

## WESTERN ELECTRICITY COORDINATING COUNCIL

### UNSCHEDULED FLOW REDUCTION PROCEDURE

The combination of scheduled and unscheduled flows on a Transfer Path may exceed the transfer capability of that Transfer Path. This Unscheduled Flow Reduction Procedure (USF Reduction Procedure) will be utilized to reduce the Unscheduled Flows (USF) across a constrained Qualified Transfer Path. The USF Reduction Procedure has the following parts:

1. Transfer Path Qualification
2. Transfer Path Requalification
3. Transfer Path Deletion
4. Actions Required Following Addition of a New Qualified Transfer Path
5. Controllable Device Qualification
6. Controllable Device Deletion
7. Accommodation Limits
8. General Terms
9. General Action Rules
10. Action Steps
11. Further Action
12. Term

This USF Reduction Procedure addresses the actions which are required by all Members. This USF Reduction Procedure recognizes the effectiveness of coordinated control and operation of the Qualified Controllable Devices installed within the **WECC** systems. It is subject to review for its effectiveness (Section 13 of the Plan) and modification as provided in Section 5.2 of the Plan.

When a Qualified Transfer Path is constrained by USF, the Transfer Path Operator will notify all Members via the **WECC** communications system, and Members will take actions as required by this USF Reduction Procedure to reduce the effects of USF across the Qualified Transfer Path. Where Schedule adjustments are required by this USF Reduction Procedure, it is the responsibility of the Member who is a Receiver to determine if any mitigation steps are required, and if so, to initiate appropriate actions. If the ultimate Receiver is not a Member, then the scheduling change administration responsibility shall belong to the Member most closely associated with the Schedule to the non-Member.

This USF Reduction Procedure is not intended to be prescriptive with regard to which Schedules are to be adjusted to effect the required USF Accommodation or Schedule reduction. Rather, when actions are required to reduce the effects of USF, it is expected that each Member will select the most appropriate Schedule reduction which will satisfy the intended accommodation and curtailment responses required by this USF Reduction Procedure.

Terms which are initially capitalized in this USF Reduction Procedure refer to defined terms in the WSCC Unscheduled Flow Mitigation Plan.

1. Transfer Path Qualification

Requests for Transfer Path qualification shall be made directly to the UFAS. To qualify a Transfer Path under this Plan, a Transfer Path Operator must specify the applicable direction and provide documentation to satisfy the requirements for qualification set forth below:

- a. The Transfer Path must be a transmission element or elements across which:
  - i. A Schedule (MW) can be established,
  - ii. Actual Flow (MW) is metered, and
  - iii. Maximum Transfer Limit has been established and published in WECC Planning Coordination Committee or WECC Operating Committee documents.
- b. An historical record exists to document that:
  - i. for at least 100 hours in the most recent 36 months, Actual Flow across a Transfer Path (MW) has exceeded 97 percent of the Maximum Transfer Limit in MW, and at the same time
  - ii. energy Schedules were curtailed because of USF.
- c. The prospective Transfer Path Operator will be expected to make a presentation to the UFAS explaining how the Maximum Transfer Limit was determined and how the historical Actual Flow and/or Schedule curtailment records were obtained.
- d. An incremental matrix for the current operating season and applicable to the proposed Transfer Path confirms that a feasible combination of Schedules between Sender and Receiver can create USF across the Transfer Path whose sum is equal to or greater than five percent of the Maximum Transfer Limit.
- e. After the UFAS has reviewed the documentation and presentation, a recommendation will be forwarded to the WECC Operating Committee. The Transfer Path Operator may be requested to make a presentation to the WECC Operating Committee.
- f. A Transfer Path is normally qualified for USF reduction in only one direction. The Transfer Path may be qualified for USF reduction in both directions, but supporting data must be provided for each direction.

2. Transfer Path Requalification

If there is a change in the Maximum Transfer Limit for an existing Qualified Transfer Path or the addition of a Controllable Device in the Qualified Transfer Path, the Transfer Path Operator shall make a presentation to the UFAS so that the UFAS can determine if requalification of the Qualified Transfer Path is necessary.

3. Transfer Path Deletion

If there have been no Schedule reductions or USF Accommodations and the Actual Flow across a Qualified Transfer Path has not exceeded 97 percent of the Maximum Transfer Limit for the most recent 36 months, the UFAS shall make a determination as to whether the WECC system configuration has been altered sufficiently so that USF Schedule reductions or USF Accommodation on the Qualified Transfer Path would no longer be expected. An affirmative finding of the UFAS and approval by the WECC Operating Committee will be required to delete a Qualified Transfer Path.

