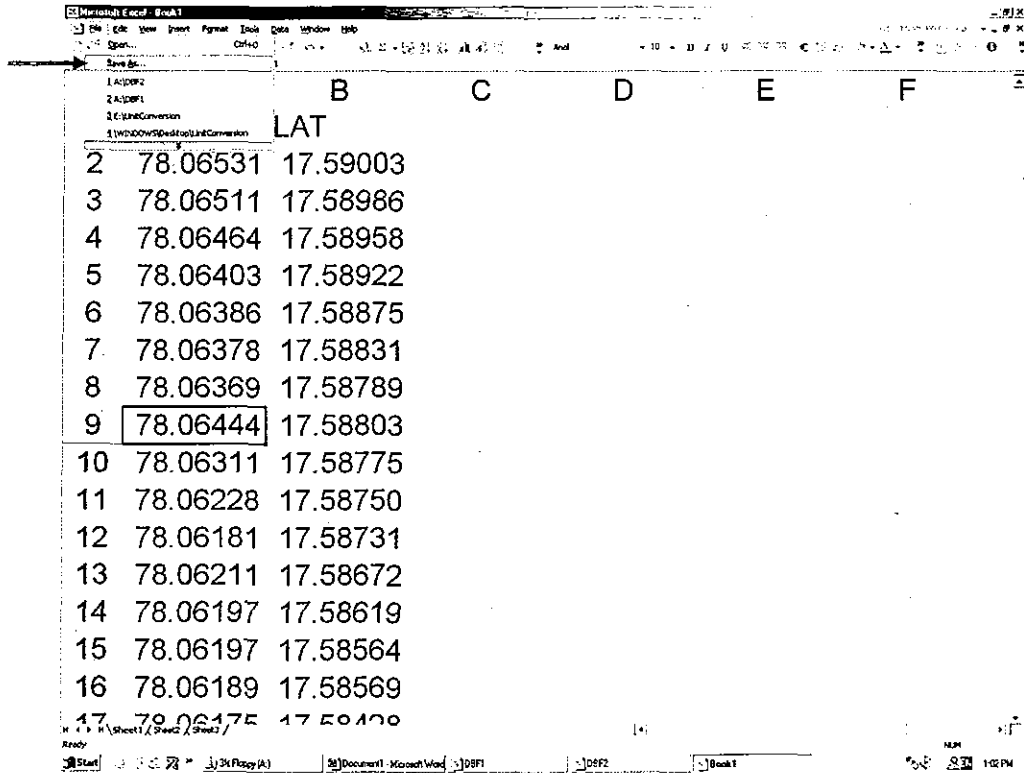
The screenshot shows the same Excel spreadsheet as above, but with the first row (row 1) modified. Cell A1 now contains the text 'LONG' and cell B1 contains the text 'LAT'. The rest of the data in columns A and B remains the same.

	A	B	C	D	E	F
1	LONG	LAT				
2	78.06531	17.59003				
3	78.06511	17.58986				
4	78.06464	17.58958				
5	78.06403	17.58922				
6	78.06386	17.58875				
7	78.06378	17.58831				
8	78.06369	17.58789				
9	78.06444	17.58803				
10	78.06311	17.58775				
11	78.06228	17.58750				
12	78.06181	17.58731				
13	78.06211	17.58672				
14	78.06197	17.58619				
15	78.06197	17.58564				
16	78.06189	17.58569				
17	78.06175	17.58428				

17. Click a cursor on any data.

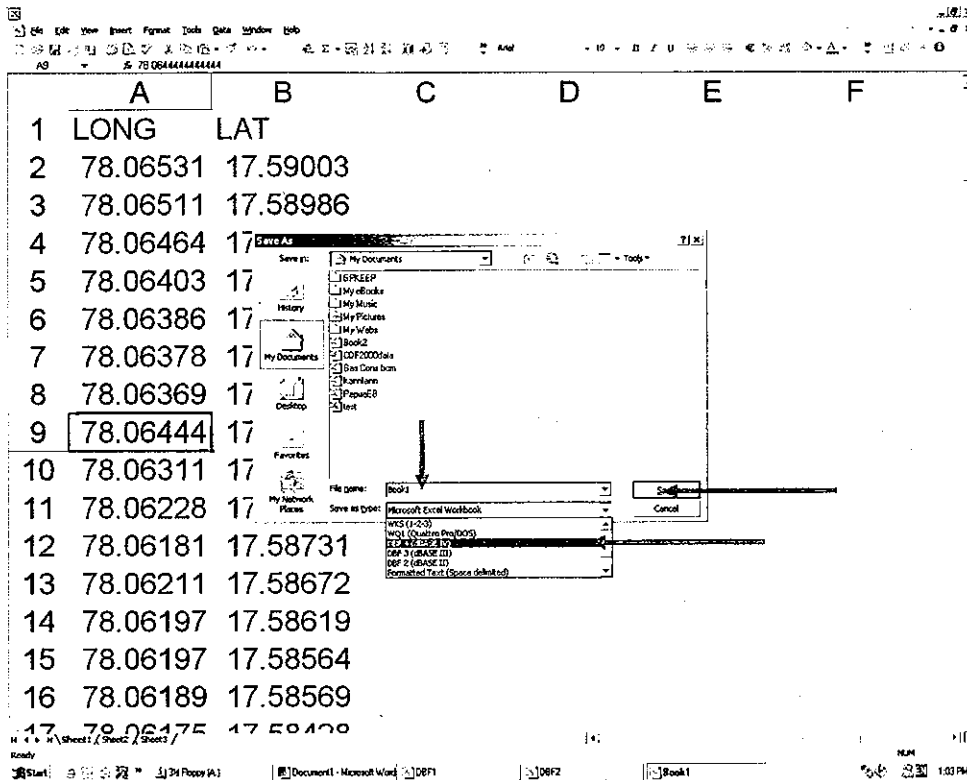


18. Click Save as.



Reference 3. Basic Manual for ArcMap

19. Input name in File Name.
20. Select DBF 4 (dBASE IV).
- 21 Save



Microsoft Excel asks you some messages (warning). You can click OK.

Annex

1. Personnel Interviewed by JICA Study Team
2. List of Collected Data / Documents
3. Minutes of Meeting / Memorandum

**The Development Study on the Improvement of Power Distribution System of
Andhra Pradesh in INDIA**

Annex 1 Personnel Interviewed by the JICA Study Team

Personnel Interviewed by the JICA Study Team

First On-site Survey

Embassy of Japan

H. E. K. Kodama	Minister
Mr. H. Kobayashi	Counsellor

JICA India Office

Mr. T. Take	Deputy Resident Representative
Mr. T. Matsumoto	Assistant Resident Representative

APTRANSCO

Mr. T. R. C. Bose	Director, Projects
Mr. D. Ramakrishna Rao	CE, DFID & APL
Mr. Ramakosteswara Rao	DE, DFID
Mr. A.D.V. Sai Baba Rao	Superintending Engineer

APCPDCL

Mr. S. Suryaprakasa Rao	Director, Commercial
Mr. G. Purandar Rao	DE, Projects (SE, O & M)
Mr. L. Radha Krishna	DE, Operation
Mr. C. Srinivasa Rao	Director (Finance)
Mr. G. Sudarshan	General Manager
Mr. J. Sreenivasa Reddy	SE, RR(S)
Mr. Mohad Mazhar Ali	AAE, Tech.RR(S)
Mr. V. Gandhi Das	SE, RR(N)
Mr. P. Sadanandam	SE, Sangareddy, Operation
Mr. Manohar	AE, Commercial, Sangareddy
Mr. Peachushetty	LT Meter, Sangareddy
Mr. Kondal Reddy	DE/SCADA
Mr. V. Sudahakar	ADE/Project
Mr. Srinivasa Chary	ADE/SCADA
Mr. C. P. Bapulu	S.E./OP/CENTRAL
Mr. Venkalayah	D.E/Meters/Sangareddy
Mr. K. Raghuma Reddy	D.E/Operation/Saroornagar
Mr. S. Chittaranjan	A.D.E/Operation/Saroornagar
Mr. N. L. Prabhaker	A.D.E/Gaganpahad
Mr. Ch. Chakrapari	A.D.E/ SCADA Project

Annex 1 Personnel Interviewed by the JICA Study Team

Mr. S. Srikanth AE/Ibrahimpattam

Other

Dr. M. V. Krishna Rao	Director GECE Private Limited
Mr. S. R. Vijayan	Manager-Engineering Network/Management System ABB(Bangalore)
Mr. Peter Smith	MSc, C Eng DFID
Ms. Bhavna Bhatia	Senior Energy Economist WB
Dr. M. V. Krishna Rao	Director, Global Energy Consulting Engineers
Mr. K. Satheesh Kumar	Director, Map World Technologies Ltd.
Mr. Maj. Shiva Kiran	Editorial Associate, GIS India
Mr. Ravi Kanth Reddy	Secure Meter Limited

