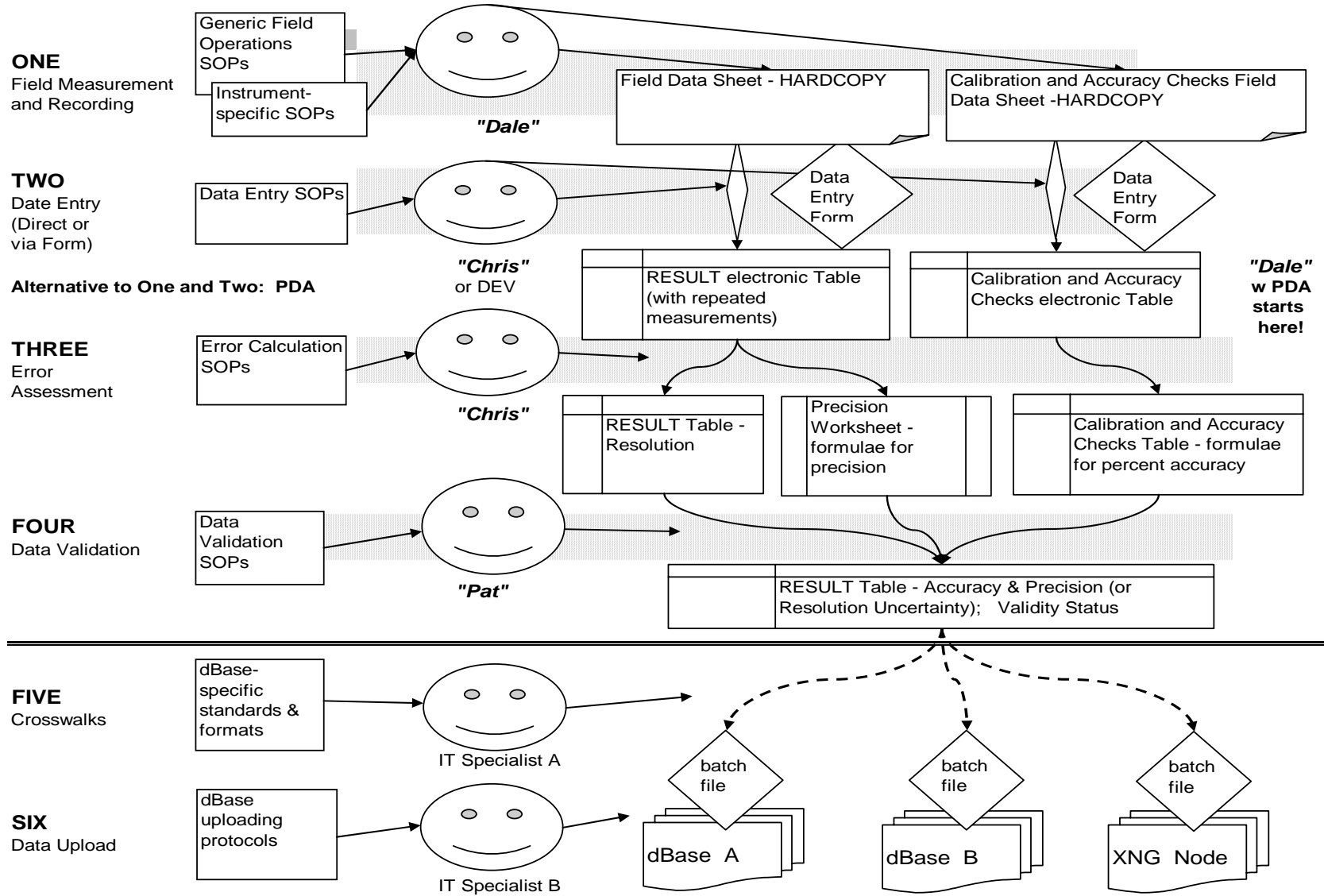
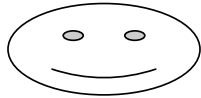


# DATA FLOW FROM FIELD TO CENTRAL DATABASE



# Key to Data Flow scheme symbols and roles



A human brain (and eyes and fingers)

## Roles: *(Roles in shaded area are filled by Project personnel)*

"Dale" - the field operator; conducts measurements, calibrations, and accuracy checks; collects and dispatches samples for analysis off-site

"Chris" - the Trainer; responsible for Project logistics, operators' training, Project documentation, and data quality

