Vista Software

April 5, 2001

WHAT IS VISTA

VISTA is a computer tool that uses

- **Forecasting**
- **Optimization and Simulation**

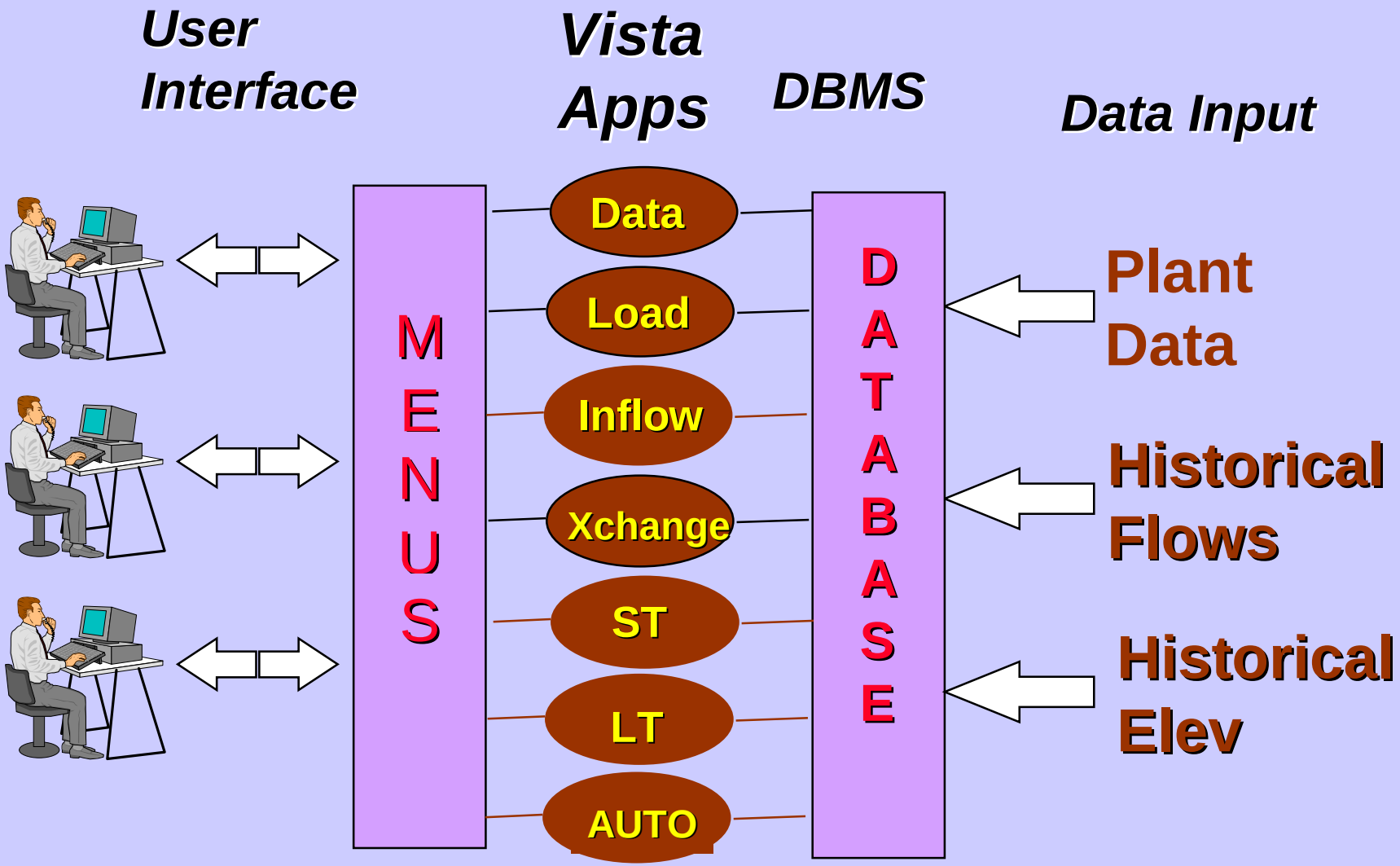
to find cost effective solutions for

Operations

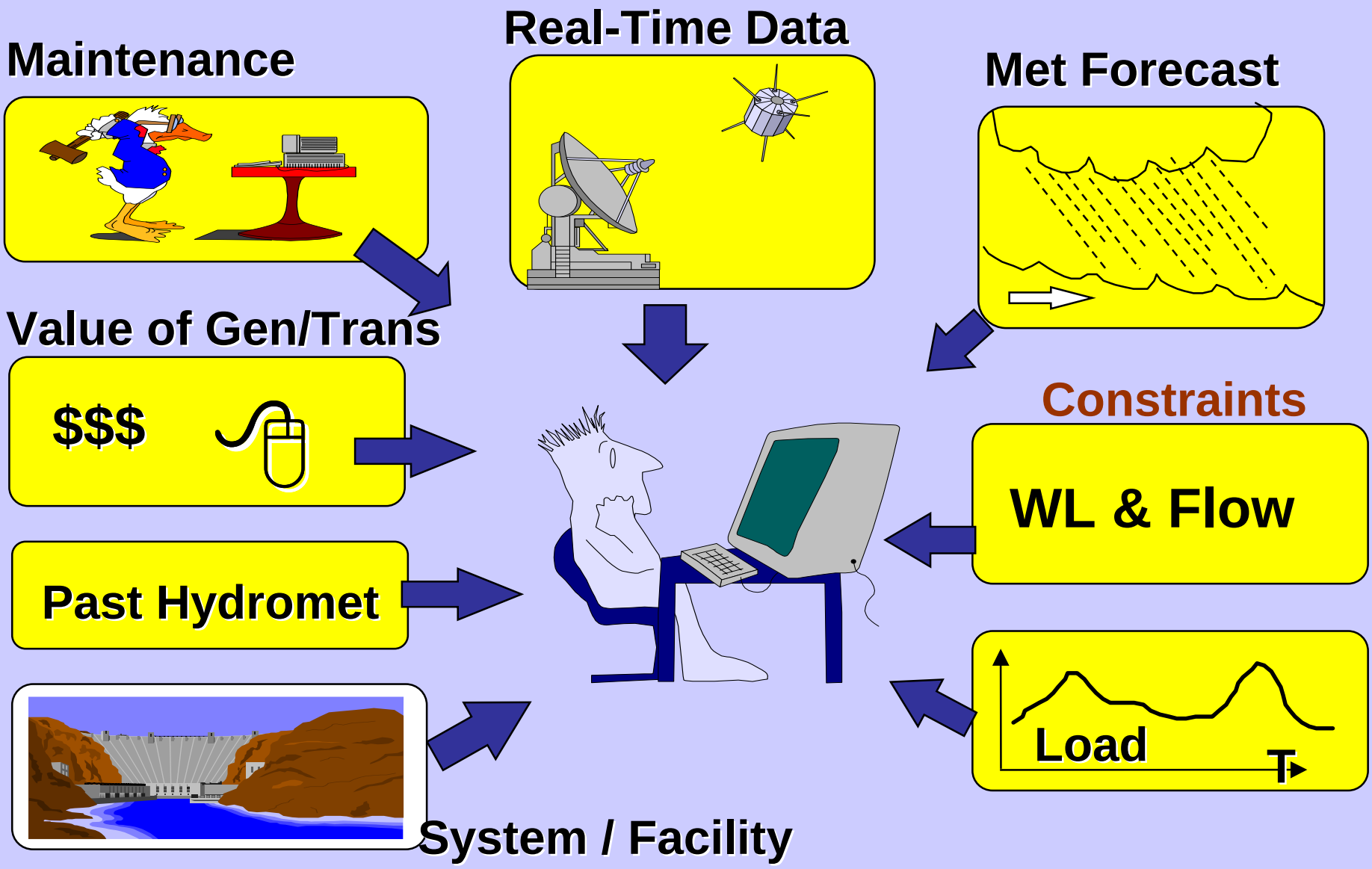
- **Long term energy management**
- **Short term scheduling**
- **Facility upgrading**
- **Relicensing**