Personnel Interviewed by the JICA Study Team

Second On-site Survey

JICA India Office

Mr. T. Sakai	Resident Representative
Mr. T. Matsumoto	Assistant Resident Representative

APTRANSCO

Mr. J. V. Pandurangam	Director/Project
Mr. D. Ramakrishna Rao	CE/DFID&APL
Mr. Ramakoteswara Rao	DE/DFID
Ms. D.Jayshree	A.E/OPN/APTRANSCO

APCPDCL

Mr. Suyaprakasa Rao	Director/Commercial & Project
Mr. G. Purandar Rao	DE/Project
Mr. Ramamohan Meda	DE/SCADA
Mr. Srinivasa Chary	ADE/SCADA
Mr. Ch. Chakrapari	ADE/SCADA Project
Mr. D. Sudhama	Sub-Engineer/Hyath nagar SS
Mr. NI Prabhakar	ADE/OP/Kattedan SS
Mr. K Rajendar	ADE/OP/Kattedan SS
Ms. Jyothi Rani	AE/Telecom
Mr. Chiranjeevi Rao	AE/Telecom
Mr. K. Rajeswar	DE, Technical, RR(S)
Mr. Hemachandler	ADE, Commercial, RR(S)
Mr. D. L. Prabhakar	ADE, Gaganpahad, RR(S)
Mr. Y. Markandaiah	DE, Operation, Rajendranagar, RR(S)
Mr. K. Raghuma Reddy	DE, Operation. Saroornagar, RR(S)
Mr. G. Amuruthaiah	DE, Technical , RR(N)
Mr. M. Sudhakar Reddy	DE, Technical , RR(N)
Mr. S. Ravi Kumar	ADE, Cpmmercial, RR(N)
Mr. N. Sudhakar	AEE, Technical, RR(N)
Mr. P. Jagathpal Reddy	SE, Operation, Sangareddy
Mr. K. Venkat Reddy	DE, Technical, Sangareddy
Mr. Md. Masood	AEE, Malkapur, Sangareddy
Mr. K. Bagaiah	AE, Commercial, Sangareddy
Mr. Krishna Murthy	ADE, Operation, Sadasivapet, Sangareddy

Annex 1 Personnel Interviewed by the JICA Study Team

Mr. K. Raju	AE, Technical, Sangareddy
Mr. L. Radha Krishna	DE, Operation
Mr. J. Sreenivasa Reddy	SE, RR(S)
Mr. Mohad Mazhar Ali	AAE, Tech.RR(S)
Mr. Manohar	AE, Commercial, Sangareddy
Mr. K. Vekata Narayana	Chief General Manager/APCPDCL
Mr. Venkalayah	D.E/Meters/Sangareddy
Mr. Syod Masood	Addi. Assit. Engineer/OP/Condapur
Mr. P.V.L. Narayana Rao	ERO, Saroomagar
Mr. K. Bagaind	AE/Commercial, Sanga Reddy
Mr. L.N. Plabhakee	ADE/Operation, Gaganpahad (Kattedan)

Other

Mr. S.R.Vijayan	Mnager-Engineering Network/Management System ABB(Bangalore)
Mr. K. Satheesh Kumar	Director, Map World Technologies Ltd.
Mr. Maj. Shiva Kiran	Editorial Associate, GIS India

Personnel Interviewed by the JICA Study Team

Third On-site Survey

Embassy of Japan

Mr. H. Kobayashi	Counsellor
Mr. M. Sakuramachi	First Secretary (Commercial)

JICA India Office

Mr. T. Sakai	Resident Representative
Mr. T. Matsumoto	Assistant Resident Representative

APTRANSCO

Mr. J. V. Pandurangam	Director/Project
Mr. D. Ramakrishna Rao	CE/DFID&APL
Mr. Ramakoteswara Rao	DE/DFID
Mr. G. A. Manikya Prabhu	S.E, CTI
Mr. V. D. B. Srinivasa Rao	A.D.E, CTI
Mr. K.Laxmi Narsaiah	S.A.O, CTI
Mr.Chandra Sekhar	A.D.E, Computer center

APCPDCL

Mr. Dimesh Kumar	Chairman & Managing Director/APCPDCL
Mr. Ganesh Rao	PS to CMD/APCPDCL
Mr. A. Raghavendra Rao	Director / Operation/APCPDCL
Mr. G. Purandar Rao	S.E/O&M/Corporate Office
Mr. J. Sreenivas Reddy	S.E/Ranga Reddy (South)
Mr. P. Jagathpal Reddy	S.E/Operation/Medak
Mr. Y. Markandaiah	D.E/Operation/Rajendranagar
Mr. K. Raghuma Reddy	D.E/Operation/Saroomnagar
Mr. Ch. Ashok Reddy	D.E/Operation/Sangareddy
Mr. B. Nagaraju	D.E/Meter/APCPDCL
Mr. Venkalayah	D.E/Meters/Sangareddy
Mr. S. Chittaranjan	A.D.E/Operation/Saroomnagar
Mr. N. L. Prabhakar	A.D.E/Gaganpahad
Mr. Bagaiah	A.E/Commecial/Sangareddy
Mr. K. Raju	A.E/Tech/Comm/Sangareddy
Mr. Syod Masood	Addi. Assit. Engineer/OP/Condapur
Mr. S. Venkat Krishna	Asst. to ADE/Gaganpahad

Annex 1 Personnel Interviewed by the JICA Study Team

Mr. S. Srikanth	Asst. Engineer/Saroomnagar
Mr. K. A. N. Rao	Sub Engineer/Sangareddy
Mr. M. Bhaskar Reddy	Secure meter limited
Mr. N. Nagaraj	SE, RR(N)
Mr. B. Karunakara Rao	Sub-E, Div, Saroomnagar, RR(S)
Mr. L. Radha Krishna	DE, Operation
Mr. Mohad Mazhar Ali	AAE, Tech.RR(S)
Mr. K. Rajeswar	DE, Technical, RR(S)
Mr. K. Rajender	AE, Operation, Kattedan, RR(S)
Mr. M. Sudhakar Reddy	DE, Technical , RR(N)
Mr. S. Ravi Kumar	ADE, Cpmmercial, RR(N)
Mr. N. Sudhakar	AEE, Technical, RR(N)
Mr. P. Jagathpal Reddy	SE, Operation, Sangareddy
Mr. K. Vankat Reddy	DE, Technical, Sangareddy
Mr. Md. Masood	AEE, Malkapur, Sangareddy
Mr. K. Bagaiah	AE, Commercial, Sangareddy
Mr. Krishna Murthy	ADE, Operation, Sadasivapet, Sangareddy
Mr. G. Gnana Shekav	Sub-Engineer, Sanga Reddy (Malkapur)
Mr. G. Manohar	AE/Commercial, Sanga Reddy (Malkapur)
Mr. Venkatech	Sanga Reddy (Malkapur)
Mr. L.N. Plabhakee	ADE/Operation, Gaganpahad (Kattedan)
Mr. Praveen Kumar	Gaganpahad (Kattedan)
Mr. Nazar Nawaz	Saroomnagar (Kothapet)
Mr. G. Jayaprakash Das	A.E (Tech), SCADA Center
Mr. G. Ravinder	Sub. Engineer, SCADA Center
Mr. P. Srinivasulu	A.A.E, SCADA Center
Mr. T. Vishnu Vardhan Reddy	A.D.E, LSTC
Mr. D. Nagender Naik	A.E LSTC
Mr. C. Rama Mohan Rao	Director, HRD & P&MM
Mr. Subba Rao	C.E, Operation
Mr. I. V. Raghava Rao	P.O
Mr. K. N. Rao	A.S
Mr. Ramamohan Meda	D.E, SCADA Project
Mr. Radha Krishna	D.E, Energy Audit
Mr. Raghma Reddy	D.E
Mr. A. Manohan	A.E

Annex 1 Personnel Interviewed by the JICA Study Team

Other

Mr. S.R. Vijayan	Mnager-Engineering Network/Management System ABB(Bangalore)
Mr. B.S. Varma	Director GECE
Mr. K. Satheesh Kumar	Director, Map World Technologies Ltd.
Mr. B. S. Varma	Director, Global Energy Consulting Engineers
Mr. M. V. S. Birinchi	Advisor (Power & Energy), ESCI
Mr. K. Satheesh Kumar	Director, Map World