"Pat" - the Technical Leader and QA/QC officer; responsible for the technical merit and the usability of the data and for delivery of the complete Project File

DEV - a data entry volunteer; recruited to help with typing the information from hardcopies into spreadsheets or Data Entry Forms

IT Specialist - Information Technology person who handles data preparation for batch files and data uploading into central databases

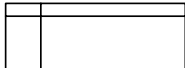
## Objects:



Hardcopy Data Sheets: used for entering data with a pencil



Guidance documents: Standard Operating Procedures (SOPs), instructions, standardization tools and formats, or protocols



Spreadsheet Tables: accommodate Results and descriptors in rows ("Records") and columns ("Fields")

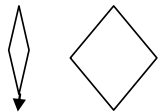


Worksheets: accommodate raw data used for endpoint or error calculations; may contain cells that relate to each other both horizontally and vertically.



Databases: multiple tables with established relationships between components. Databases often compile data from different sources or Data Exchange Nodes

## Processes:



Data transfer processes: direct entry into spreadsheet, or via tools (electronic Data Entry Forms, Batch Files, etc.)



Data manipulations



"Crosswalks": automated tools that translate Field Names from one data management system to another and move cell contents from system to system

**"Normal" Format (a.k.a vertical, or flat file)** : Each row contains one Result plus any number of Measurement or Result descriptors (e.g., Instrument ID). Data Fields include all links to inventories and QA information. This is the format used in databases. The redundancy is in the Station Visit identifiers

Project ID	Water body	Station name	Station ID	date	time	Depth (cm)	Measurement ID	parameter	units	detection limit	Result	Qual	comm/Bra cket	Instrument ID	Operator
AL-SLC99	San Leand Chabot Park	SLC-WD	5/22/1999	9:15	4	SLC-WD-e35	Conductivity	µS	10				dead battery	EC-SLC3	R. Kaufmann
AL-SLC99	San Leandr Chabot Park	SLC-WD	5/22/1999	9:15	4	SLC-WD-e35	dissolved oxyg	mg/l (ppm)	0.2		8.2			DOW-SLC1	D. Eliason
AL-SLC99	San Leandr Chabot Park	SLC-WD	5/22/1999	9:15	4	SLC-WD-e35	H2O Tempera	°C	na		13.5			TR-SLC1	D. Eliason
AL-SLC99	San Leandr Chabot Park	SLC-WD	5/22/1999	9:15	4	SLC-WD-e35	pH	pH	na		7.6			PHSL-SLC3	R. Kaufmann
AL-SLC99	San Leandr Chabot Park	SLC-WD	5/22/1999	9:15	4	SLC-WD-e35	pH	pH	4.5		7.3		7-7.5	PHST-SLC2	C. Ryan
AL-SLC99	San Leandr Chabot Park	SLC-WD	5/22/1999	9:15	4	SLC-WD-e35	Turbidity	JTU	2			ND		TUJ-SLC1	C. Ryan
AL-SLC99	San Leand Root Park	SLC-WC	5/22/1999	10:00	3	SLC-WC-e35	Conductivity	µS	10		570			EC-SLC3	R. Kaufmann
AL-SLC99	San Leandr Root Park	SLC-WC	5/22/1999	10:00	3	SLC-WC-e35	dissolved oxyg	mg/l (ppm)	0.2		7.6			DOW-SLC1	D. Eliason
AL-SLC99	San Leandr Root Park	SLC-WC	5/22/1999	10:00	3	SLC-WC-e35	H2O Tempera	°C	na		14.5			TR-SLC1	D. Eliason
AL-SLC99	San Leandr Root Park	SLC-WC	5/22/1999	10:00	3	SLC-WC-e35	pH	pH	na		7.8			PHSL-SLC3	R. Kaufmann
AL-SLC99	San Leandr Root Park	SLC-WC	5/22/1999	10:00	3	SLC-WC-e35	pH	pH	4.5		8			PHST-SLC2	C. Ryan
AL-SLC99	San Leandr Root Park	SLC-WC	5/22/1999	10:00	3	SLC-WC-e35	Turbidity	JTU	2			ND		TUJ-SLC1	C. Ryan
AL-SLC99	San Leand Peralta	SLC-WB	5/22/1999	10:45	2	SLC-WB-e35	Conductivity	µS	10		570			EC-SLC3	R. Kaufmann
AL-SLC99	San Leandr Peralta	SLC-WB	5/22/1999	10:45	2	SLC-WB-e35	dissolved oxyg	mg/l (ppm)	0.2		7.6			DOW-SLC1	D. Eliason
AL-SLC99	San Leandr Peralta	SLC-WB	5/22/1999	10:45	2	SLC-WB-e35	H2O Tempera	°C	na		16			TR-SLC1	D. Eliason
AL-SLC99	San Leandr Peralta	SLC-WB	5/22/1999	10:45	2	SLC-WB-e35	pH	pH	na		7.4			PHSL-SLC3	R. Kaufmann
AL-SLC99	San Leandr Peralta	SLC-WB	5/22/1999	10:45	2	SLC-WB-e35	pH	pH	4.5		7.5			PHST-SLC2	C. Ryan
AL-SLC99	San Leandr Peralta	SLC-WB	5/22/1999	10:45	2	SLC-WB-e35	Turbidity	JTU	2			ND		TUJ-SLC1	C. Ryan