} ***Studies***

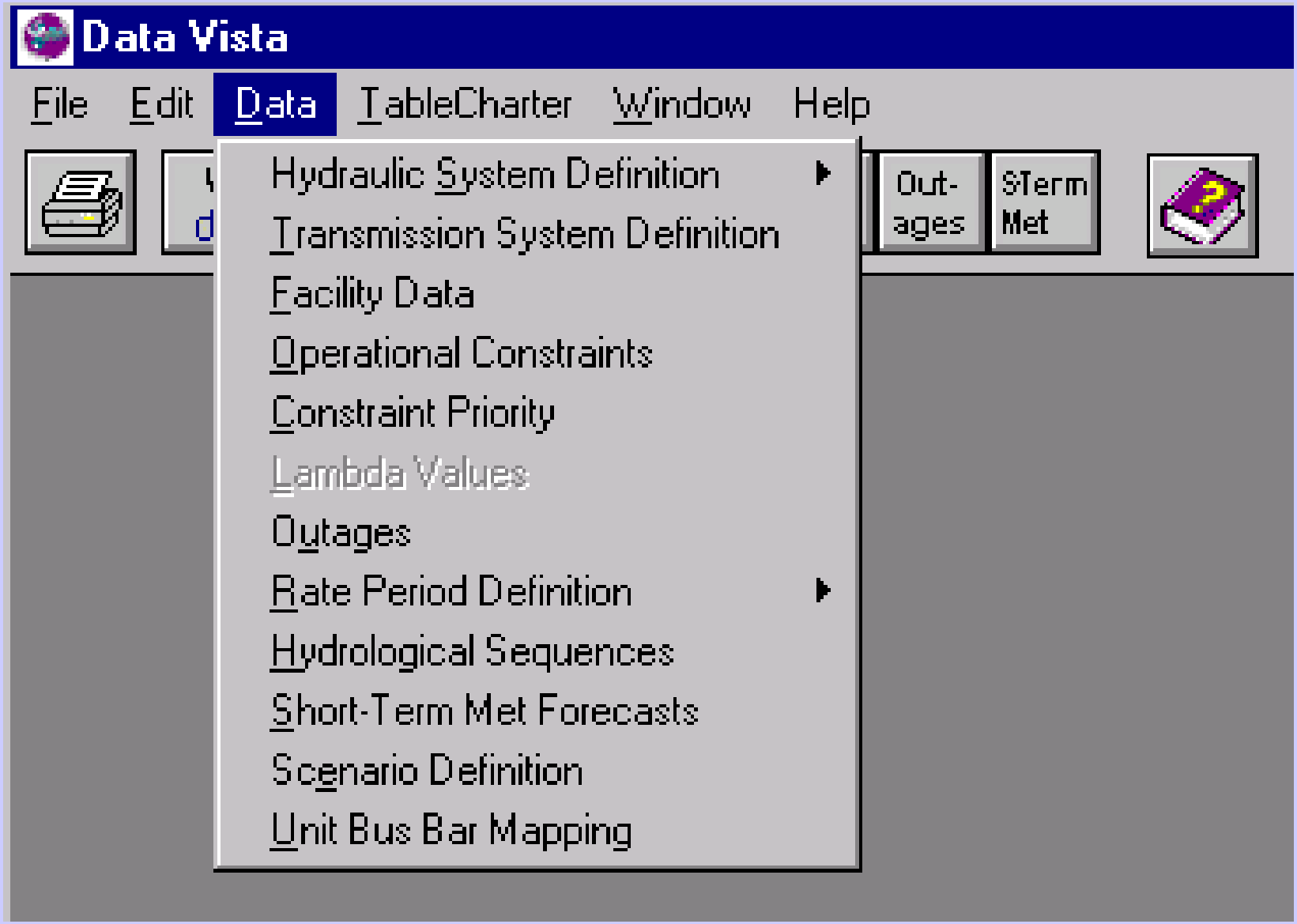
VISTA STRUCTURE



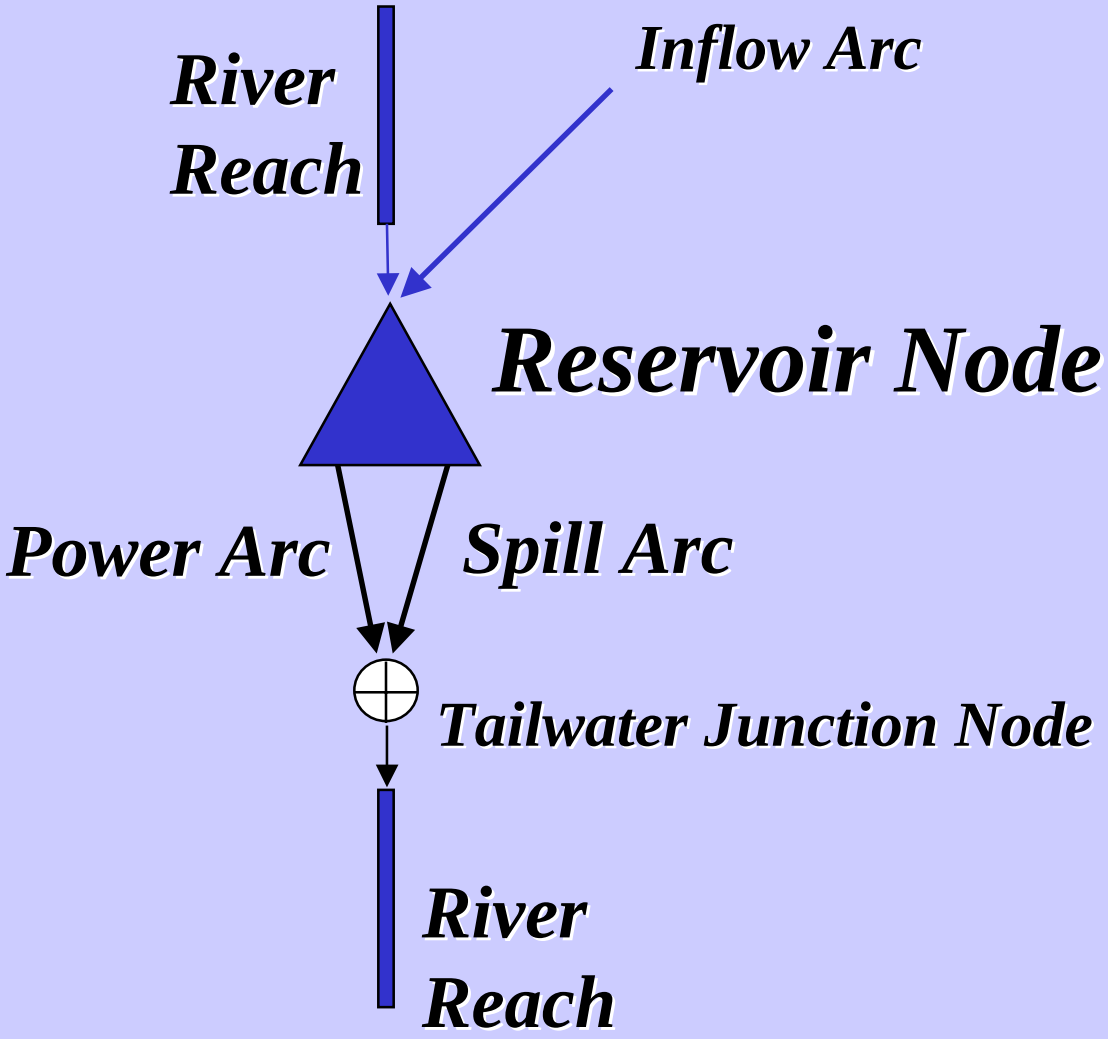
VISTA DATA REQUIREMENTS



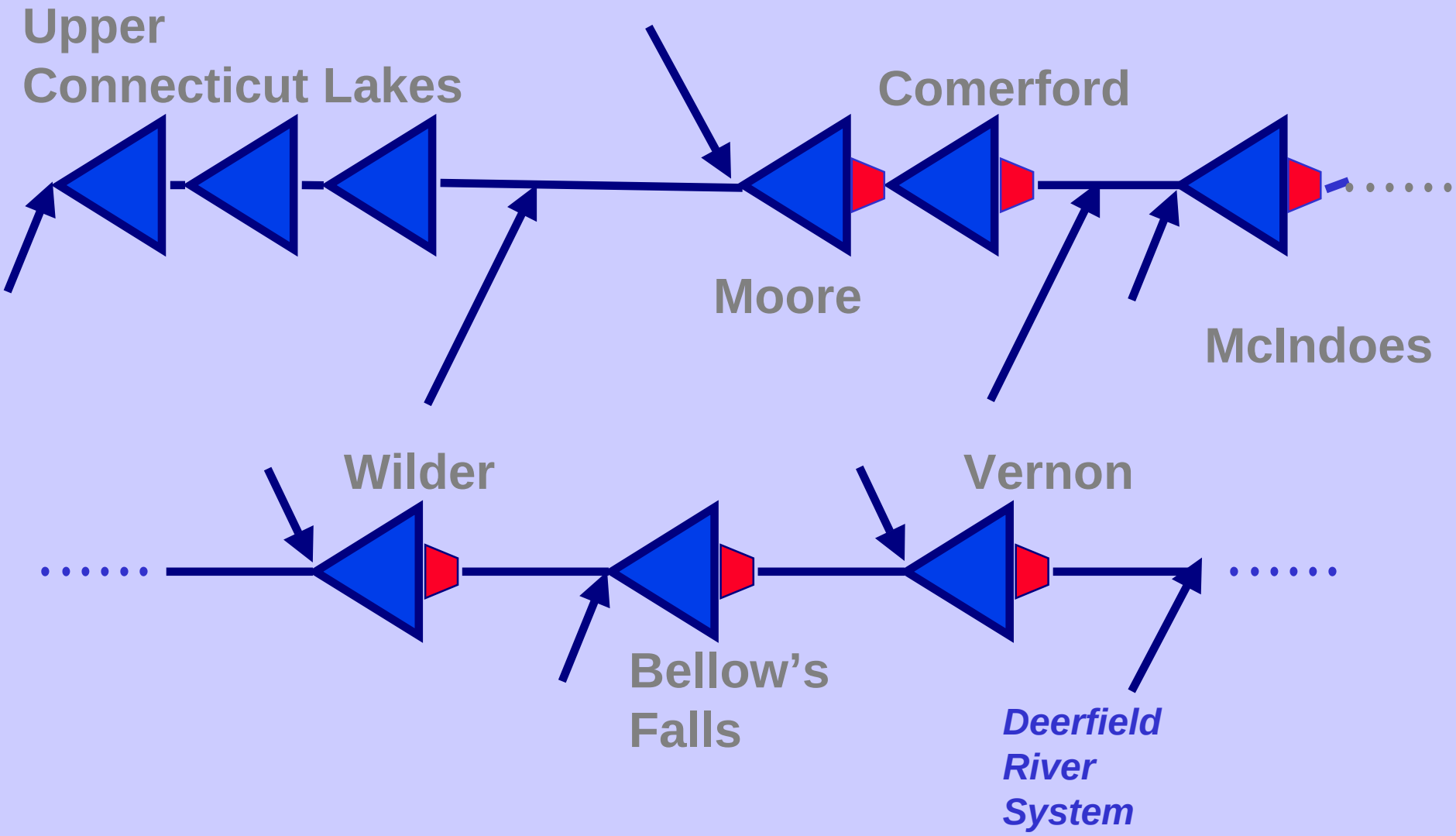
Data Vista Menu



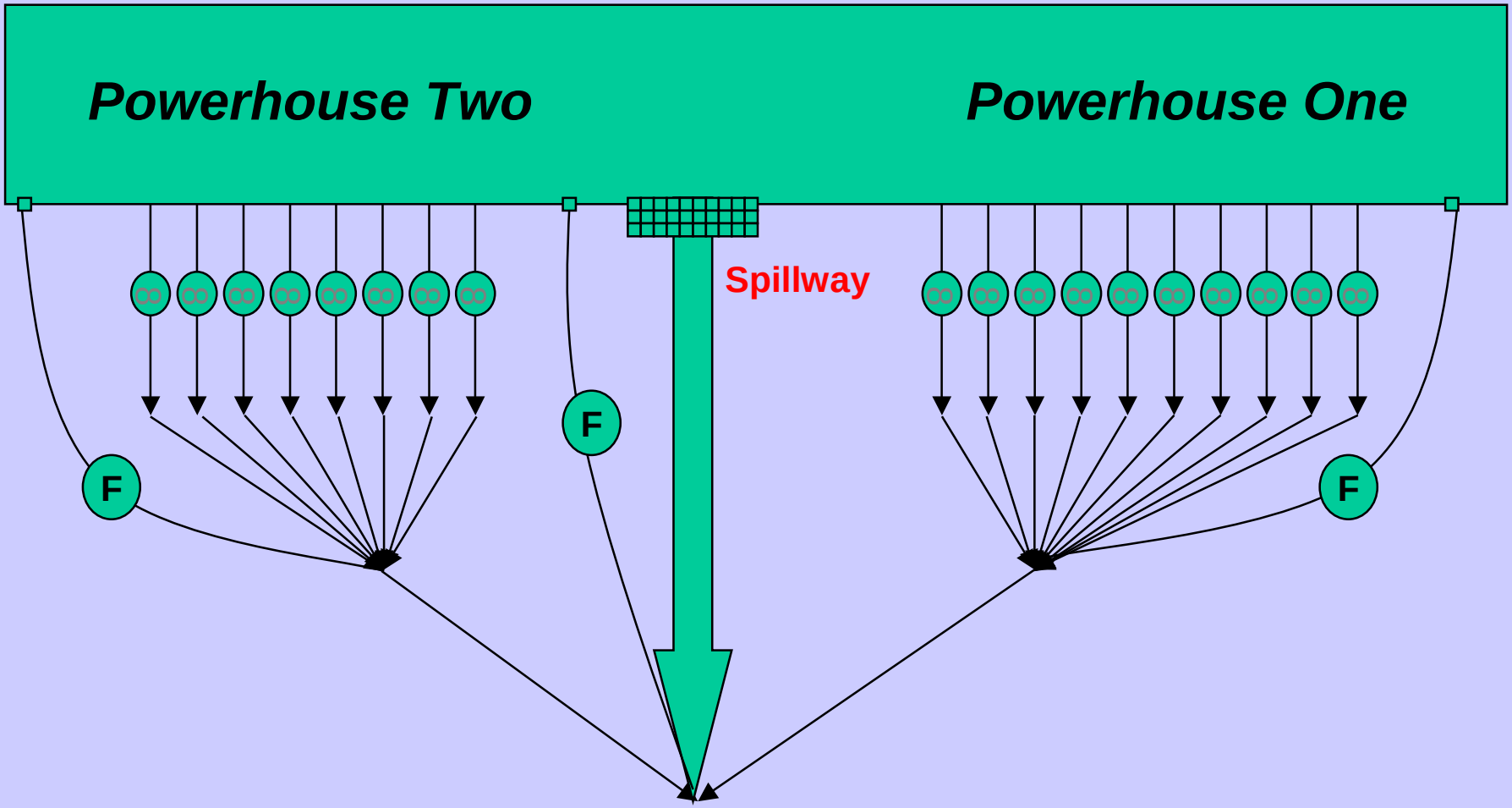
Hydro System Components



PG&E New England: Connecticut River System



Rock Island Project: Vista Model



Data Vista: Typical Input

Data Vista

File Edit Data TableCharter Window Help

Facil Data | Oper. Const | Const Prior | Out-ages | Sterm Met

Facility Data

System Config: Existing System

Case ID: Base Facility Case

Description: Base Facility Case

Data Type: Plant