Personnel Interviewed by the JICA Study Team

Fourth On-site Survey

Embassy of Japan

Mr. H. Kobayashi Counsellor

JICA India Office

Mr. T. Sakai Resident Representative

Mr. K. Ito Deputy Resident Representative

APTRANSCO

Mr. J. V. Pandurangam Director, Projects

Mr. Satyanarayana Murthy C.E/DFID&APL

Mr. Ramakosteswara Rao DE, DFID

Mr. Sundaraiah CE/Telecom

Mr. S. Sivakumar Varma ADE/Telecom

Ms. Anurga ADE/Telecom

Mr. Peshi Director/HRD, PLG&RD

Mr. Chandra Sekhar A.D.E

Mr. A. V. Seshaiah A.E/DFID&APL

Mr. G. A. Manikya Prabhu S.E/CTI

Mr. V. D. B. Srinivasa Rao A.D.E/CTI

APCPDCL

Mr. Dimesh Kumar Chairman & Managing Director/APCPDCL

Mr. G. Purandar Rao SE/O&M

Mr. Ramamohan Meda SE/Assesments

Mr. Subba Rao DE/SCADA

Mr. Srinivasa Chary ADE/SCADA

Mr. Ch. Chakrapari ADE/SCADA Project

Mr. Ragendar Singh AE/CBD/Asif Nagar SS

Mr. Upender Reddy Vanastlipuram SS

Mr. V. Bangalaiah SE, RR(S)

Mr. S. Srikanth AE, Saroornagar, RR(S)

Mr. P. Veereshalingam Sub-E, Sadasivepet, Sangareddy

Mr. K. Rajeswar DE, Technical, RR(S)

Mr. Hemachandler ADE, Commercial, RR(S)

Annex 1 Personnel Interviewed by the JICA Study Team

Mr. D. L. Prabhakar	ADE, Gaganpahad, RR(S)
Mr. K. Rajender	AE, Operation, Kattedan, RR(S)
Mr. Y. Markandaiah	DE, Operation, Rajendranagar, RR(S)
Mr. K. Raghuma Reddy	DE, Operation. Saroornagar, RR(S)
Mr. G. Amuruthaiah	DE, Technical , RR(N)
Mr. M. Sudhakar Reddy	DE, Technical , RR(N)
Mr. S. Ravi Kumar	ADE, Cpmmercial, RR(N)
Mr. N. Sudhakar	AEE, Technical, RR(N)
Mr. P. Jagathpal Reddy	SE, Operation, Sangareddy
Mr. K. Vankat Reddy	DE, Technical, Sangareddy
Mr. Md. Masood	AEE, Malkapur, Sangareddy
Mr. K. Bagaiah	AE, Commercial, Sangareddy
Mr. Krishna Murthy	ADE, Operation, Sadasivapet, Sangareddy
Mr. K. Raju	AE, Technical, Sangareddy
Mr. Ch. Ashok Reddy	D.E/Operation/Sangareddy
Mr. S. Chittaranjan	A.D.E/Operation/Saroornagar
Mr. N. L. Prabhakar	A.D.E/Gaganpahad
Mr. S. Srikanth	Asst. Engineer/Saroornagar
Mr. K. A. N. Rao	Sub Engineer/Sangareddy
Mr. M. Hanumat Sai	Computer in charge at ERO/peration/Saroornagar
Mr. S. Venkat Krishna	Asst. to ADE/Gaganpahad
Mr. Venkalayah	D.E/Meters/Sangareddy
Mr. Bagaiah	A.E/Commeccial/Sangareddy
Mr. Venkatech	Gaganpahad (Kattedan)
Mr. L.N. Plabhakee	ADE/Operation, Gaganpahad (Kattedan)
Mr. L. Radha Krishna	DE/EA
Mr. P. Jagathpal Reddy	S.E/Operation/Medak
Mr. Er. S. Sreekanth	A.A.E/Operation/Saroornagar
Mr. T. Vishnu Vardhan Reddy	A.D.E/LSTC
Mr. E. Jagan Mohan	S.E/Master Plan Circle
Mr. L. Radha Krishna	D.E, Energy Audit
Mr. Veereshalingan	Sub-engineer/Sadasiypet
Mr. Y. K. Reddy	D.E/Master Plan
Mr. N. S. R. Murthy	A.D.E/Master Plan
Mr. K. Narashinga Rao	A.D.E/Master Plan
Mr. D. Nagender Naik	A.E/LSTC
Mr. Manohar	A.E
Mr. K. Subhas Chandra Bose	D.E/Construction/City North

Annex 1 Personnel Interviewed by the JICA Study Team

Mr. L. Laxminarayana A.D.E/construction/City North

Other

Mr. S. R. Vijayan Mnager-Engineering Network/Management System ABB(Bangalore)

Mr. Pankaj Prandhan Reliance

Mr. Pavan Kumar Reliance

Mr. K. Satheesh Kumar Director, Map World Technologies Ltd.

CIRE

Dr. P. S. Rao, Additional Director/CIRE

Dr. M. Y. Reddy CIRE

Dr. R. Mohamed Nafi Deputy Director/CIRE

Mr. S. V. Murty Program Coordinator/The Institute of Indian Foundrymen,
Research & Development Center, Technology Upgradation
Programme(A.P.)

ESCI

Mr. C. S. Sastry Deputy Director/ESCI

Dr. S. Nagabhushana Rao Director/ESCI

Mr. J. Balakrishna Rao Senior Faculty/Power & Energy Division/ESCI
(Formerly C.E/APTRANSCO)

Dr. C. Radhakrishna Director & Professor of Electrical Engg.
/UGC-Academic Staff College)

Personnel Interviewed by the JICA Study Team

Fifth On-site Survey

Embassy of Japan

Mr. H. Kobayashi

Counsellor

JICA India Office

Mr. T. Sakai

Resident Representative

Mr. T. Matsumoto

Assistant Resident Representative

Mr. K. Ito

Deputy Resident Representative

Mr. D. Iijima

Assistant Resident Representative

APTRANSCO

Mr. J. V. Pandurangam

Director/Projects Construction

Mr. G. Kasava Rao

Director/Transmission & Grid Operation

Mr. Satyanarayana Murthy

C.E/DFID&APL

Mr. Ramakosteswara Rao

DE, DFID

Mr. R. Ashokachary

DE/OECF

Mr. Chandra Sekhar

A.D.E

Mr. A. Sessaiah

AE

Mr. S. Subramanyam

DE/APL

Mr. T. S. Haranadha Rao

ADE

Mr. K. Vidyadhari

ADE

Mr. O. Haripasad

ADE

APCPDCL

Mr. Dimesh Kumar

Chairman & Managing Director/APCPDCL

Mr. G. Purandar Rao

SE/O&M

Mr. Ramamohan Meda

SE/Assesments

Mr. U. Vidyasagar

ADE/T to CMD

Mr. G. Vinay Kumar

Director/Operation

Mr. G. Pedda Bapulu

CGM/Operation

Mr. L. Radha Krishna

DE/Operation

Mr. B. Krishna Murthy

SE/Operation/Ranga Reddy South

Mr. K. Rajeswar

DE

Mr. Y. Markandaiah

DE/Operation/Rajendranagar

Mr. D. L. Prabhakar

ADE/Gaganpahad

Mr. K. Rajendar

AE/Operation/Kattedan

Annex 1 Personnel Interviewed by the JICA Study Team

Mr. K. Raghuma Reddy	SE/Operation/Saroornagar
Mr. Chittaranjan	ADE/Operation/Saroornagar
Mr. Srikanth	AAE/Operation/Saroornagar
Mr. S. Sitaram Babu	AGM/IT
Mr. P. Jagathpal Reddy	SE/Operation/Medak
Mr. Amarnath	AE/Technical/Sanga Reddy
Mr. Bagaiah	AE/Commercial/Sanga Reddy
Mr. Syed Masood	AAE
Mr. R. Krishna Murthy	ADE/Operation
Mr. N. S. R. Murthy	ADE
<i>Other</i>	
Dr. P. S. Rao	Additional Director/CIRE
Mr. G. Shanker	Faculty Member/CIRE

**The Development Study on the Improvement of Power Distribution System of
Andhra Pradesh in INDIA**

Annex 2 Lists of Collected Data / Documents

List of Collected Documents (Operation and Maintenance of the Distribution Network)

