



**PRELIMINARY AGENDA**  
**NW TRANSMISSION ASSESSMENT COMMITTEE (NTAC)**  
**February 9, 2006 – Portland, OR**  
**9:30 AM-3:30 PM – PDX Conference Center**

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- |   |                           |
|---|---------------------------|
| <b>1. Introductions, Arrangements, and Agenda Changes</b> | Chris Reese, PSE, Chair   |
| <b>2. Meeting Notes – December 13<sup>th</sup>, 2005</b>  | Dana Reedy, NWPP          |
| <b>3. TPC Screening Study Effort</b>                      | Jeff Miller/Marv Landauer |
| <b>4. Current Western Interconnection Study Efforts</b>   |                           |
| <b>a. WECC/SSG-WI</b>                                     | Jeff Miller               |
| <b>b. DOE – Western Proposal Congestion Study</b>         | Chris Reese               |
| <b>5. Path and Resource Integration Studies</b>           |                           |
| <b>a. SW/NE Oregon Wind Integration Study</b>             | Chris Reese               |
| <b>b. Can-NW-Cal Integrated Study</b>                     | Marv Landauer             |
| <b>c. South King County Study</b>                         | John Phillips             |
| <b>6. Northwest Hydro System Model</b>                    | John Fazio                |
| <b>7. BPA Wind Forecasting and Hydro Modeling</b>         | Rebecca Berdahl           |
| <b>8. Other Topics</b>                                    | All                       |
| <b>9. Next Meeting, Location</b>                          |                           |



*Northwest Transmission Assessment Committee Meeting  
February 9, 2006 – Portland, OR*

*Attendance List*

	<i>Name</i>	<i>Company</i>	<i>Phone Number</i>	<i>Email</i>
1	Berhanu Tesema	BPA-T	360. 619-6654	<a href="mailto:bktesema@bpa.gov">bktesema@bpa.gov</a>
2	Mahta Boozari	Powerex	604. 895-7046	<a href="mailto:mahta.boozari@powerex.com">mahta.boozari@powerex.com</a>
3	Jim Polvi	SBP-ZE	604. 244-1469	<a href="mailto:j.polvi@ze.com">j.polvi@ze.com</a>
4	Kenneth Dillon	PGE-T	503.464-7400	<a href="mailto:kenny.dillon@pgn.com">kenny.dillon@pgn.com</a>
5	Roger Hamilton	West Wind Wires	541. 686-4839	<a href="mailto:hamilton.roger@comcast.net">hamilton.roger@comcast.net</a>
6	Jeff King	NWPCC	503. 222-5161	<a href="mailto:jking@nwcouncil.com">jking@nwcouncil.com</a>
7	Dana Reedy	NWPP	503. 464-2806	<a href="mailto:dana@nwpp.org">dana@nwpp.org</a>
8	Marv Landauer	BPA	503. 230-4105	<a href="mailto:mjlandauer@bpa.gov">mjlandauer@bpa.gov</a>
9	Chris Reese	Puget Sound Energy	425. 462.3055	<a href="mailto:chris.reese@pse.com">chris.reese@pse.com</a>
10	Francis Tong	TPWR	253. 502-8262	<a href="mailto:ftong@cityoftacoma.org">ftong@cityoftacoma.org</a>
11	Scott Waples	Avista	509. 495-4462	<a href="mailto:scott.waples@avistacorp.com">scott.waples@avistacorp.com</a>
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14	Amir Amjadi	BCTC	604. 699-7351	<a href="mailto:famarz.amjadi@bctc.com">famarz.amjadi@bctc.com</a>
15	Franklin Lu	SCL	206. 684-3736	<a href="mailto:franklin.lu@seattle.gov">franklin.lu@seattle.gov</a>
16	John Martinsen	Snohomish County PUD	425.783-4327	<a href="mailto:jdmartinsen@snopud.com">jdmartinsen@snopud.com</a>
17	Kurt Granat	PAC	503. 813-5744	<a href="mailto:kurt.granat@pacificorp.com">kurt.granat@pacificorp.com</a>
18	Jeff Miller	PAC	503. 813-5067	<a href="mailto:jeffrey.miller@pacificorp.com">jeffrey.miller@pacificorp.com</a>
19	Jim Eden	PGE-PS	503. 464-7031	<a href="mailto:jim.eden@pgn.com">jim.eden@pgn.com</a>
20	Rebecca Berdahl	BPA-PBL	503. 702-9939	<a href="mailto:rmberdahl@bpa.gov">rmberdahl@bpa.gov</a>