Save | Save As | Add | Delete | Add | Delete

Units for Griddle Station

	1	2	3
Priority	0	0	0
Rated Head	175.00	175.00	175.00
Max MW	40.00	40.00	40.00
Min MW	0.00	0.00	0.00
Max cfs	3500	3500	3500
Min cfs	1400	1400	1400
LTGS eff	0.900000	0.900000	0.900000
a1	+0.00000e+000	+0.00000e+000	+0.00000e+000
a2	+0.00000e+000	+0.00000e+000	+0.00000e+000
a3	+0.00000e+000	+0.00000e+000	+0.00000e+000
b1	-1.10000e-008	-1.10000e-008	-1.10000e-008
b2	+8.94900e-006	+8.94900e-006	+8.94900e-006
b3	+0.00000e+000	+0.00000e+000	+0.00000e+000
c1	+3.72560e-006	+3.72560e-006	+3.72560e-006
c2	+2.26480e-008	+2.26480e-008	+2.26480e-008
c3	+0.00000e+000	+0.00000e+000	+0.00000e+000
d1	-1.38090e-009	-1.38090e-009	-1.38090e-009
d2	+0.00000e+000	+0.00000e+000	+0.00000e+000
d3	+0.00000e+000	+0.00000e+000	+0.00000e+000

View Equation

Generating Unit Power Function

$$P = A + (B \cdot Q) + (C \cdot Q^2) + (D \cdot Q^3)$$

where P is the unit power output (MW)

Q is the unit flow rate (cfs)

H is the net head (ft) (after plant headloss)

$$A = a_1 + a_2 \cdot H + a_3 H^2,\ B = b_1 + b_2 \cdot H + b_3 H^2$$

$$C = c_1 + c_2 \cdot H + c_3 H^2,\ D = d_1 + d_2 \cdot H + d_3 H^2$$

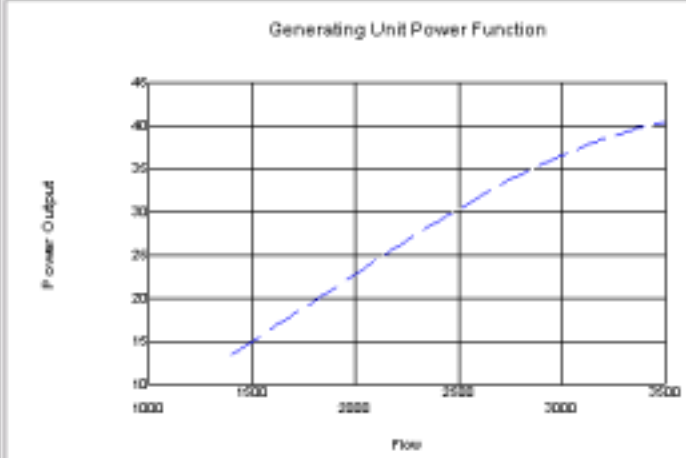
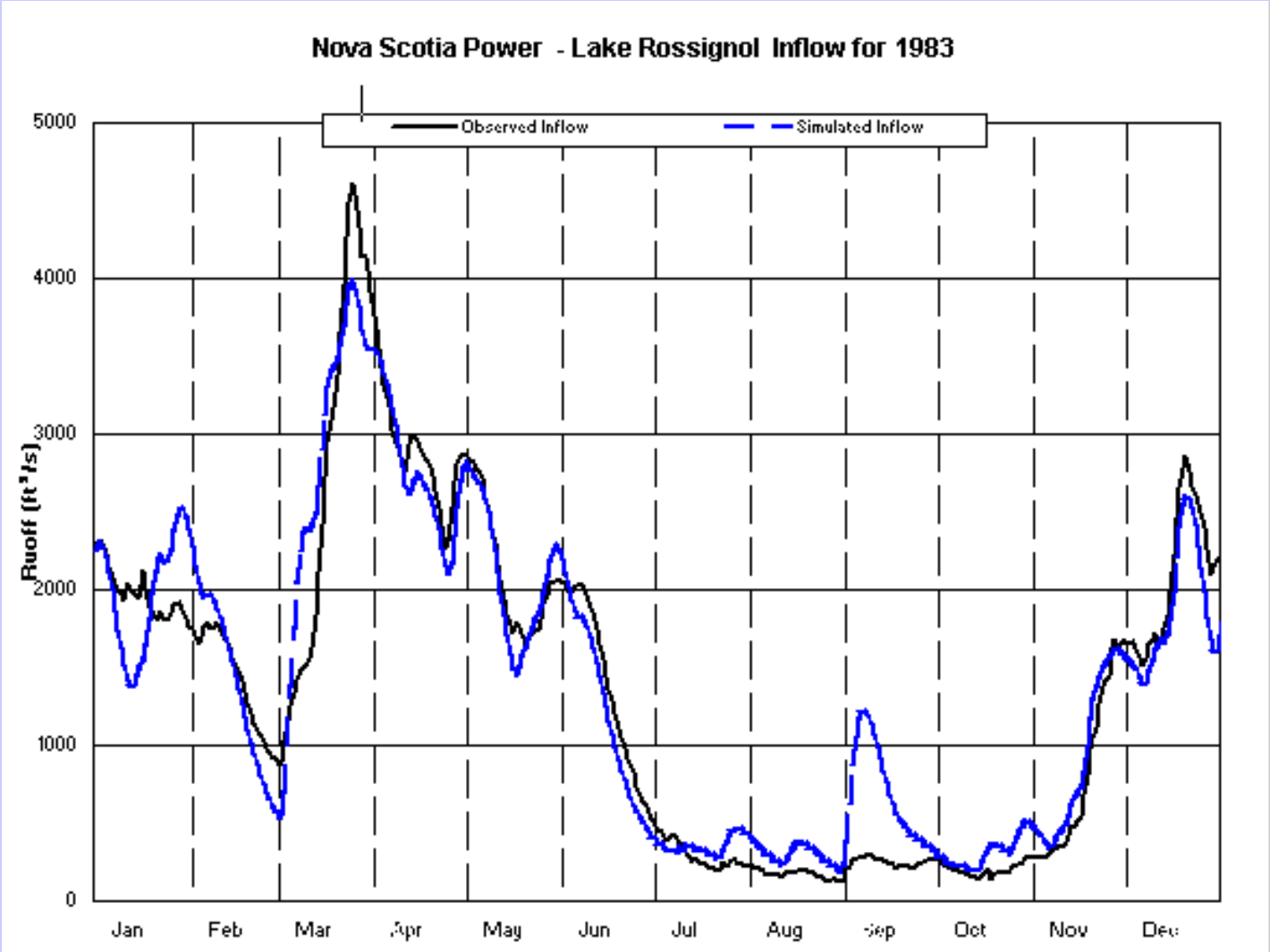