No.	Name of documents	Name of author	Remark
	1st On-site Survey		
A-1	Information (RR(N))	RR(N), Operation Circle	
A-2	Information (RR)	RR(S), Operation Circle	
A-3	List of Feeders (Medak)	Sangareddy, Operation	
A-4	Break Down Abstract, 30.11.02	Operation	
A-5	Grid Map (Medak)	Sangareddy, Operation	
	2nd On-site Survey		
A-6	The daily maximum and minimum frequencies for the month of May, June, July and November 2002	LDC, APTRANSCO	
A-7	Voltage Record (Kothapet)	RR(S), Operation Circle	
A-8	Voltage Record (Kattedan)	RR(S), Operation Circle	
A-9	Voltage Record (Malkapur)	Sangareddy, Operation Circle	
A-10	Grid Map (Medak)	Sangareddy, Operation	
	3rd On-site Survey		
A-11	Outage Records (Ranga Reddy)	RR(S), Operation Circle	PC to PC
A-12	Outage Records (Medak)	Operation Circle Medak	Hand Written
A-13	Action Plan for Preventive Maintenance of Lines and transformers 2003-04	Sangareddy, Operation	
A-14	Collection of data to conduct the survey on quality of supply	Sangareddy, Operation	
A-15	Voltage Record (Kattedan #2)	RR(S), Operation Circle	

No.	Name of documents	Name of author	Remark
A-16	List of 33 kV feeders having load relief from 0.00-02.00 & 12:00 to 14:00 Hrs	Sangareddy, Operation	
A-17	Operation status of substations & feeders	Sangareddy, Operation	
A-18	GRID CODE for APTRANSCO	APREC	Web Site of APREC
A-19	Slip of Line Relief (Permit Medak)	Sangareddy, Operation	
A-20	Operation manual of substation	RR(S), Operation Circle	
	4th On-site Survey		
A-21	Section wise Distribution Transformers and Length of Lines	RR(S), Operation Circle	
A-22	Subdivision wise 33/11 kV SS with PTR Capacitors and 11 kV Feeders	RR(S), Operation Circle	
A-23	Daily Report (Power Supplied through 11 kV Feeders)	RR(N), Operation Circle	
A-24	List of 132/33 kV Substation, 33 kV Feeders, 33/11 kV substations, 11 kV Feeders	Operation Circle Medak	
A-25	M.I.S. for Month of September, 2003	Operation Circle Medak	
A-26	Grid Map (Ranga Reddy)	APTRANSCO, DFID	
A-27	Grid Map (Medak)	APTRANSCO, DFID	
A-28	District wise Hourly quota and Demand in MW	O & M	
A-29	District wise Hourly quota and Demand in MW	O & M	
A-30	District wise Hourly quota and Demand in MW		Web site of APTRANSCO
A-31	Highlights, 2003	APTRANSCO, DFID	

List of Collected Documents (SCADA SYSTEM)

No.	Name of documents	Name of Author	Remark
	1st On-site Survey		
B-1	HYDERABAD CITY INTEGRATED SCADA PROJECT	ABB	
B-2	COMMUNICATION SYSTEM IN APTRANSCO	APTRANSCO/Telecom	
	2nd On-site Survey		
B-3	Development of 'Distribution Automation' Project at 33/11 KV Gachibowli SS Jointly with M/s CMC Limited - Administrative sanction -	APSE BOARD	
B-4	Material Regarding Substation Online Diagram etc.	SCADA Center	Computer Print Out
	3rd On-site Survey		
B-5	SCHEDULE OF ELECTRICITY TARIFF 2002-2003 POWER TARIFFS WITH EFFECT FROM 1-4-2002	APCPDCL	
B-6	CENTRAL POWER DISTRIBUTION COMPANY LIMITED Control Instruction No 6 CONTROL BOUNDARY SPLIT-POINTS	APCPDCL	
B-7	Material Regarding Construction Cost of SCADA Center	APSEB	Price Shedule
B-8	Hyderabad Feeder Map (Cityit I~CityIX)	APCPDCL	
B-9	APCPDCL LINES DIVISION-I SCADA CIRCLE (4/2003)	SACDA Center	Data Book of Electricity Supply
B-10	APCPDCL LINES DIVISION-I SCADA CIRCLE (5/2003)		
B-11	APCPDCL LINES DIVISION-II SCADA CIRCLE (4/2003)		
B-12	APCPDCL LINES DIVISION-II SCADA CIRCLE (5/2003)		

Annex 2 Lists of Collected Data / Documents

No.	Name of documents	Name of Author	Remark
	4 th On-site Survey		
	(Nothing)		

List of Collected Documents (Physical Improvement of Distribution Network)

No.	Name of documents	Name of author	Remark
	1st On-site Survey		
C-1	Secure meter pamphlet	Secure meter limited	
C-2	2nd On-site Survey		
C-3	Diary (2003-2004)	APTRANSCO	Mr.S.Chittaranjan,A.D.E/Saroornagar
C-4	DTR WISE PHYSICAL LAYOUTS AND POLE TO POLE SURVEY REPORT(11KV KAMALANAGAR FEEDER)	CPDCL	Mr.S.Chittaranjan,A.D.E/Saroornagar
C-5	CHART OF DTR CONNECTION (KATTEDAN #2 FEEDER)	CPDCL	Mr.N. L. Prabhaker,A.D.E/Gaganpahad
C-6	CHART OF DTR CONNECTION (MALKAPUR FEEDER)	CPDCL	Mr.Syod Masood ,Addi. A.E/Condapur
C-7	Feeder specification (Kamalanagar feeder)	CPDCL	Mr.S.Chittaranjan,A.D.E/Saroornagar
C-8	Feeder specification (Kattedan #2 feeder)	CPDCL	Mr.N.L. Prabhaker,A.D.E/Gaganpahad
C-9	Feeder specification (Malkapur feeder)	CPDCL	Mr.Bagaiah, A.E/Sangareddy
C-10	Existing standard of distribution facilities	CPDCL	Mr.S.Chittaranjan,A.D.E/Saroornagar
C-11	Specification of existing distribution facilities	CPDCL	Mr.N.L.Prabhaker,A.D.E/Gaganpahad
C-12	Construction Cost of distribution facilities	CPDCL	Mr.Bagaiah, A.E/Sangareddy
C-13	Power demand of feeder (Kamalanagar feeder)	CPDCL	Mr.S.Chittaranjan,A.D.E/Saroornagar
C-14	Power demand of feeder (Kattedan #2 feeder)	CPDCL	Mr.N.L.Prabhaker,A.D.E/Gaganpahad
C-15	Power demand of feeder (Malkapur feeder)	CPDCL	Mr.Bagaiah, A.E/Sangareddy
C-16	CHART OF 11KV KATTEDAN #2 FEEDER	CPDCL	Mr.N.L.Prabhaker,A.D.E/Gaganpahad
	3rd On-site Survey		
C-17	Measuring data (Kamalanagar feeder)	CPDCL	Mr.S.Chittaranjan,A.D.E/Saroornagar

Annex 2 Lists of Collected Data / Documents

No.	Name of documents	Name of author	Remark
C-18	Measuring data (Kattedan #2 feeder)	CPDCL	Mr.N.L.Prabhaker,A.D.E/Gaganpahad
C-19	Measuring data (Malkapur feeder)	CPDCL	Mr.Bagaiah, A.E/Sangareddy
	4th On-site Survey		
C-20	L.T. SKETCHES OF FEEDER NO-II IN DISTRIBUTION TRANSFORMERS FOR KATTEDAN SECTION	CPDCL	Mr.Rajendar,A.E/Kattedan
C-21	Measuring data (Kamalanagar feeder)	CPDCL	Mr.S.Chittaranjan,A.D.E/Sarooranagar
C-22	Measuring data (Kattedan #2 feeder)	CPDCL	Mr.N.L.Prabhaker,A.D.E/Gaganpahad
C-23	Measuring data (Malkapur feeder)	CPDCL	Mr.Bagaiah, A.E/Sangareddy
C-24	Result of load at substation (KOTHAPET SS)	CPDCL	Mr.S.Chittaranjan,A.D.E/Sarooranagar
C-25	Result of load at substation (KATTEDAN SS)	CPDCL	Mr.N.L.Prabhaker,A.D.E/Gaganpahad
C-26	Result of load at substation (MALKAPUR SS)	CPDCL	Mr.Bagaiah, A.E/Sangareddy

List of Collected Documents (Facilities and Customer Management by Use of GIS)