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*Attendance List*

	<i>Name</i>	<i>Company</i>	<i>Phone Number</i>	<i>Email</i>
21	Mary Johannis	BPA	503. 230-3047	<a href="mailto:mhjohannis@bpa.gov">mhjohannis@bpa.gov</a>
22	Francis Halpin	BPA	503. 230-7545	<a href="mailto:fjhalpin@bpa.gov">fjhalpin@bpa.gov</a>
23	John Pease	BPA	503. 230-3299	<a href="mailto:jhpease@bpa.gov">jhpease@bpa.gov</a>
24	John Fazio	NWPCC		
25				
26				
27				
28				
29				
30	<i>Phone:</i>			
31	Gordon Dobson-Mack	Powerex		
32	Bill Hosie	TCPL & Northern Lights		
33	Rod Lenfest	SBP-RTS		
34	Hugh Nguyen	PSE		
35				
36				
37				
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39				
40				

Proposal for Future Screening for TPC  
January 2006

- Continue screening effort in 2006
- Footprint to include TPC member systems in BC, AB, WA, OR, ID, MT, WY, UT.
- Run cases in 3-5 and 8-10 year out timeframe, normal winter and summer, - EH studies in alternate years (start in 2006)
- Coordinate with NERC/WECC compliance as much as possible
- Incorporate as much of the following as possible
  - Refine N-2 list
  - Refine A/R lists, thermal and voltages
  - Incorporate individual utility criteria for minimum voltage if possible
  - Develop RAS lists, outage notes
- If members do not want to participate in screening, need participation in basecase update process.
- Case changes should be updates (change files, not wholesale model changes)
- NWPP to start with management of overall process, move toward actually running studies
  - NWPP staff to assemble list of contact people from TPC members for the screening process this year
- Ultimate product is document that lists the problem areas and the utilities that are working to correct them. A “NW Plan” that includes projects utilities are committed to building should also be collected and posted to start the screening process each year.

Annual Schedule:

Start process: <ul style="list-style-type: none"> <li>• review basecases</li> <li>• collect system Plans from utilities</li> </ul>	January
Update cases, outages, A/R	February
Run outages and share raw results	March
Utilities screen their results	April
Share final results, identify problem responsibility	May
Document identified problems in report	June

**Draft Agenda for PNWER Resource/Transmission Planning Mini-Conference; Portland, Oregon -- May 1 – 2  
(As of February 8, 2006)**