Chart | Table | OK

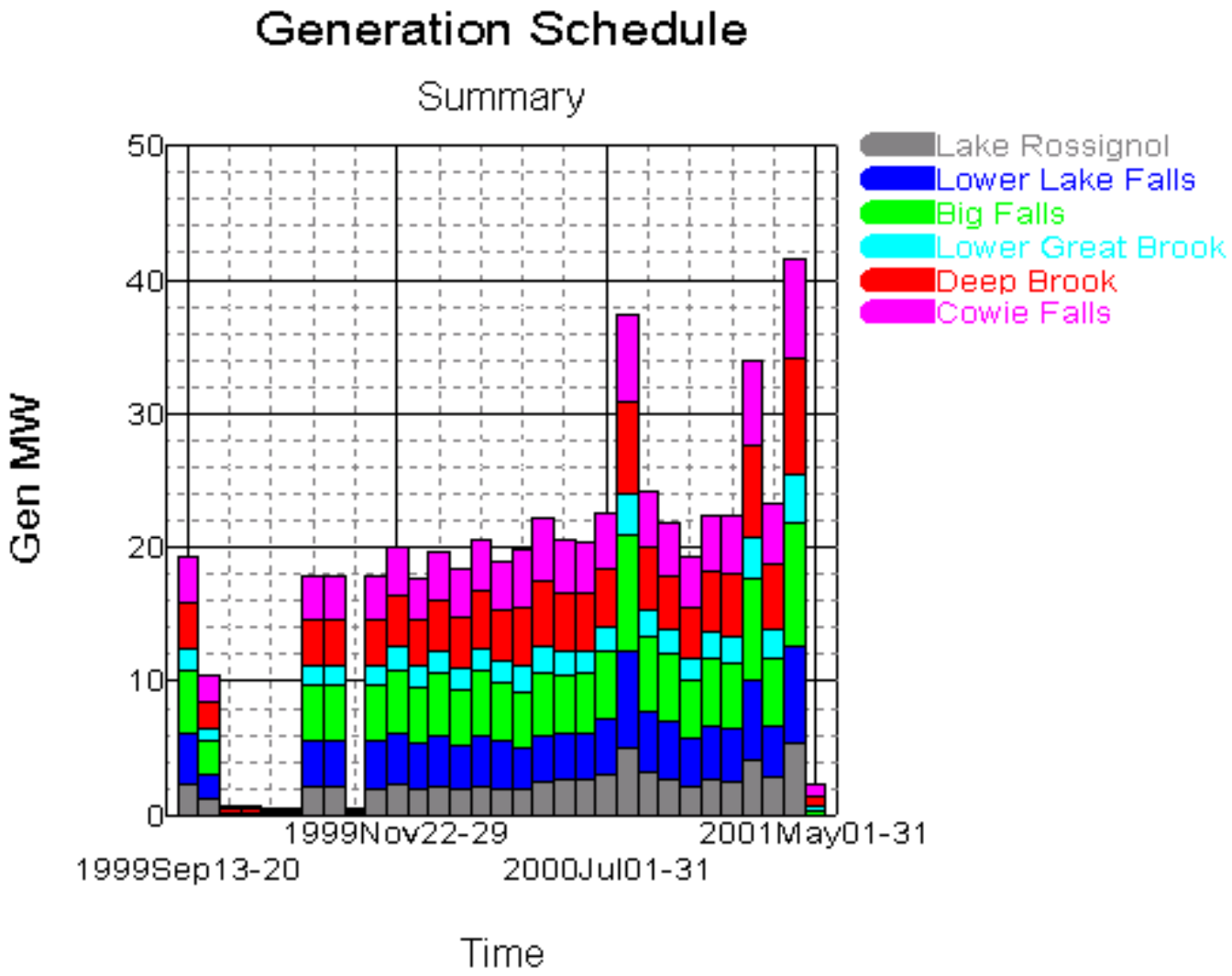
VISTA ANALYTICAL MODELS

- ***Long-Term Generation and Transaction Scheduling*** → **LT *Vista***
- ***Short-Term Generation and Transaction Scheduling*** → **ST *Vista***
- ***Market Transactions*** → **Xchange*Vista***
  → **Load *Vista***
  → **Inflow *Vista***
  → **AUTO *Vista***
- ***Load Forecasting***
- ***Inflow Forecasting***