No.	Name of documents	Name of author	Remark
	1st On-site Survey		
	(Nothing)		
	2nd On-site Survey		
D-1	Consumer Analysis Tool	APDCDCL	
D-2	Sixteenth Electric Power Survey of India	Central Electricity Authority	
D-3	Schedule of Retail Tariff Rates and Terms & Conditions	APDCDCL	
D-4	Economic Survey 2001-2002	Government of Andhra Pradesh	
D-a	Questionnaire for the 4th investigation (23-10-2003)	JICA Study Team	To D.E/construction/City North
	3rd On-site Survey		
	(Nothing)		
	4th On-site Survey		
D-5	The list of sub-stations for Hyderabad, Ranga Reddy South & North, Medak	APCPDCL	

List of Collected Documents (Training Facilities and Program)

No.	Name of documents	Name of author	Remark
	3rd On-site survey		
E-1	Course material on transmission and power System	CTI	For induction training
E-2	Course material on M.R.T induction training course for trainee assistant engineers	CTI	For induction training
E-3	Course material on distribution and rural electrification	CTI	For induction training
E-4	Course material on boards culture, office procedures & accounting module	CTI	For induction training
E-5	The Indian Electricity Act, 1910 with important case law	ADL Publications	For induction training
E-6	The A.P Electricity Reform Act, 1998 & The A.P Electricity Reform Rules, 1999 with important case law	ADL Publications	For induction training
E-7	Indian Electricity Rules, 1956	ADL Publications	For induction training
E-8	The Electricity (Supply) Act, 1948 with important case law	ADL Publications	For induction training
E-9	Andhara Pradesh Power Sector Reforms Powering the New Millennium	APTRANSCO	For induction training
E-10	Grid Map of Andhara Pradesh as on 31.3.2001	APTRANSCO	For induction training
E-11	Terms and Conditions of Supply of east while APSE Board applicable to APTRANSCO as per condition 12 of provisional retail supply license granted by Govt. of AP in G.O.Ms. No.11 Energy (Power-III) dt. 30.01.1999. 20th October 1975 (Amended up to 30.01.1999)	APTRANSCO	For induction training
E-12	Line man safety guideline (written by Telugu)	CPDCL	For induction training
E-13	Course material for sub engineers 33/11kV, Substation	CPDCL	
E-14	Course material on Accounts & Administrative procedure for LDC's /	CPDCL	

No.	Name of documents	Name of author	Remark
	LD Steno's / Typists		
E-15	Training manual O & M of Distribution systems 17-21 January 2002	APTRANSO	
E-16	S.P.I.D.E.R Training S.P.I.D.E.R Basics Course S10	ABB Network Partner	
E-17	Executive Orientation Workshop, Workshop Manual	APTRANSO	
E-18	Executive Orientation Workshop, 2nd to 4th February 2000, CIRE	CIRE	
E-19	Train the "Trainers", Individual Training Kit, November 14-16, 2000	Arthur Andersen	
E-20	Power Development in Andhara Pradesh (Statistics) 2000-2001	APTRANSO	
E-21	Administration Report 1998-99 (1-2-1999 to 31-01-1999)	APTRANSO	
E-22	Future layout of CTI	CTI	
E-23	Answer for the questionnaire of Maintenance, Management and Training for APDPDCL	APCPDCL	
E-24	Annual Training Plan for the year 2003-2004 (Transco, Discoms)	CTI	
E-25	Annual Training Calendar for the year 2003-2004 at LSTC/ CPDCL/ Hyderabad	LSTC	
E-26	Computer specifications	CTI	
E-27	Organization chart of APTRANSO as on 01-05-2003	APTRANSO	
E-28	Corporate Training Institute, Hyderabad -45, Organization Chart as on 20-02-2003	CTI	
E-29	Organization Chart of CPDCL as on June 2003	CPDCL	
E-30	Organization Chart of LSTC (Hyd)/ CPDCL as on June 2003	LSTC	
E-31	Complaint form	CPDCL	

No.	Name of documents	Name of author	Remark
E-32	SCADA by Mr. Ramamohan Meda	SCADA Center	
E-a	Questionnaire of Maintenance, Management and Training for CTI (List of data to be collected)	JICA Study Team	
E-b	Questionnaire of Maintenance, Management and Training for APCDCL (List of data to be collected)	JICA Study Team	
	4 th On-site Survey		
E-33	Trade (News letter)	APTRANSCO	
E-34	CALENDAR OF TRAINING PROGRAMMES 2003-2004	CIRE	
E-35	CALENDAR OF TRAINING PROGRAMMES 2002-2003	CIRE	
E-36	ESCI A Profile	ESCI	
E-37	Calendar of Training Programmes April 2003 - March 2004	ESCI	
E-38	ESCI communications Jul – Sep 2003 (News letter)	ESCI	
E-39	Programme on Renovation & Modernisation of Power Distribution Systems	ESCI	Course material
E-40	2000-2001 ANNUAL REPORT	CPDCL	
E-41	ORGANIZATION CHART OF APTRANSCO AS ON 30-09-2003	APTRANSCO	
E-42	Organization Chart of CPDCL as on 24-10-2003	CPDCL	
E-43	Working Estimate (Reinforcement of Dog conductor in place of ACSR 7/1.44 conductor on 33kV Line)	CPDCL	Master Plan Circle Office
E-44	Estimate for shifting of 11kV/LT poles and lines	CPDCL	Construction Wing (City North)
E-45	Improve Estimate for erection of 100kVA Distribution Transformer	CPDCL	Construction Wing (City North)

No.	Name of documents	Name of author	Remark
E-46	Estimated cost of CTI at Present Rates	CTI	
E-47	Construction Cost of distribution facilities	CPDCL	Mr.Higashinaka
E-48	COMMENTS ON INTERIM REPORT CHAPTER 7	CTI	Mr.Manikya Prabhu, S.E./CTI
E-49	Comments on Interim Report	CTI	Mr.Srinivasa Rao, A.D.E./CTI
E-50	Emergency call network of JICA India office as on 08-10-2003	JICA India	
E-51	Emergency call network of JICA India office as on 01-10-2003	JICA India	
E-52	ITC Kakatiya Sheraton Hotel, Hyderabad room rate (09-09-2003)	ITC Kakatiya Sheraton	
E-53	ITC Kakatiya Sheraton Conference, Seminars, Events rates	ITC Kakatiya Sheraton	
E-54	TAJ BANJARA, Hyderabad Conference and Banquets rates	TAJ BANJARA	
E-55	Hotel Amrutha Castle Conference and Banquets rates	Hotel Amrutha Castle	
E-c	Questionnaire for the 4th investigation (10-10-2003)	JICA Study Team	To S.E./Assessment/CPDCL
E-d	Request for comments of the Interim Report Chapter 7 (13-10-2003)	JICA Study Team	To S.E./CTI, A.D.E./LSTC
E-e	Questionnaire for the 4th investigation (14-10-2003)	JICA Study Team	To S.E/Op./CPDCL
E-f	Questionnaire for the 4th investigation (17-10-2003)	JICA Study Team	To S.E./Master Plan Circle
E-g	Questionnaire for the 4th investigation (23-10-2003)	JICA Study Team	To D.E./construction/City North

**The Development Study on the Improvement of Power Distribution System of
Andhra Pradesh in INDIA**

Annex 3 Minutes of Meeting / Memorandum

Minutes of Meeting
for
The Development Study on the Improvement of Power Distribution System of Andhra
Pradesh in India

Agreed Upon Between
Japan International Cooperation Agency (JICA) Study Team
and
The Transmission Corporation of Andhra Pradesh Limited

Hyderabad, 11 February 2003

酒井 利文

Mr. Toshifumi Sakai
Resident Representative of JICA
India Office

J. V. Pandurangam

J. V. Pandurangam
Director (Projects)
Transmission Corporation of
Andhra Pradesh Limited
(APTRANSCO)

S. Surya Prakasa Rao 11/2/03

S. Surya Prakasa Rao
Director (Commercial & Projects)
Central Power Distribution
Company of Andhra Pradesh
Limited (APCPDCL)

T. Sakai

S. Surya Prakasa Rao

The Study Team (hereinafter referred to as "the JICA Team") , on "The Development Study on the Improvement of Power Distribution System of Andhra Pradesh in India (hereinafter referred to as "the Study")", organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), represented by Mr. Toshifumi Sakai, had a series of discussions regarding the implementation plan of the Scope of Work (hereinafter referred to as "S/W") signed on 29 May 2002 with the officials of Transmission Corporation of Andhra Pradesh Limited (hereinafter referred to as "APTRANSCO") and Central Power Distribution Company of Andhra Pradesh Limited (hereinafter referred to as "APCPDCL") on 10 and 11 February 2003.

The JICA Team and APTRANSCO&APCPDCL have examined and confirmed that the implementation plan met the S/W.