	<b>Monday, May 1</b>		<b>Tuesday, May 2</b>
<b>7:30am</b>	Breakfast/Registration	<b>7:30am</b>	Breakfast/Registration
<b>8:30am</b>	<b>Resource/Transmission Planning Cycles</b> Potential Speaker: Brian Silverstein	<b>8:30am</b>	<b>Energy Policy Act</b> Speaker 1: DOE or FERC Speaker 2: Multi-State Compact
<b>9:00am</b>	Breakouts by Affinity Group to discuss policy recommendations	<b>9:00am</b>	Breakouts by Affinity Group to discuss policy recommendations
<b>10:20am</b>	Break	<b>10:20am</b>	Break
<b>10:30am</b>	Breakouts by Jurisdiction to discuss policy recommendations	<b>10:30am</b>	Breakouts by Affinity Group to discuss policy recommendations
<b>12:00pm</b>	Lunch	<b>12:00pm</b>	Working Lunch by Jurisdiction
<b>12:30pm</b>	<b>Regional Resource Planning</b> Speaker 1: Examples Speaker 2: Why we need a Regional Aggregated Resource Plan		
<b>1:00pm</b>	Breakouts by Affinity Group to discuss Regional Resource Planning	<b>1:00pm</b>	Breakouts by Jurisdiction to discuss policy recommendations
<b>2:00pm</b>		<b>2:30pm</b>	Plenary Session – Report Back
<b>3:00pm</b>		<b>3:30pm</b>	Briefing on Canadian Resources
<b>4:00pm</b>	Plenary Session - Report Back Initial Recommendations	<b>4:00pm</b>	Wrap-up/Next Steps
<b>5:00pm</b>	Evening Reception	<b>5:00pm</b>	Dinner for Board Members
<b>6:00pm</b>		<b>6:00pm</b>	

**Affinity Groups:** Resource Planners, Transmission Planners, Policymakers, Regulators, Siting Officials, Organizational Representatives (WGA, etc.)

**Jurisdictions:** Montana, Idaho, Oregon, Washington, Alaska, British Columbia, Alberta, Yukon

**Draft Agenda for PNWER Resource/Transmission Planning Mini-Conference; Portland, Oregon -- May 1 – 2  
(As of February 8, 2006)**

Potential Attendees

Resource Planners (20)

Transmission Planners (20)

Energy Chairs Task Force (15)

Regulators (10)

Siting Officials (5)

Outreach Officers (5)

Organizational Representatives (10)

Others (25)

Total = 110

Breakouts by Group = 7

Breakouts by Jurisdiction = 8

**NW Wind Projects from Interconnection Requests**

BPA Project Location		Size (MW)	Max MW	County	Comments	Bus	Opportunity Factor	Wind Zone	Congestion Bubble
Columbia - Covington 230 kV near Cle Elum	Wild Horse-PSE	240MW	240		Connects to PSE/Grant system PSE 2006 Project	Wanapum 230		Ellen's Burg	Mid Columbia
Columbia - Covington 230kV, west of Ellensburg	Kittitas Valley	160MW	160		May connect to PSE system	Columbia 230		Ellen's Burg	Mid Columbia
Columbia - Covington 230kV, east of Ellensburg	Desert Claim	250MW	250		May connect to PSE system	Columbia 230		Ellen's Burg	Mid Columbia
<b>Total Mid-Columbia</b>			<b>650</b>						
McNary-Badger Canyon 115kV	Nine Canyon	65MW	65		65MW Online, 35MW Belly Up	McNary 115		65 Stataline	McNary
McNary-Santiam 230kv	Leaning Juniper	200MW	200		2005 project for interconnection	Dalreed 230		Slatt	McNary
N. Lewiston - Walla Walla 115kV line	Hopkins Ridge (PSE)	150MW	150		2005 project for interconnection-PSE	WalaWala 115		150 Hopkins	McNary
McNary-Santiam 230kv line	Arlington CEP	200MW	400		2005 project for interconnection (400 MW)	Dalreed 230		Slatt	McNary
Walla Walla - Freewater 69kv line	Combine Hills II	64 MW	64		2005 project for interconnection	WalaWala 69		Stataline	McNary
McNary-Santiam 230kV line No. 1, near Slatt		200MW	200			Dalreed 230		Stataline	McNary
McNary-Santiam 230kV line No. 1, near Slatt	Willow Creek	180MW	180			Dalreed 230		Slatt	McNary
Dalreed Substation, 34.5kV	PAC Interconnection	85	85	Gilliam	In Progress	Dalreed 34.5		Slatt	McNary
Walla Walla - Dry Creek, 230kV	Hopkins Ridge (PAC)	200	200	Columbi	In Progress	Walla Walla 230		Hopkins	McNary
Wallula Substation, 230kV	Stataline Expansion	160	160	Walla W	In Progress	Wallula Substation 230		Stataline	McNary
<b>Total for McNary</b>			<b>1704</b>						
Slatt 500kV w/New 230kV yard	Shepards Flat	250MW / 1000MW	1000		Total site may develop 1000MW's	Slatt 500		Slatt	Slatt
<b>Total for Slatt</b>			<b>1000</b>						
Wautoma-John Day 500 near Goldendale	Goodnoe Hills	150MW	150		2005 project for interconnection	Rock Creek 500		Klondike	Wautoma
Wautoma-John Day 500	White Creek	200MW	200			Rock Creek 500		Slat	Wautoma
<b>Total for Wautoma</b>			<b>350</b>						
John Day 500kv w/New 230kV yard	Sherman County	600MW	600		Dalreed 230kV may be Point of Receipt for 300 MW of this	John Day 500		klondike	JohnDay Big Eddie
Klondike PH 3/4, Le Ecole John Day 230	Klondike 3	200 / 300MW	300			John Day 500		klondike	JohnDay Big Eddie
Big Eddy-Midway 230 kV, near BE		80MW				BigEddy1 230		klondike	JohnDay Big Eddie
DeMoss 115kv Bus	Klondike I,II	100MW	100		2005 project for interconnection	Big Eddy 115		klondike	JohnDay Big Eddie
Midway - North Bonn 230kv near Underwood	Saddleback	70MW	70			Bonnville 230		klondike	JohnDay Big Eddie
Midway - Big Eddy 230kV line	Big Horn	200MW	200		2005 project for interconnection	BigEddy1 230		klondike	JohnDay Big Eddie
The Dalles - Hood River 115kV line	Seven Mile Hill	UPC Wind Part #116	50		2005 project for interconnection	Hood Rvr 115		klondike	JohnDay Big Eddie