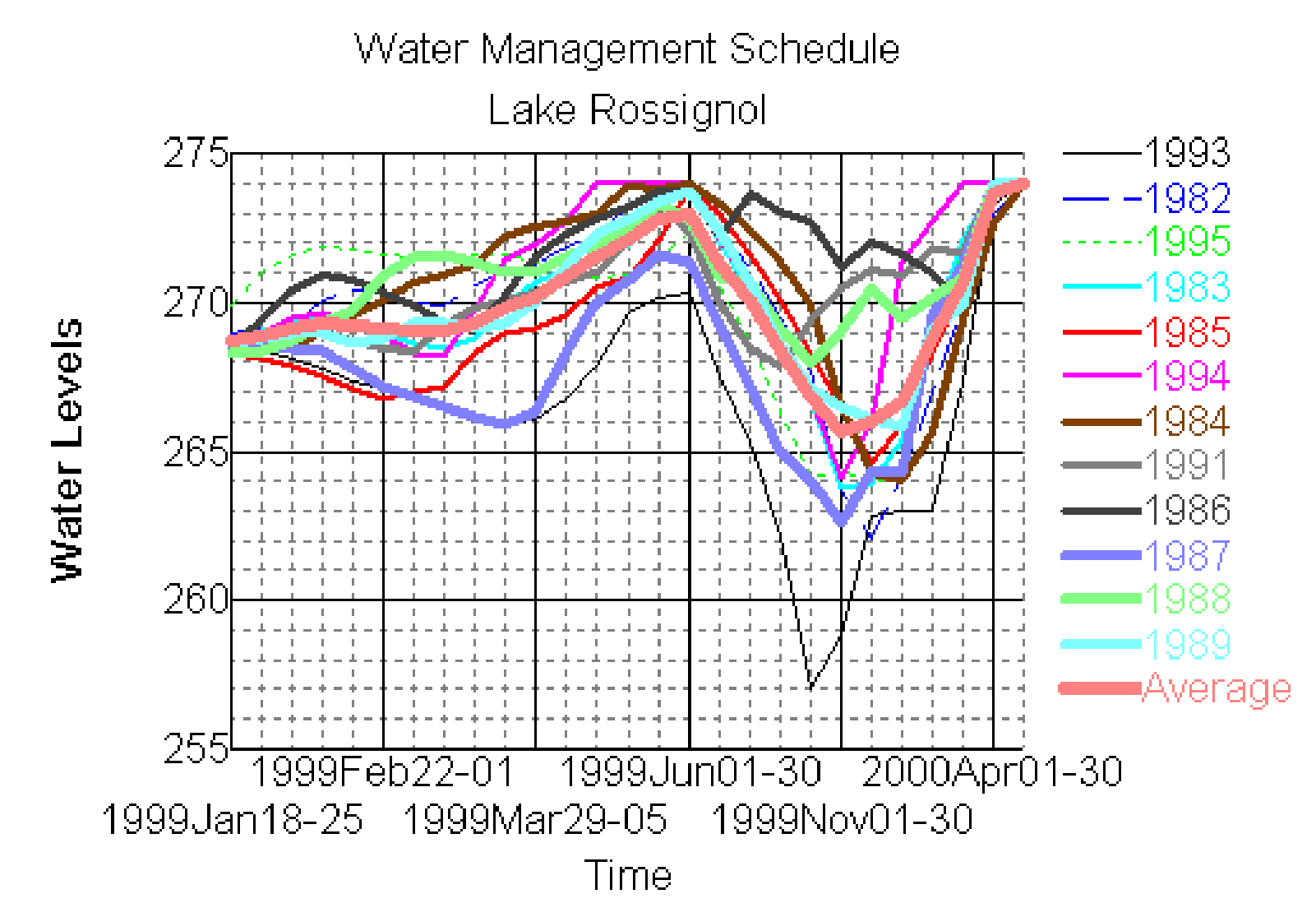
Inflow Forecast



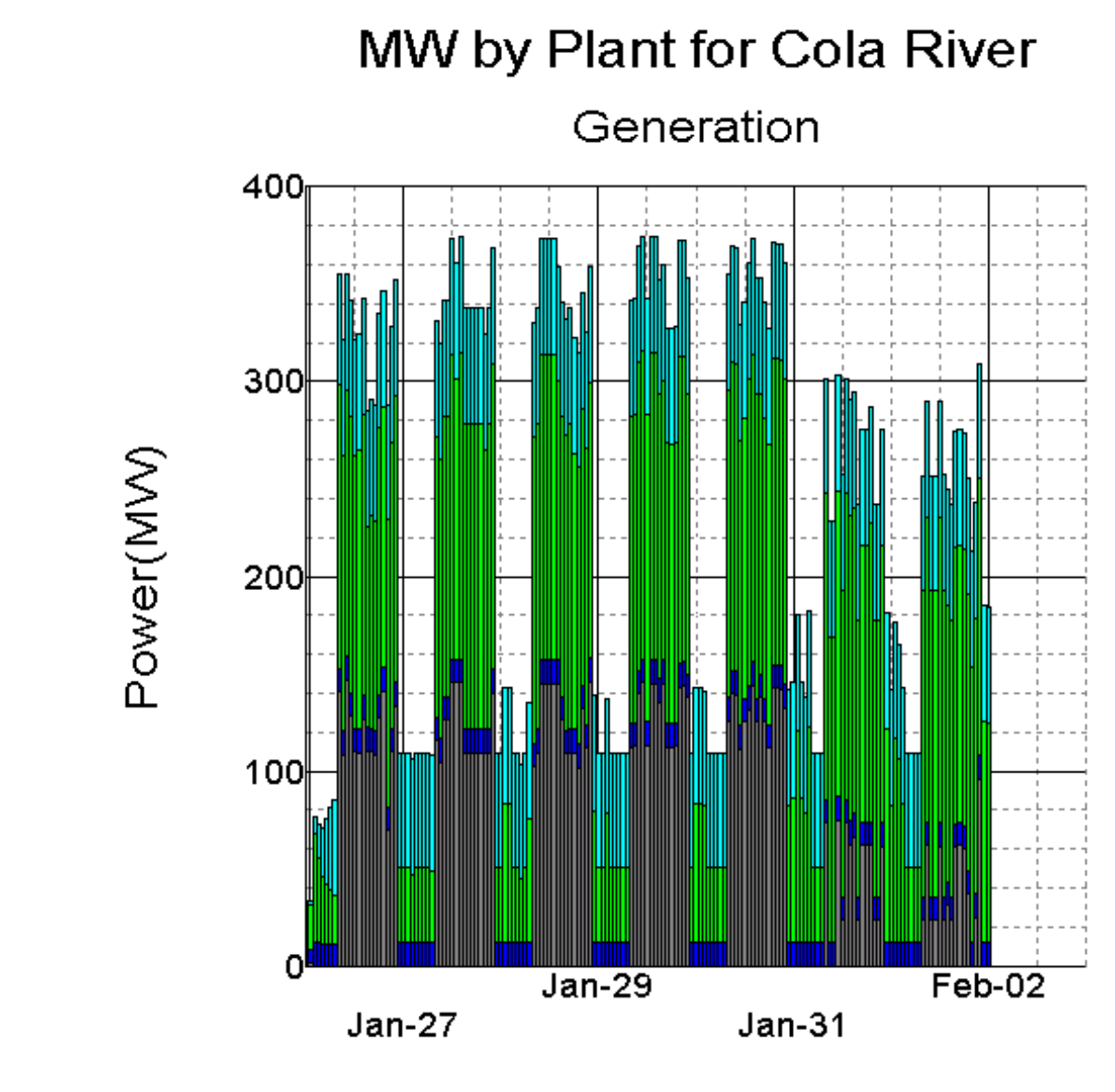
LT Generation Schedule



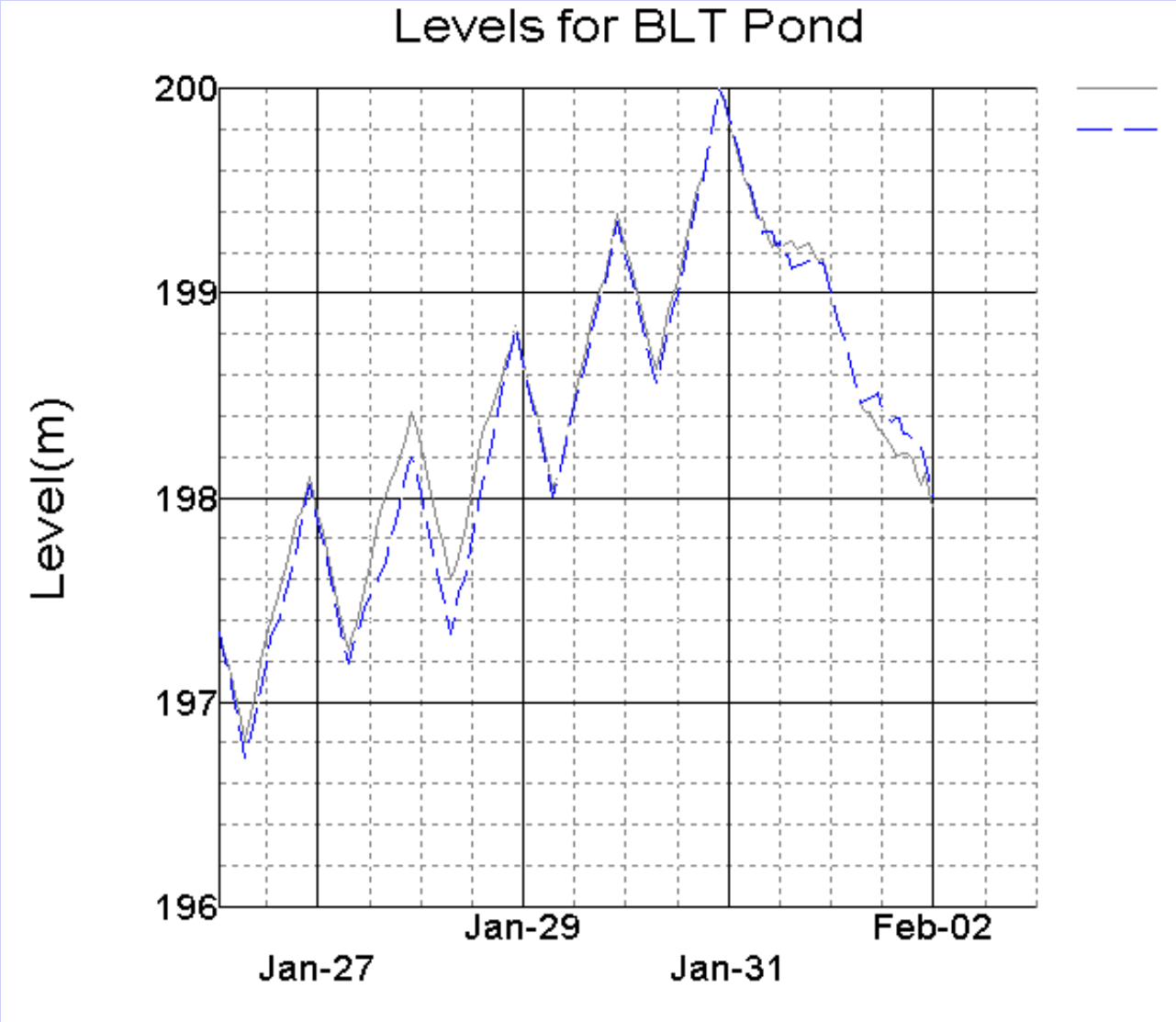
LT Vista *Display - Water Levels*



ST Generation Plot