4. Actions Required Following Addition of a New Qualified Transfer Path

- a. A new Transfer Path will be added to the list of Qualified Transfer Paths, attached as Exhibit A, upon approval of the WECC Operating Committee.
- b. Owners of facilities making up a Qualified Transfer Path will designate a Transfer Path Operator.
- c. Incremental power flow matrices will be prepared for the current summer and winter seasons based on appropriately modified operating base cases for each Qualified Transfer Path and provided to the WECC Operating Committee members. The matrices will be based on an incremental schedule of 100 MW and express results in units of MW (equivalent to percent of individual Schedule). They will be used to determine the magnitude of each Contributing Schedule's contribution to USF. A "Contributing Schedule" is defined as the net Schedule between individual Senders and Receivers that contributes USF across a Qualified Transfer Path in the same direction as the Actual Flow across that Qualified Transfer Path.
- d. The effectiveness factors and compensation for the Qualified Controllable Devices will be recalculated.

5. Controllable Device Qualification

- a. Any Member wishing to qualify a Controllable Device to receive compensation for coordinated operation under the Plan shall present a plan for coordinated operation to the UFAS. This plan should include the following elements:

- i. The procedures developed to ensure that adequate communication and coordination occurs between the Member’s Controllable Device and other Qualified Controllable Devices to achieve the desired coordination,
    - ii. A demonstration that by adding the Member’s Controllable Device to the overall coordinated Controllable Device control strategy, using the Controllable Devices Compensation Methodology (Attachment 3), the proposed Controllable Device will reduce USF:
      - (1) by an average over all of the then Qualified Transfer Paths of at least one percent of the respective Qualified Transfer Path limits, (which corresponds to average percent control of 6.7 percent in Table 1 of Attachment 3), and
      - (2) for more than half of the Qualified Transfer Paths, by at least one percent of each of the respective Qualified Transfer Path limits.
  - b. After the UFAS has reviewed the documentation and presentation, it will make a recommendation to the WECC Operating Committee. Upon approval by the WECC Operating Committee, the proposed Controllable Device will be added to the list of Qualified Controllable Devices.
6. Controllable Device Deletion
- a. A Qualified Controllable Device shall be considered by UFAS for deletion from the list of Qualified Controllable Devices if the Controllable Device is no longer capable of reducing USF over all of the then Qualified Transfer Paths by the criteria specified in Section 5.a above. Approval of the Operating Committee will be required to delete a Controllable Device. The Controllable Device will no longer be required to participate in coordinated operation. However, its continued participation is encouraged.
7. Accommodation Limits
- a. During normal operating conditions when Actual Flow is not exceeding the Transfer Limit and desired Schedules are not being curtailed, the Qualified Transfer Path(s) will accommodate 100 percent of the USF.
  - b. During those times when there is or it is anticipated that there will be a scheduling limitation on a Qualified Transfer Path due to USF, the Transfer Path Operator and those scheduling across the Qualified Transfer Path are required to accommodate a minimum level of USF. Such USF Accommodation will be achieved by ensuring that the net Schedules across the Qualified Transfer Path are reduced below the then available Transfer

Limit by the following amount:

- i. The greater of 50 MW or
  - (1) during the first Plan Year, 10 percent of the Transfer Limit;
  - (2) during the second Plan Year, 7.5 percent of the Transfer Limit; or
  - (3) during the third and subsequent Plan Years, 5 percent of the Transfer Limit.
  
- c. If net Schedules are reduced below the Transfer Limit by the amounts specified above, then the Transfer Path Operator has met the USF Accommodation requirement and may request additional relief under the Plan, including coordinated operation of Qualified Controllable Devices, and Schedule curtailments by other Receivers who are scheduling across other Transfer Paths.
  
- d. It is intended that the Qualified Controllable Devices shall not be requested to operate in a coordinated manner in response to requests under this USF Reduction Procedure in excess of 4,000 hours per year, and if operation exceeds or is forecast to exceed that level, then the level of Transfer Path USF Accommodation shall be increased such that coordinated operation shall not exceed 4,000 hours annually. The UFAS shall monitor the coordinated operation of the Qualified Controllable Devices and recommend to the WECC Operating Committee adjustments to the level of USF Accommodation as needed to meet this objective.