But to avoid misunderstanding, both sides have also agreed on revised Articles of the S/W as follows:

1. Article II of S/W (OBJECTIVE OF THE STUDY)

The objective of the Study is to establish the methodology of an integrated solution package for loss reduction of distribution network covering facility improvement, operation & maintenance, and facility & customer management by use of GIS and to provide technical transfer of the methodology for replication.

2. Article III of S/W (THE STUDY AREA)

The selected districts are Ranga Reddy and Medak District

3. Article IV of S/W (SCOPE OF THE STUDY)

1. The methodology of an integrated solution package for loss reduction of distribution network shall be established covering the following aspects: facility improvements, operation & maintenance, and facility & customer management by use of GIS as detailed below.

(1) Facility Improvements

- a. Survey of Distribution Facilities
- b. Physical Improvement of Distribution Facilities
- c. Construction Plan of Distribution Facilities



(2) Operation & Maintenance

- a. Data collection
- b. Data analysis
- c. Recommendation

(3) Facility & Customer Management by Use of GIS

- a. Introduction of Basic Module of GIS
- b. Identification of Area of GIS Mapping
- c. Data Collection and Input Procedure
- d. Expected Effect of GIS Mapping
- e. Method of Field Survey and Technology Transfer

2. SCADA System

- a. Assessment of the Existing SCADA System
- b. Study of Distribution SCADA Introduction
- c. Recommendation of Distribution SCADA System

3. Technical transfer of the above methodology shall be provided in order for the Indian counterpart to be capable of replicating the loss reduction measures established in the same methodology.

ANNEX : Work Schedule



ANNEX Work Schedule (Tentative)

Task	Fiscal Year 2003												Fiscal Year 2003											
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3							
(Position)																								
Team Leader/Distribution Line																								
Operation & Maintenance																								
Distribution Line Planning																								
Corporate Management																								
GIS (1)																								
GIS (2)																								
SCADA System																								
Training																								
(Facility Improvement)																								
Water Installation																								
Line measurement																								
Survey of feeder data (residential)																								
Survey of feeder data (agriculture, industry)																								
Analysis/loss calculation for residential																								
Analysis for agriculture & industry																								
Physical improvement plan for residential																								
Physical improvement plan for agriculture & industry																								
Construction Plan of Distribution Facilities																								
(Operation & Maintenance)																								
Data collection																								
Data input to PC																								
Data analysis																								
Data analysis																								
Data analysis																								
Suggestion/recommendation																								
(Facility & Customer Management by Use of GIS)																								
Explanation of GIS construction																								
Preparation of GIS																								
Position securing by JICA																								
Position securing by counterpart																								
Data collection																								
Export data to Excel file																								
Map installation																								
Importing data file to GIS																								
Making GIS manual																								
Guidance for GIS operation																								
(SCADA System)																								
Data collection and analysis																								
Improvement and introduction study																								
Improvement proposal																								
(Training)																								
Survey on existing training center and related information																								
Preparation/explanation of recommendation																								
Signature																								

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MEMORANDUM
OF
SECOND SURVEY
OF
JICA DEVELOPMENT STUDY
ON
IMPROVEMENT OF POWER DISTRIBUTION SYSTEM
OF
ANDHRA PRADESH IN INDIA

AGREED UPON BETWEEN
THE JICA STUDY TEAM
AND
THE TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

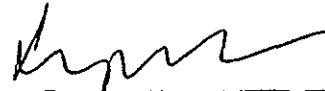
Hyderabad, 10 March 2003



Yoshiyuki Kudo
Team Leader
JICA Study Team



J.V. Pandurangam
Director (Projects)
Transmission Corporation of
Andhra Pradesh Ltd.
(APTRANSCO)



S. Surya Prakasa Rao
Director (Commercial & Projects)
Central Power Distribution
Company of Andhra Pradesh Ltd.
(APCPDCL)

I. General

This memorandum covers the activities conducted by JICA study team in the period from 10 November 2002 through 10 March 2003 in the state of Andhra Pradesh.

The minutes of meeting was signed on 11 February 2003 between APTRANSCO/APCPDCL and JICA to confirm the implementation plan of the Scope of Work signed on 29 May 2002 between APTRANSCO and JICA, with both sides agreeing on the revised articles of the above Scope of Work. (See Annex-1)

At the same time, the Progress Report describing the above implementation plan was submitted in 30 copies and explained in outline by JICA study team to APTRANSCO/APCPDCL and accepted by APTRANSCO/APCPDCL. (See Annex-5)

It is to be noted that for the mixed load the feeder has been changed from Huda Complex to Kamalanagar because of the length of LV line.

II. Seminar

A seminar was held on 18 February 2003 at Hotel Amrutha Castle in Hyderabad to present the methodology to be adopted for a study on loss reduction of distribution network by explaining in detail the Progress Report and to make an exchange of opinions on the methodology between the participants in the seminar and JICA study team. The participants in the seminar are listed in Annex-2.

The seminar consisted of four sessions according to the scope of the study:(1) facility improvements, (2) operation and maintenance, (3) facility and customer management by use of GIS and (4) SCADA.

The methodology presented in the seminar was accepted by the participants in the seminar and APTRANSCO/APCPDCL.

The seminar material is attached herewith as Annex-6.

III. Work Schedule

i) Selection of feeders for Case Study

The feeders for Case Study was selected between November 2002 and February 2003 as follows:

- For the mixed load in Ranga Reddy: feeder Kamalanagar
- For the industrial load in Ranga Reddy: feeder Kathedan No.2
- For the agricultural load in Medak: feeder Malkapur

ii) Installation of electronic energy meters

This work started in first week of March to complete by the middle of March 2003 by APCPDCL.

The total number of the meters to be installed is follows.

	Meter for outgoing of the feeder	Meter for transformer	Volt meter at end user	KWH meter at pump set
KAMALA NAGAR		33	3	
KATHEDEN No2		40	8	
MALKAPUR	1	15	1	16
TOTAL	1	88	12	16

iii) Meter reading

Meter reading will be conducted monthly by APCPDCL until the end of June 2003.

Reading data will be sent monthly to the JICA Team in Japan by APCPDCL using e-mail when the JICA Team is staying in Japan.

iv) Case Study by JICA study team for the mixed load in Ranga Reddy

This will be conducted in May and June 2003.

v) Replication by the Indian counterpart for the industrial load in Ranga Reddy and the agricultural load in Medak

This will be conducted in July and August 2003.

vi) General work schedule

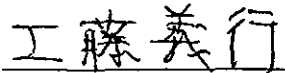
For general work schedule until the submission of the Final Report, see Annex-3.

IV. Allocation of Undertakings

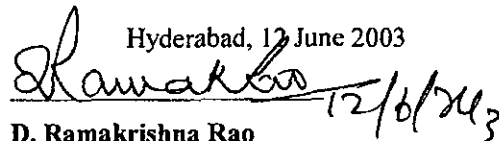
Allocation of undertakings that the study team and India-side should carry out, and required equipment and materials are mentioned in Annex-4.

MEMORANDUM
OF
THIRD SURVEY
OF
JICA DEVELOPMENT STUDY
ON
IMPROVEMENT OF POWER DISTRIBUTION SYSTEM
OF
ANDHRA PRADESH IN INDIA

AGREED UPON BETWEEN
THE JICA STUDY TEAM
AND
TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED



Yoshiyuki Kudo
Team Leader
JICA Study Team

Hyderabad, 12 June 2003


D. Ramakrishna Rao
Chief Engineer (DFID & APL)
Transmission Corporation of
Andhra Pradesh Limited
(APTRANSCO)

I. General

This memorandum covers the activities conducted by JICA study team (the Team) in the period from 20 May 2003 through 12 June 2003 in the state of Andhra Pradesh.

II. Operation and Maintenance

The Team will bring back all collected data and analyze the data in Japan. However, there are still many data that have not been collected from both Medak and Ranga Reddy Districts. Accordingly, APTRANSCO and APCPDCL are requested to devote themselves more time in collecting the remaining data earnestly while the Team stays in Japan.

Technical transfer on the data analysis will be conducted during the fourth (4th) on-site visit to India, which is scheduled in September 2003. Counterpart personnel of APTRANSCO and APCPDCL will collect and analyze the remaining data by themselves.

The results of analysis will be presented by the counterparts at the workshop, which is planned on the fifth (5th) on-site survey in India, which is scheduled in December 2003.