ST Water Level Plot



AUTO Vista -- BACKGROUND

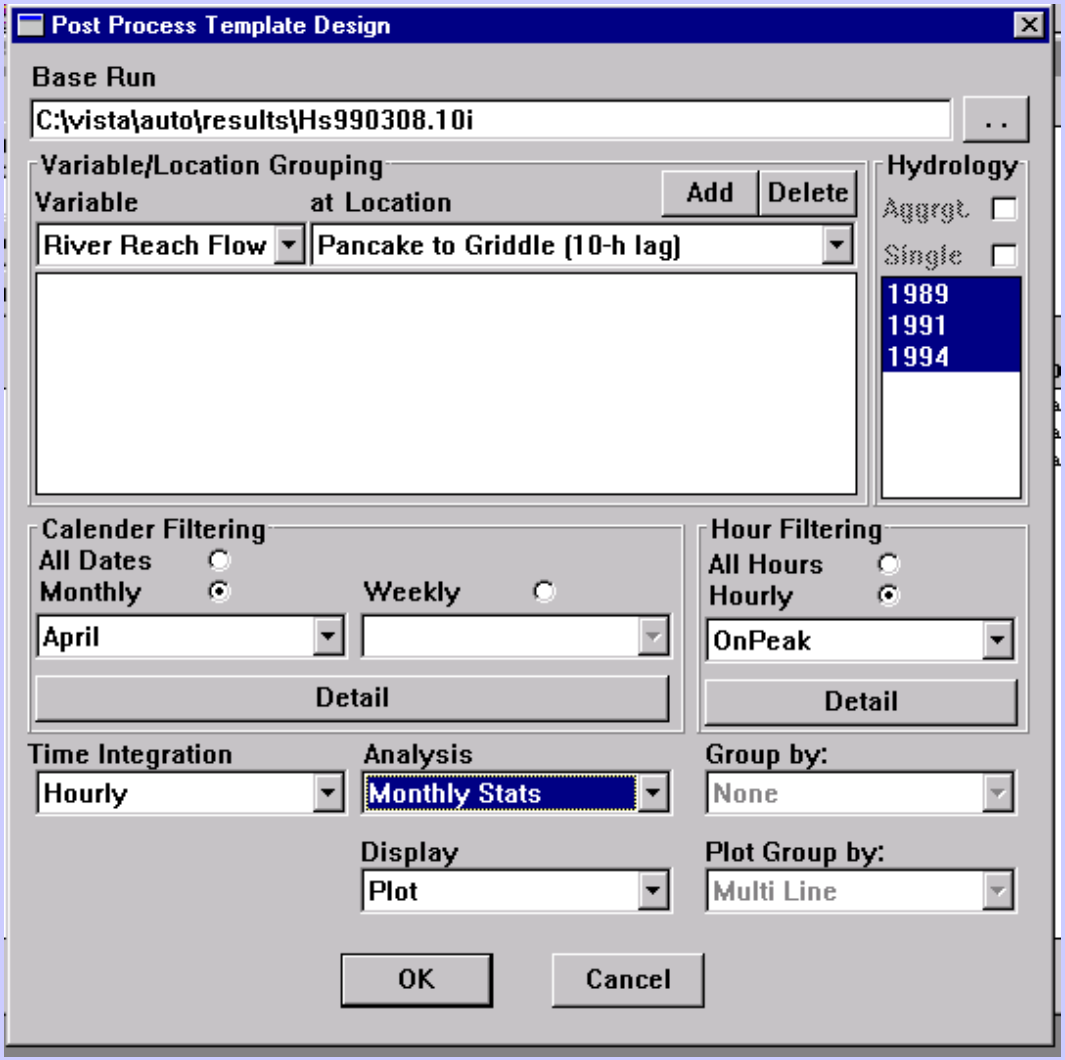
- ***Analytic Module to study:***
  - **Operations**
  - **Transactions**
  - **Upgrading**
  - **Relicensing issues**