List of Wind Projects Request in BPA OASIS Interconnection Queue as of December 2004

New line to Big Eddy 230kV	Columbia Hills	125MW	125		BigEddy3 230		
New line to Big Eddy 230kV	White Creek	200MW	200		BigEddy3 230	klondike	JohnDay Big Eddie
<b>Total for John Day/Big Eddy</b>			<b>1645</b>				
<b>Oregon/Washington Total</b>			<b>5349</b>				
Minidoka-Wendover / East Hills 138kV lines		100/200MW	200	NV-UT-Idaho border	Minidoka 138		
Goshen Substation, 161kV		200	200	Bonnevi	In Progress		Utah
Goshen-Rigby line, 69kV		20	20	Bonnevi	In Progress		
<b>Southern Idaho Total</b>			<b>420</b>				
<b>Grand Total</b>			<b>5769</b>				

PacifiCorp Project Location	Size (MW)	Max MW	County	Comments -Excluded "In Service"
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Long Hollow Switching Station, 138kV	200		Uinta	In Progress	
Sigurd - Parowan Line, 230kV OR Cameron - West Cedar Line,	200		Iron	In Progress	
Brady - Treasureton Line, 230kV	150		Power	In Progress In Progress -assumed to duplicate deactivated	
Naughton-Ben Lomand 230kV	300		Lincoln	project	
<b>Utah Total</b>	<b>850</b>				
Emery - Camp Williams Line, 345kV	890		Utah	Deactivated	
Long Hollow Switching Station, 138kV	101		Uinta	Deactivated	
Difficulty - Miners Line, 230kV	300		Carbon	Deactivated	
Cameron Substation, 138kV	200		Beaver	Deactivated	
Coleman - Gateway Line, 69kV	100		Washing	Deactivated	
<b>Total "Deactivated"</b>	<b>1,591</b>				
<b>Grand Total PacifiCorp</b>	<b>2,441</b>				
<b>Assumed to be a PacifiCorp duplicate</b>				<b>Not included in total</b>	<b>Not included in total</b>
Naughton - Birch Creek, 230kV	300		Lincoln	Deactivated	Deactivated
<b>PAC Total OR, WA &amp; ID (part of PAC "Grand Total")</b>	<b>815</b>				
<b>Total OR, WA &amp; ID (BPA plus PAC)</b>	<b>#REF!</b>				