The data so far collected is as follows :

As of June 10, 2003				
District	33kV feeder	11kV feeder	LV feeder	Remarks
RR(S) +(N)	58(9)	364(179)	(0)	
Medak	79(0)	402(36)	(0)	
Total	137(9)	766(215)	(0)	

Figures show estimated number of feeders.

() indicates number of data collected by the Team.

III. Distribution Line

Mr. Keiji Higasinaka, the responsible member of the Team will be in Hyderabad on 27 June 2003. His departure from Japan and arrival in Hyderabad is behind schedule due to unavoidable circumstances brought about by acquisition of data for his analysis work.

IV. GIS and GIS Database

The team will set up GIS equipment in six (6) offices. The team owns these equipment during the study period and these should be kept properly while the Team is in Japan. The team requested the counterparts to keep and manage these equipment until fifth (5th) on-site survey in India.

Following is the list of equipment.

Office	Equipment
APTRANSCO	Desktop computer, GPS, MS Windows XP professional, MS Office, Arc View 8.3
APTRANSCO	Desktop computer, GPS, MS Windows XP professional, MS Office, Arc View 8.3
Kothapet regional office	Desktop computer, GPS, MS Windows XP professional, MS Office, Arc View 8.3, HP printer, Digital camera
Kattedan regional office	Desktop computer, GPS, MS Windows XP professional, MS Office, Arc View 8.3, HP printer, Digital camera
Sanga Reddy circle office	Desktop computer, GPS, MS Windows XP professional, MS Office, Arc View 8.3, HP printer, Digital camera
APCPDCL	Desktop computer, GPS, MS Windows XP professional, MS Office, Arc View 8.3

V. Security

In response to the request from JICA Delhi Office, the Team requested APTRANSCO and APCPDCL to provide one policeman to accompany the Team for security when they visit Medak District. APTRANSCO and APCPDCL pleasantly agreed this request and dispatched appropriate person

VI. Counterpart training

The team requested to nominate a total of four (4) persons for counterpart training. These personnel shall be nominated from counterparts of APTRANSCO and APCPDCL. APTRANSCO and APCPDCL agreed to nominate four (4) persons for training by 17 June 2003. Counterpart training will be held in Japan for two (2) weeks this coming October 2003.

VII. Schedule

The future schedule is attached herewith at Annex – 1.

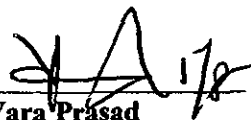
MEMORANDUM
OF
THIRD SURVEY
OF
JICA DEVELOPMENT STUDY
ON
IMPROVEMENT OF POWER DISTRIBUTION SYSTEM
OF
ANDHRA PRADESH IN INDIA

AGREED UPON BETWEEN
THE JICA STUDY TEAM
AND
TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

Hyderabad, 6 August 2003

東中啓二

Keiji Higashinaka
Team member
JICA Study Team



P.L.V. Vara Prasad
Chief Engineer (DFID & APL)
Transmission Corporation of
Andhra Pradesh Limited
(APTRANSCO)

I. General

This memorandum covers the activities conducted by JICA study team (the Team) in the period from 11 July 2003 through 6 August 2003 in the state of Andhra Pradesh

II. Distribution Line

The Team will bring back all collected data and analyze the data in Japan. However measuring is still conducting as far as the end of August. Accordingly, counterparts of APCPDCL, must send measuring data by e-mail after measuring will be over

Technical transfer on the data analysis will be conducted during the fourth on-site visit to India, which is scheduled in September 2003.

The result of the third survey is as follows

1. Number of newly attached meters for measuring

Substation	Feeder	Category	Meter at mouth of feeder	Meter at DTR	Volt meter at customer	Meter at pump set
KOTHAPET	KAMALA NAGAR	Domestic/Commercial	0	44	3	0
KATTEDAN	KATTEDAN#2	Industrial	0	66	0	0
MALKAPUR	MALKAPUR	Agricultural	1	15	1	16
TOTAL			1	125	4	16

2. Number of measuring meters

Substation	Feeder	Category	Meter at mouth of feeder	Meter at DTR	Volt meter at customer	Meter at pump set	KWH meter at customer
KOTHAPET	KAMALA NAGAR	Domestic/Commercial	1	44	3	0	3650
KATTEDAN	KATTEDAN#2	Industrial	1	78	8	0	465
MALKAPUR	MALKAPUR	Agricultural	1	15	1	16	842
TOTAL			3	137	12	16	4957

3 Project Schedule

See attachment

2003.8.3

Attachment

project schedule	days	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
July/August		Fri	Sa	Su	Mo	Tu	We	Th	Fri	Sa	Su	Mo	Tu	We	Th	Fri	Sa	Su	Mo	Tu	We	Th	Fri	Sa	Su	Mo	Tu	We	Sat	
meter installation	KOTHAPET																													
	KATTEDAN																													
	MEDAK																													
measuring	KOTHAPET																													
	KATTEDAN																													
	MEDAK																													
data collection	KOTHAPET																													
	KATTEDAN																													
	MEDAK																													
calculation&analysis	KOTHAPET																													
	KATTEDAN																													
	MEDAK																													
Collection of Feeder Specification	KOTHAPET																													
	KATTEDAN																													
	MEDAK																													

MEMORANDUM
OF
FOURTH SURVEY
OF
JICA DEVELOPMENT STUDY
ON
IMPROVEMENT OF POWER DISTRIBUTION SYSTEM
OF
ANDHRA PRADESH IN INDIA

AGREED UPON BETWEEN
THE JICA STUDY TEAM
AND
THE TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

Hyderabad, 24 October 2003

工藤義行

Yoshiyuki Kudo

Team Leader

JICA Study Team



K. Satyanarayana Murthy

Chief Engineer (DFID & APL)

Transmission Corporation of

Andhra Pradesh Ltd.

(APTRANSCO)

I. General

This memorandum covers the activities of JICA study team (the Team) in the period from 06 October 2003 through 24 October 2003 in the state of Andhra Pradesh.

The Interim Report on the study so far made was submitted in thirty (30) copies and explained by the Team to APTRANSCO/APCPDCL.

II. Operation and Maintenance

1. The analysis of voltage at the consumer-end will be made on collection of the necessary data.

2. Items "3.4.3 Power Flow" and "3.4.5 Daily Load Curve" will be converted into item "3.4.3 Power Supply and Demand".

III. Distribution Line

The Team have got the necessary measurement data during this survey period under the combined effort of counterparts. Accordingly, the Team will study the improvement plan in Japan and explain to APTRANSCO/APCPDCL at the next visit to India.

IV. GIS and GIS Database

The Team provided GIS manual for distribution and instructed to counterparts in three substations how to make distribution GIS. The counterparts could understand basic methodologies and created distribution GIS of other feeders by themselves. Also the counterparts will make GIS map for all the feeders of target substation by January 2004.

The team left six GPSs and three digital cameras in three substations to continue their survey. Number of devices is as follows.

Name of substation	GPS	Digital Camera
Kothapet	1	1
Kattedan	1	1
Malkapur	4	1

The Team provided two new UPSs in Kattedan and Malkapur because the capacity of the existing UPS was insufficient.

V. Security

The Team requested APTRANSCO and APCPDCL to provide one policeman to accompany the Team for security when they visit Medak District. APTRANSCO and

APCPDCL agreed this request and dispatched appropriate person.

VI. Counterpart Training

The advance copies of A2A3 form of the four (4) nominated persons have been received. These documents are to be sent through official channel to JICA India Office.

VII. Workshop

The 2nd workshop is planed to be held in the middle of January, 2003 as follows :

- First day : General explanation at the meeting hall.
- 2nd day and after : Group-wise meeting as required.

VIII. Schedule

The future schedule is attached herewith at Annex – I.

Annex - 1 Schedule of the Study for Fiscal Year 2003

Name	Position	2003												2004		
		4	5	6	7	8	9	10	11	12	1	2	3			
Yoshiyuki KUDO	Team Leader/ Distribution Line		■	■					▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Takeshi ICHIKAWA	Operation/ Maintenance		■	■					▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Keiji HIGASHINAKA	Distribution Line				■				▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Shinji OMOTEYAMA	GIS			■	■				▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Shigeaari MATSUMURA	SCADA System			■	■				▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Ken-ichi KUWAHARA	GIS Database			■	■				▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Tetsuya YAMANAKA	Maintenance Management/ Training			■	■				▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Kanji SUZUKI	Coordinator		■						▨▨▨▨▨▨▨▨				▨▨▨▨▨▨▨▨			
Interim Report																
Draft Final Report									△							△
Final Report																
Workshop																△

Note : ■ 3rd on-site survey ▨▨▨▨▨▨▨▨ 5th on-site survey ▨ Milestone

Minutes of Meeting
for
The Development Study on the Improvement of Power Distribution System
of
Andhra Pradesh in INDIA

Agreed Upon Between
Japan International Cooperation Agency (JICA) Study Team
and
Transmission Corporation of Andhra Pradesh Limited
and
Central Power Distribution Company of Andhra Pradesh Limited

Hyderabad, 27 January 2004

工藤 義行

Yoshiyuki Kudo

Team Leader

JICA Study Team


Dinesh Kumar

Chairman & Managing Director

Central Power Distribution

Company of Andhra Pradesh Ltd.