## 8. General Terms

- a. All Members shall cooperate with the Transfer Path Operator by reducing Schedules as requested to achieve the appropriate reduction in USF. Schedule reductions required by this USF Reduction Procedure may be taken in either the Contributing Schedule, or any other Schedule, the reduction of which achieves the equivalent effect on reducing USF on the affected Transfer Path.
  
- b. Members having Controllable Devices, such as series capacitors, phase shifting transformers, and DC transmission lines shall cooperate with the Transfer Path Operator to the extent practical by using these elements to reduce USF across the constrained Qualified Transfer Path. Operation of such Controllable Devices shall be required where the Controllable Devices are being operated in a coordinated manner pursuant to the Plan. Operation of Controllable Devices (which are not Qualified Controllable Devices) shall be at the discretion of and consistent with the normal practice of the Member. Schedule reductions shall not be required by the Member to the extent that

controllable elements (which are not operated in a coordinated manner) are operated to achieve an equivalent reduction in USF across the constrained Qualified Transfer Path.

- c. To the extent that a Qualified Controllable Device is capable of operating to achieve Actual Flows through the Controllable Device equal to Scheduled Flows, such Schedules shall be deemed to be 100 percent effective through the Controllable Device, and thus shall be exempt from the Schedule reductions required under this USF Reduction Procedure.
- d. The WECC Staff will provide a summary of all qualified controllable elements which are being operated in a coordinated manner pursuant to the Plan, whenever a new Controllable Device is qualified pursuant to the Plan. This summary shall be provided to the WECC Operating Committee.

## 9. General Action Rules

- a. This procedure applies to all Members.
- b. The UFAS shall develop guidelines to enable the Transfer Path Operators to implement actions under this USF Reduction Procedure which will achieve the desired accommodation/control/curtailment results in the scheduling hour immediately following the request. Furthermore, these guidelines shall enable the Transfer Path Operators to make an initial request for any step in the procedure up through the NINTH STEP, provided however that the guidelines shall ensure that neither over-control nor over-curtailment shall be expected. Until such guidelines are developed, the following action limits shall apply:
  - i. The Transfer Path Operator may request actions through the FOURTH STEP in the first hour if experience indicates that such action will be needed to achieve the required reduction in USF.
  - ii. For requests beyond the FOURTH STEP, no more than three requests may be initiated in any clock hour. The notice must specify if this is an FIFTH, SIXTH, SEVENTH, EIGHTH, OR NINTH STEP request. The request must be transmitted to Members by at least 30 minutes prior to the hour to ensure implementation for the following Schedule hour.
- c. The Transfer Path Operator will verify, if possible, the magnitude of USF across the Qualified Transfer Path by checking adjacent metered and scheduled values prior to requesting any other Member to take actions under this USF Reduction Procedure.
- d. As to the actions to be taken in accordance with this Plan for each hour of a curtailment period, each Member shall promptly provide documentation of

all such accommodation, control or curtailment actions taken by its dispatchers or real-time schedulers, and in addition each Transfer Path Operator shall provide such documentation on such actions taken or not taken by others in response to its requests, to the WECC Staff following each curtailment period. Members' documentation shall use formats and reporting conventions developed and monitored by the WECC Operating Committee. The compiled information, including identification of Members who failed to adjust Schedules according to this USF Reduction Procedure, shall be promptly distributed to the WECC Operating Committee members.

- e. Operation of Qualified Controllable Devices will be monitored by the WECC Operating Committee for compliance with the Minimum Operating Reliability Criteria and the WECC Controllable Devices Coordinated Operating Procedure. Results will be distributed to the WECC Operating Committee members.
- f. The WECC Operating Committee shall monitor major loop USF in a minimum of four locations during hours in which any USF Accommodation or coordinated operation of the Qualified Controllable Devices or curtailments are occurring under this USF Reduction Procedure.
- g. The Transfer Path Operator and those scheduling across the constrained Qualified Transfer Path will continue to take actions necessary to reduce Actual Flow to a level at or below the Transfer Limit of the Qualified Transfer Path.
- h. Upon receipt of a curtailment request, Contributing Schedules which are subject to curtailments will be reduced (or equivalent alternative Schedule adjustments will be effected) in accordance with the following procedures:
  - i. Receivers of Contributing Schedules will initiate the requested Schedule reductions unless an otherwise agreed upon procedure for Schedule reduction achieving the equivalent effect on the Qualified Transfer Path is established by the Receiver and/or the Sender. If the ultimate Receiver is not a Member, then the curtailment administration responsibility shall first belong to the Member utility that has scheduling responsibility for the Receiver, and then to the Member utility that has control area responsibility for the Receiver.
  - ii. Members may arrange among themselves to make curtailments called for by this USF Reduction Procedure in a manner other than prescribed provided that the arrangements are as effective as the identified Schedule curtailment in reducing USF across the Qualified Transfer Path. Members may make bi-lateral arrangements which will enable a Member with Schedules on the affected Qualified Transfer Path to make the required curtailments in lieu of making larger curtailments in Schedules over other parallel paths. Where