# NW Hydroelectric Models and Wind



# Topics



NW Hydro Models



Rule Curves



Non-power Constraints



Genesys Model



Wind Integration with Genesys

# Three Monthly Hydro Models

- **Hydro Simulator Program (HYDSIM)**  
Bonneville Power Administration  
NW Power and Conservation Council
- **Hydro System Seasonal Regulation (HYSSR)**  
Corps of Engineers
- **PNCA Seasonal Regulation (HYDREG)**  
Northwest Power Pool

# Common Elements

- Simulate the hydroelectric operation over 14 periods per year (split April and August)
- Share hydroelectric project data
- Share historical stream flow and irrigation data
- Share flood control data

# HYDROSIM - BPA

- Columbia River Treaty (Coordination with the Canadian Operation)
- White Book (NW Loads and Resources)
- EIS (Environmental Impact Statement)
- Biological Opinion (Endangered Species)
- Long-term resource planning

# HYSSR - Corps

- Columbia River Treaty (Coordination with the Canadian Operation)
- Flood Control Development
- EIS (Environmental Impact Statement)
- Biological Opinion (Endangered Species)
- Evaluation of System Changes (new storage, revised irrigation withdrawals, etc.)

# HYDREG - PNCA

- Power Pool Operating Program
- Critical Period Evaluation
- Firm Energy Load Carrying Capability
- Headwater Benefits
- Each Party's Rights and Obligations

# Other Models

- **HOSS – BPA hourly hydro simulation**
  - Federal hydro system only
  - No transmission
- **GridView – ABB**
  - Includes west-wide transmission
  - Hourly simulation
  - Poor NW hydro algorithm

# Other Models

- **Supply Adequacy Model – CEC**
  - Includes west-wide transmission
  - Hourly simulation
  - Poor NW hydro algorithm
- **SDDP – PSRI**
  - Includes west-wide transmission
  - Hourly simulation
  - Good NW hydro algorithm
  - Not yet complete

# Rule Curves

- Elevations at each reservoir to guide the operation
- Specify the highest and the lowest elevation for a reservoir
- Intermediate rule curves help determine which projects release water first when energy is needed

# Rule Curves

## ➤ **Flood Control - Ceiling**

- Defines the drawdown required to assure adequate space to store the anticipated runoff without causing downstream flooding.

## ➤ **Critical Rule Curve - Floor**

- Defines how deep a reservoir can be drafted in order to meet the firm energy requirements during the poorest water conditions on record.