**"Tabular" File Format (a.k.a. horizontal, or cross-tab)** : Each row contains many Results. No placeholders for Result descriptors or other QA/QC linkages. Data Fields do not include measurement descriptors; adding fields for that information will create huge redundancy. This is the format used in Reports.

Project ID	Water body	Station Name	Station ID	date	time	Depth	Measurement ID	Conductivity	diss oxygen	H2O temp	pH	Turbidity
						cm		µS	mg/l	Celsius		JTU
AL-SLC97	San Leandr Peralta	SLC-WB	3/29/1997	10:45	25	SLC-WB-e20	570	6.4	14.5	7.8	ND	
AL-SLC97	San Leandr Peralta	SLC-WB	4/26/1997	10:30	20	SLC-WB-e22	590	4.6	17.5	6.8	ND	
AL-SLC97	San Leandr Peralta	SLC-WB	6/7/1997	10:55	20	SLC-WB-e25	530	10.2	19		5	
AL-SLC97	San Leandr Peralta	SLC-WB	6/21/1997	11:20	30	SLC-WB-e26		15	18	8.2	5	
AL-SLC97	San Leandr Peralta	SLC-WB	8/2/1997	10:50	10	SLC-WB-e29	660	1	18	7.4	ND	
AL-SLC97	San Leandr Root Park	SLC-WC	2/15/1997	10:15	20	SLC-WC-e17	320	10j	11.6	7.2	25	
AL-SLC97	San Leandr Root Park	SLC-WC	3/29/1997	10:00	20	SLC-WC-e20	590	7.4	12.5	7.7	ND	
AL-SLC97	San Leandr Root Park	SLC-WC	4/19/1997	12:49	20	SLC-WC-e21	230	6	18	7.4	2/5	
AL-SLC97	San Leandr Root Park	SLC-WC	4/26/1997	9:50	20	SLC-WC-e22	580	5.4	15.5	7.4	ND	
AL-SLC97	San Leandr Root Park	SLC-WC	5/10/1997	10:05	20	SLC-WC-e23	280	3.4	14	7	10	
AL-SLC97	San Leandr Root Park	SLC-WC	5/24/1997	10:12	5	SLC-WC-e24	260	0	17	7	35	
AL-SLC97	San Leandr Chabot P	SLC-WD	3/1/1997	9:40	35	SLC-WD-e18	460	9	10	7.6	2	
AL-SLC97	San Leandr Chabot P	SLC-WD	3/15/1997	9:30	35	SLC-WD-e19	580	9.4	12	7.5	ND	
AL-SLC97	San Leandr Chabot P	SLC-WD	3/29/1997	9:10	35	SLC-WD-e20	600	7.4	12	7.2	ND	
AL-SLC97	San Leandr Chabot P	SLC-WD	4/26/1997	9:10	35	SLC-WD-e22	670	6.2	14	7.5	ND	
AL-SLC97	San Leandr Chabot P	SLC-WD	5/10/1997	9:12	35	SLC-WD-e23	650	6.6	14	7.2	ND	
AL-SLC97	San Leandr Chabot P	SLC-WD	5/24/1997	9:10	20	SLC-WD-e24	580	5	17	7.6	ND	

Each of these is a Result

This "Tabular" format does not let you describe or validate each Result

Tabular format can be easily created from the vertical format (single Result per row), after data validation. On the other hand, data entered into tabular format cannot be easily transferred to the vertical format.