alternative Schedule adjustments are utilized, it is the Receiver's responsibility to cause Schedule adjustments to be effected which provide the same reduction in flow across the Qualified Transfer Path as would have been achieved by the prescribed reduction in the Contributing Schedule.

- iii. The total amount of requested Schedule reduction may be apportioned to the applicable Schedules at the discretion of the Receiver subject to item iv below.
  - iv. Irrespective of the Schedules reduced or the manner in which they are reduced, each Member's overall net reduction in Actual Flow across the constrained Qualified Transfer Path must be equivalent to the reduction which would have been achieved had the identified Schedule reduction occurred as requested.
  - v. System dispatchers or real-time schedulers should identify in advance those Schedules that qualify for curtailment requests for all Qualified Transfer Paths. This will expedite implementation of this USF Reduction Procedure when requested.
  - vi. While this USF Reduction Procedure does not expect Receivers to curtail Schedules which would result in loss of firm load, nothing in this USF Reduction Procedure shall relieve the Receiver of the obligation to achieve the required reduction in USF across the constrained Qualified Transfer Path.
- i. In the event of a transmission system emergency on any Member's system, such Member may request coordinated operation of the Qualified Controllable Devices if such operation is reasonably expected to assist in relieving the emergency condition.

#### 10. Action Steps

- a. Action Taken by the Transfer Path Operator - Notification of Curtailment Period
  - i. The Transfer Path Operator shall advise the Members via the WECC communications system of a current or an impending curtailment period, and may request assistance in mitigating the curtailment using the following procedure:

The following actions shall become effective at the start of the next scheduling hour following the request.

- b. Action Taken by the Transfer Path Operator - Controllable Devices

- i. **FIRST STEP:** If the Qualified Transfer Path contains series connected Controllable Devices, such as series capacitors, phase shifting transformers, and DC transmission lines, these elements will be used to the maximum extent practical in reducing the USF across the constrained Qualified Transfer Path to a level at or below the Transfer Limit. Operations of such Controllable Devices shall comply with the WECC Minimum Operating Reliability Criteria.
  
- c. **Action Taken by the Transfer Path Operator - Accommodation**
  - i. **SECOND STEP:** USF across a Qualified Transfer Path will be accommodated up to the greater of 50 MW or 10 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 7.5 percent in the second Plan Year, and 5 percent in the third and subsequent Plan Years. USF Accommodation will be effected by the Transfer Path Operator causing the net Schedules across the Qualified Transfer Path to be reduced to not more than 90 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 92.5 percent in the second Plan Year, and 95 percent in the third and subsequent Plan Years. The Transfer Path Operator shall not be expected to reduce net Schedules across the Qualified Transfer Path in this step if they are already below the appropriate USF Accommodation level (90 percent, 92.5 percent, or 95 percent of the Transfer Limit).
  
- d. **Actions Taken by Controllable Device Owners**
  - i. **THIRD STEP:** At the request of a Transfer Path Operator, the Qualified Controllable Device owners shall operate their Controllable Devices in a coordinated manner so as to minimize the USF on the constrained Qualified Transfer Path, consistent with the WECC Minimum Operating Reliability Criteria. If the constraint persists, then;
  
- e. **Actions Taken by Others and the Transfer Path Operator - Curtailment of Schedules.**
  - i. **FOURTH STEP:** Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 50 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 20 percent reduction in the Contributing Schedule. Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 30 percent to 49 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as

would a 10 percent reduction in the Contributing Schedule. If the overload persists, then;