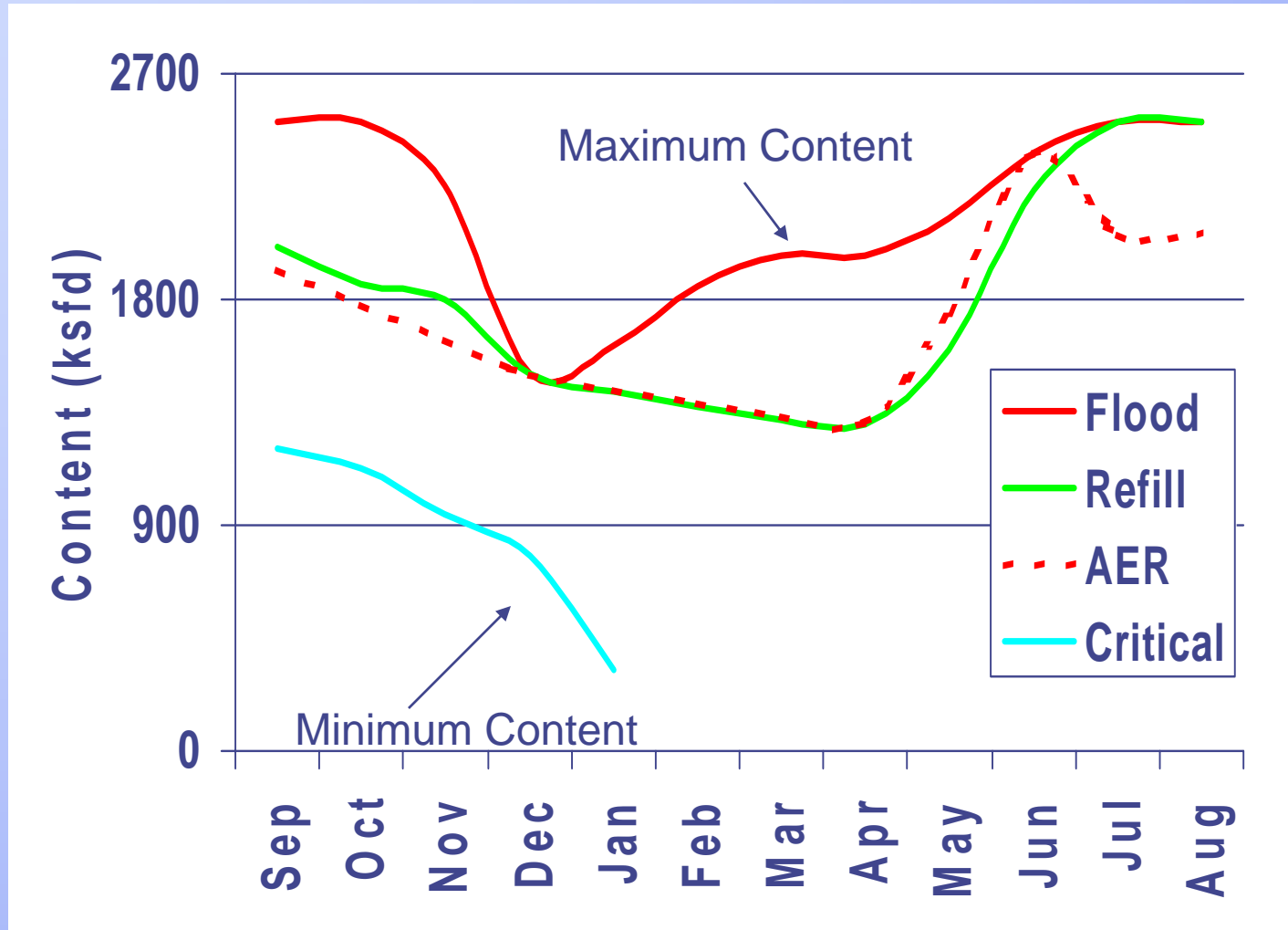
# Rule Curves

- **Assured Refill Curve**
  - Represents the elevation from which the reservoir could refill given water conditions that occurred in 1931.
- **Variable Refill Curve (Energy Content Curve)**
  - Represents the elevation from which the reservoir could refill given current water conditions.