(APCPDCL)


J.V. Pandurangam 27/1/04

Director (Projects Construction)

Transmission Corporation of

Andhra Pradesh Ltd.

(APTRANSCO)

**Minutes of Meeting for
Development Study on the Improvement of Power Distribution System
of Andhra Pradesh in INDIA**

I. General

The minutes of the meeting signed between Mr. Yoshiyuki Kudo, Team Leader of JICA Study Team and Mr. Dinesh Kumar, CMD, APCPDCL on 27-01-2004 at 15 Hrs. in APCPDCL in the presence of Mr. Masami Kido, Energy and Mining Development Study Division, Mining and Industrial Development Study Department, JICA and Mr. J.V.Pandurangam, Director (Projects Construction), APTRANSCO.

This minutes of meeting covers the activities of JICA study team (hereinafter referred to as "the Team") in the period from 16 January 2004 through 27 January 2004 in the state of Andhra Pradesh.

The main objectives of this visit are (1) to present the Draft Final Report, (2) to hold the "Seminar on the Study," and (3) to collect and analyze data and information necessary for preparing the Final Report.

II. The Draft Final Report

The Draft Final Report on the study so far made was submitted in thirty (30) copies and explained by the Team to APTRANSCO/APCPDCL. The counterpart is requested to give their comments on the DF/R, all of which is very helpful for the Team to prepare the Final Report (F/R).

The Team requested APTRANSCO and APCPDCL to inform their comments on the report by 12 February 2004 by e-mail or through fax so that the team can complete the Final Report.

Suggestion;

JICA requests APTRANSCO/ APCPDCL to utilize GIS software effectively by updating the GIS data continuously. Further following is requested:

- (1) Continuous measurement of the meters and recording of readings
- (2) Works as per the O & M manual should be carried out regularly.

III. Conduct of the Seminar

A seminar was held on 21st January at Hotel Taj Krishna to present the study results and its recommendation and to make an exchange of opinions on the study results among the participants in the seminar and the Team. The participants in the seminar are listed in Annex-1.

IV. Reflection of the Latest Data

AK

H. Kudo
27/1/04

JK

The Team will modify/revise the Draft Final Report based on the latest data which was provided to the Study team by APTRANSCO/APCPDCL during the Team's stay in Hyderabad from 16-1-2004 to 27-1-2004.

The Final Report will be submitted to Ministry of Power, Government of India through JICA India Office.

V. Transfer of the Equipment to APTRANSCO

The team handed over equipments to Indian counterparts APTRANSCO/APCPDCL after completing their study. Number and item of equipments is as follows.

DELL Dimension 4550 Desktop	6 sets
HP DeskJet 1180c – A3 (Color)	3 sets
Canon Digital camera	3 sets
Germin GPS	6 sets
ESRI ArcView Version 8.2	6 sets
Microsoft Windows XP Professional	6 sets
Microsoft Office XP Professional	6 sets
Clip on meter	6 sets
ARUN-UPS	2 sets
Geological map for three substations	1 set

VI. Counterpart Training

Counterpart Training will be conducted for two weeks during March 2004 in Japan. The Team will accompany four trainees during the Counterpart Training.

Signature

Signature
27/1/04

Signature

Annex – 1 List of participants

gr

The Development Study on the Improvement of Power Distribution System of Andhra Pradesh in INDIA
Date: Wednesday, January 21, 2004
List of participants(1 / 5)

No.	Name	Affiliation	Signature
	APTransco	-	-
1	Smt Rachel Chatterjee	Chairman & Managing Director	
2	Sri J.V.Pandurangam	Director (Projects Construction)	
3	Sri G. Keshava Rao	Director (Trans, O&M & Grid Operation)	
4	Sri G.Sai Prasad	JMD (HRD, Comm., IPC & Ref)	
5	Sri K.Satyanarayana Murty	CE Transmission(O&M)	<i>[Signature]</i>
6	Sri G.Patbanjali Rao	CGM (HRD & Trg)	
7	Sri Kumarswamy Reddy	CE (Power Systems)	
8	Sri G.A. Manikya Prabhu	SE (Training)	<i>[Signature]</i>
9	Sri Subrahmanyam ^{S. Subrahmanyam}	SE (Systems Construction)	<i>[Signature]</i>
10	Sri A.Ramakoteswar Rao	DE (Scada)	<i>[Signature]</i>
11	Sri R.Ashokachary	DE (OECF)	<i>[Signature]</i>
12	Sri N.V.V.S.Chandra Sekhar	ADE (APDRP)	<i>[Signature]</i>
13	Sri A.Seshaiah	AE	
14	Sri V. Vijay Chandra Rao	DE	
15	Sri C.Kamalakar Rao	DE (CCI)	
16	Sri S.Subramanyam	DE (APL)	<i>[Signature]</i>
17	Sri T5Haranadha Rao	ADE	<i>[Signature]</i>

[Handwritten initials]
[Handwritten signature]

The Development Study on the Improvement of Power Distribution System of Andhra Pradesh in INDIA
 Date: Wednesday, January 21, 2004
 List of participants (2 / 5)

No.	Name	Affiliation	Signature
	APTransco	-	-
18	Smt. K. Vidyadhari	ADE	K.Vidyadhari
19	Sri O. Hariprasad	ADE	
20	Sri P. V. Madhusudhan	ADE	
21	Sri C.L.N.Prasad	AE	
22	Sri K.Ram Mohan	AE	
23	Sri T. Vishnu Vardhan Reddy	ADE	
24	CIRE		
25	G. SHANKER	Faculty	
26	Dr. M.Y. Reddy	A.D.	
27	S. Suresh	C. P.	
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6/1/04

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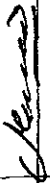





The Development Study on the Improvement of Power Distribution System of Andhra Pradesh in INDIA

Date: Wednesday, January 21, 2004

List of participants (3 / 5)

No.	Name	Affiliation	Signature
	APCPDCL	-	-
1	Sri Dinesh Kumar	Chairman & Managing Director	
2	Sri D. Vidyasagar	ADE/T to CMD	
3	Sri G. Vinay Kumar	Director (Operation)	
4	Sri G. Pedda Bapulu	CGM (Operation)	
5	Sri G. Purandar Rao	Corporate office, SE (O & M)	
6	Sri L. Radha Krishna	DE / EA	
7	Sri B. Krishna Murthy	SE (Operation) / RR District (South)	
8	Sri K. Rajeshwar	DE	
9	Sri Y. Markandajiah	DE (Operation) / Rajendranagar	
10	Sri D.L. Prabhakar	ADE / Gaganpahad	
11	Sri K. Rajendar	AE / Op / Kattedan	
12	Sri K. Raghuma Reddy	DE/Op / Saroomnagar	
13	Sri Chittaranjan	ADE/Op / Saroomnagar	
14	Sri Srikanth	AAE/Op / Saroomnagar	
15	Sri S. Sitaram Babu	AGM / IT	
16	Sri D.S. Sarma	SE (Operation) / RR District (North)	
17	Sri M. Sudhakar Reddy	DE/T	

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 List of participants (4 / 5)

No.	Name	Affiliation	Signature
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19	Sri P. Jagathpal Reddy	SE/Op./ Medak	
20	Sri K. Venkat Reddy	DE/T	
21	Sri Amarnath	AE/Tech/Sangareddy	
22	Sri Ch. Ashok Reddy	DE/Op./ Sangareddy	
23	Sri Bagniah	AE/Comm./Sangareddy	
24	Sri Syed Masood	AAE	
25	Sri M. Venkata Bangaraiiah	SE/ SCADA	
26	Sri Subba Rao	DE/ SCADA	
27	Sri Srinivasa Chary	ADE/ SCADA	
28	R. Krishna Murthy	ADE/Op/CSPT.	
29	N.S.R. Murthy	ADE/Op/CSPT	
30	K. Narasimha Rao	ADE/Op/CSPT	
31	K. Jagannatha	SS/ Medak	
32	P. Raghavendra Rao	ADDO/ B. Hella	
33			
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