- ***Simulates detailed hourly operations over long periods***

AUTO Vista -- METHODOLOGY

- ***For each 1-wk period for N years:***
  - **LT for long term "smarts"**
  - **ST for detailed hourly dispatch**
  - **Store info in *BIG* database**
- ***Post-Process Fish Passage Results***
- ***Post-Process Generation***

AUTO Vista -- DATA POST PROCESSING

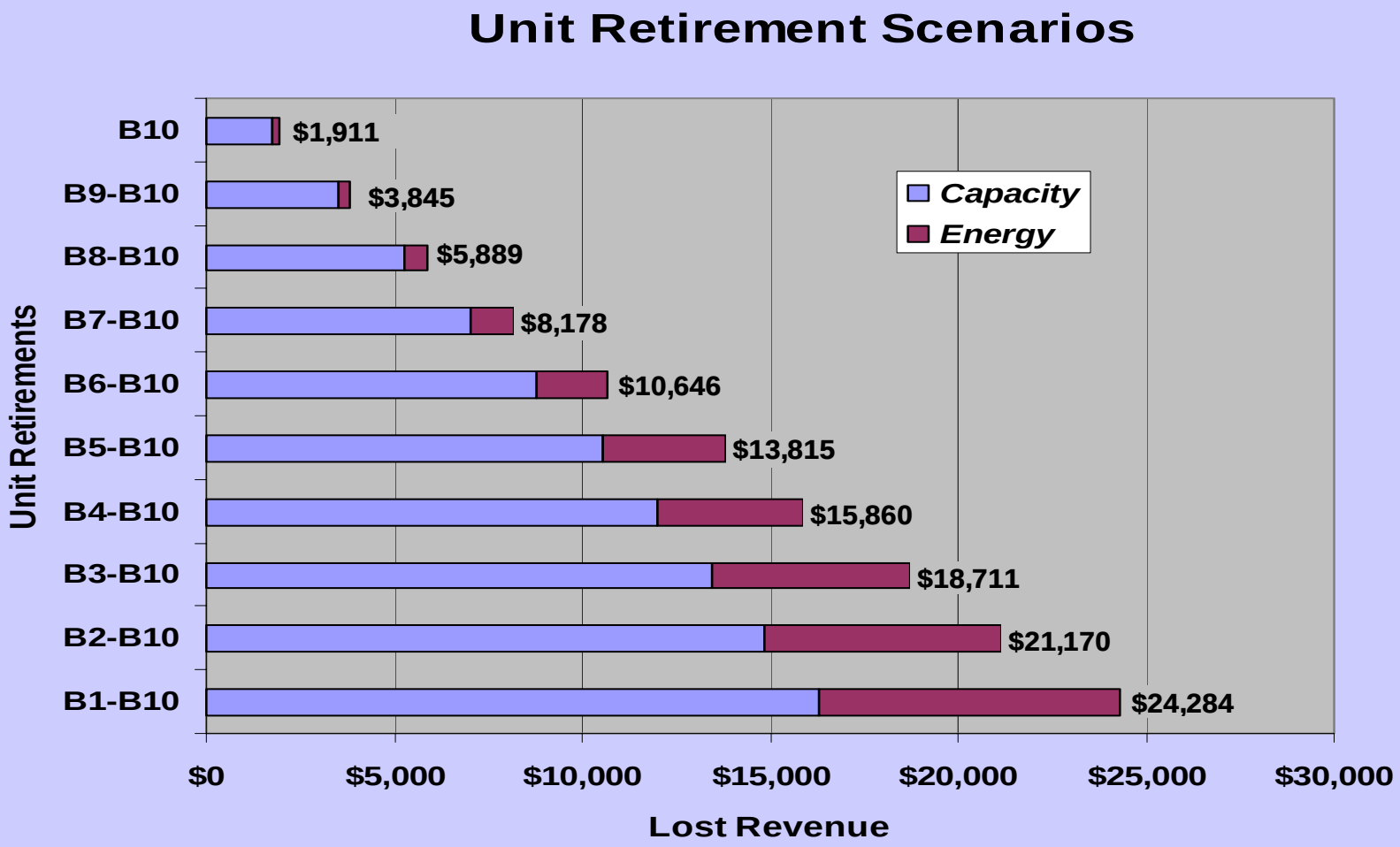


Upgrade Options for Phase 1b: AutoVista Results

Phase 1b: 1998 Hydrology, 31-15.5 kcfs Fish Release -- MWh Generation

	Case 1* Existing	Case 5P_K Units B1-B10		Case 5K_P Units B1-B10		Case 5P_P Units B1-B10		Case 5K_K Units B1-B10	
	Total MWh	Total MWh	Diff	Total MWh	Diff	Total MWh	Diff	Total MWh	Diff
Jan	244,715	249,559	4,844	248,079	3,363	246,998	2,283	250,680	5,965
Feb	258,402	264,817	6,415	263,090	4,687	261,784	3,382	266,091	7,689
Mar	257,463	262,035	4,571	260,611	3,147	259,055	1,591	263,294	5,830
Apr	145,995	146,508	513	146,605	610	145,356	(639)	146,723	729
May	273,767	280,937	7,169	279,202	5,435	277,735	3,968	281,998	8,231
Jun	269,811	277,465	7,654	275,590	5,779	274,325	4,514	278,514	8,703
Jul	238,906	243,461	4,555	242,154	3,249	240,837	1,931	244,492	5,586
Aug	217,648	221,204	3,556	220,218	2,570	219,152	1,504	222,111	4,463
Sep	172,228	173,602	1,374	173,435	1,207	172,103	(125)	174,029	1,801
Oct	166,145	166,895	750	166,982	837	165,617	(528)	167,146	1,001
Nov	183,299	185,061	1,761	184,750	1,450	183,092	(207)	185,588	2,289
Dec	219,981	223,892	3,912	222,816	2,836	221,654	1,674	224,699	4,719
Totals	2,648,361	2,695,436	47,075	2,683,532	35,171	2,667,709	19,349		57,005
Energy Value ($1,000)			$1,463		$1,090		$583		$1,783
Capacity Value ($1,000)			$778		$1,061		$872		$967
Total Value ($1,000)			$2,241		$2,151		$1,455		$2,750

Life Extension Program Benefits



Vista Differentiators

- Architecture -- Windows NT
- Open Architecture in Relational DB
- Simple RT database
- Less Maintenance and Support
- LT Functionality
- LT/ST Integration
- Operator Interaction
- Transaction Functionality
- Study Mode Functionality

Vista Summary

Facilitates Efficient Operations

Easy To Use

Detailed Decision Tool for Relicensing & Upgrade Studies

Operations Savings = 2 to 5 %

Transaction Savings = 5 to 25 %