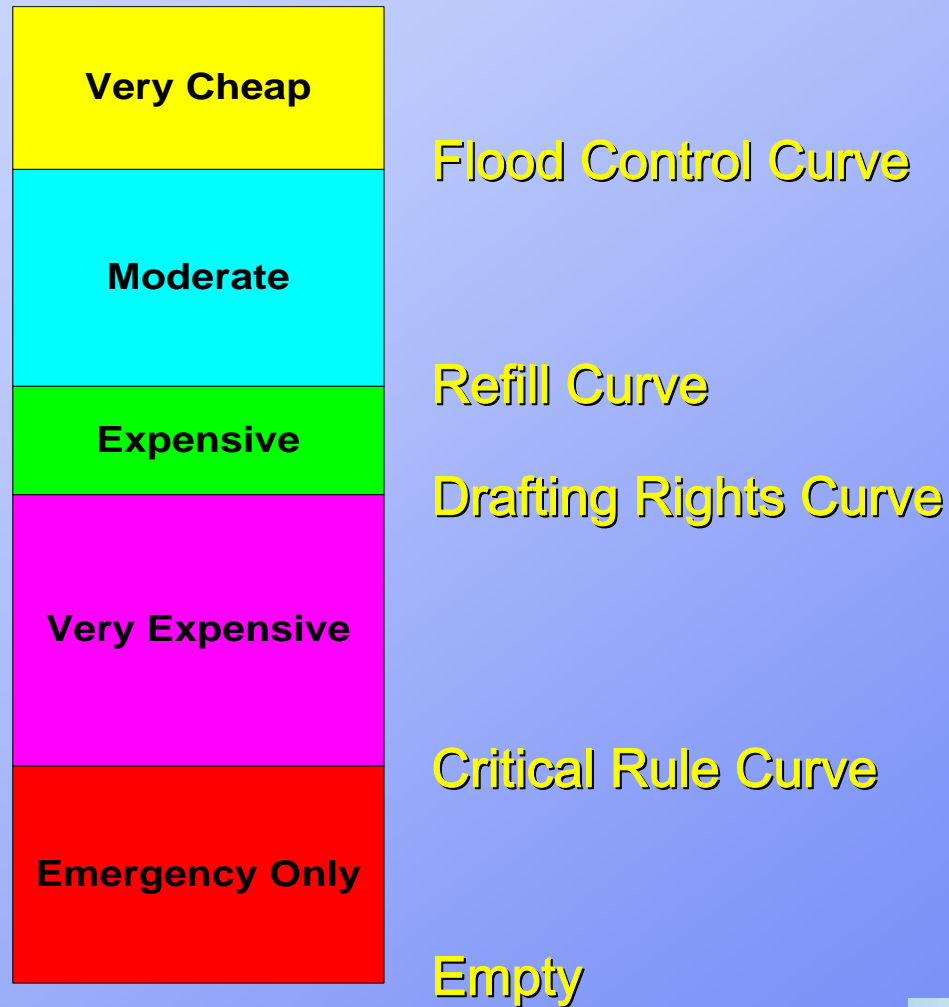
# Rule Curves

- **Actual Energy Regulation (AER)**
  - Defines how deep a reservoir can be drafted in order to meet the firm energy requirements during the current water conditions.
- **Proportional Draft Point (PDP)**
  - Same as the AER above.

# Rule Curves



# Value of Water in Storage



# Non-Power Constraints

- Physical limits (i.e. top & bottom of dam)
- Maximum flow due to channel restriction
- Maximum elevation for flood control
- Maximum flow due to rate of draft limit
- Operational minimum & maximum flow rate
- Operational minimum elevation
- Water budget flow target
- Spill level

# GENESYS Northwest



- A PC based program, incorporating HYDSIM
- Performs stochastic (probabilistic) studies, with random:
  - Water conditions
  - Temperature (and corresponding demand)
  - Thermal forced outage
- Can simulate on an hourly basis

# GENESYS Northwest



- Computes Loss-of-load probability (LOLP)
- Assesses changes in the physical operation of the hydro system
  - Energy production
  - Reservoir elevations
  - River flows

# Wind Integration using Genesys

- Hourly hydro simulation uses composite system
- Hourly wind generation can be input for east and west bubbles
- Simulation will use available hydro flexibility
- Results will show difference in hydro and thermal dispatch

# Possible Genesys Enhancements

- Link wind generation to water years and temperatures
- Make wind generation a random variable
- Add a more direct operational link between wind and hydro