- ii FIFTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 20 through 29 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 10 percent reduction in the Contributing Schedule, and Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 30 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would an additional 5 percent reduction in the Contributing Schedule. If the overload persists, then;
- iii. SIXTH STEP: USF Accommodation on the Qualified Transfer Path will increase to the greater of 75 MW or 11 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 8.5 percent in the second Plan Year, and 6 percent in the third and subsequent Plan Years. Contributing Schedules will continue to be curtailed as described up through the FIFTH STEP. If the overload persists, then;
- iv SEVENTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 15 through 19 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 10 percent reduction in the contributing Schedule, and Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 20 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would an additional 5 percent reduction in the Contributing Schedule.
- v. EIGHTH STEP: USF Accommodation on the Qualified Transfer Path will increase to the greater of 100 MW or 12 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 9.5 percent in the second Plan Year, and 7 percent in the third and subsequent Plan Years. Contributing Schedules will continue to be curtailed as described up through the SEVENTH STEP. If the overload persists, then;
- vi. NINTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 10 to 14 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 10 percent reduction in the Contributing Schedule,

and Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 15 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would an additional 5 percent reduction in the Contributing Schedule.

11. Further Action

- a. The Transfer Path Operator and those scheduling across the constrained Qualified Transfer Path will continue to take actions necessary to reduce Actual Flow to a level at or below the Transfer Limit.
- b. The Transfer Path Operator and those scheduling across the Qualified Transfer Path may resume some Schedules as curtailment steps are taken by others provided the net Schedule remains at or below the amount that provides for USF Accommodation at the level specified above for the Qualified Transfer Path.
- c. The Transfer Path Operator must reconfirm the need to continue the present level of Schedule reductions via the WECC communications system every four hours by at least 30 minutes to the hour.
- d. The Transfer Path Operator must notify Members via the WECC communications system to reduce Schedule curtailments when the Actual Flow on the Qualified Transfer Path is reduced below 97 percent of its Transfer Limit or the USF Accommodation levels above are no longer being exceeded. Schedules should be resumed in the reverse order that Schedule curtailments were initiated. If conditions warrant, the Transfer Path Operator may notify all Members to cease all curtailments at any time.

12. Term

This procedure will remain in effect coterminous with the Plan.

Revised: 4-19-02

## WECC UNSCHEDULED FLOW PROCEDURE

### SUMMARY OF CURTAILMENT ACTIONS

Step	Action Description	Party(s) Affected	Unscheduled Flow Accommodation Across Path	Equivalent Percent Curtailment Required in Contributing Schedule -- Based on amount of Unscheduled Flow across Path				
				10-14%	15-19%	20-29%	30-49%	50+%
1	Operate Controllable Devices in Path	Controllable Devices in Transfer Path	NA					
2	Accommodation	Schedules Across the Path	50 MW or 5% of Maximum Transfer Limit					
3	Coordinated Operation of Qualified Controllable Devices	Qualified Controllable Devices	50 MW or 5% of Maximum Transfer Limit					
4	First Level Curtailment	Schedules in Other Paths	50 MW or 5% of Maximum Transfer Limit				10%	20%
5	Second Level Curtailment	Schedules in Other Paths	50 MW or 5% of Maximum Transfer Limit			10%	15%	25%
6	Accommodation	Schedules Across Path	75 MW or 6% of Maximum Transfer Limit			10%	15%	25%
7	Third Level Curtailment	Schedules in Other Paths	75 MW or 6% of Maximum Transfer Limit		10%	15%	20%	30%
8	Accommodation	Schedules Across Path	100 MW or 7% of Maximum Transfer Limit		10%	15%	20%	30%
9	Fourth Level Curtailment	Schedules in Other Paths	100 MW or 7% of Maximum Transfer Limit	10%	15%	20%	25%	35%

LIST OF QUALIFIED TRANSFER PATHS

<u>Path Code</u>	<u>Path Opr</u>	<u>Qualified Transfer Path</u>	<u>Qualifying Direction *</u>	<u>Path Transfer Capability-MW**</u>
66	CISO	California-Oregon Intertie Malin-Round Mt. 500-kV lines 1&2 Captain Jack-Olinda 500-kV line	CCW (north-south)	4800
15	CISO	Midway-Los Banos Midway-Los Banos 500 kV lines 1&2 Gates-Gregg 230 kV line Gates-Panoche 230 kV lines 1&2 Gates-McCall 230 kV line	CW (south-north)	3900
20	PAC	Path C transmission path Borah-Ben Lomond 345-kV line Brady-Treasureton 230-kV line Goshen-Fish Creek 161-kV line American Falls-Malad 138-kV line	CW (north-south)	675
21	APS	Arizona-California Interties Navajo-McCullough 500 kV line Moenkopi-Eldorado 500 kV line Palo Verde-Devers 500 kV line Palo Verde-North Gila 500 kV line Liberty-Mead 345 kV line Liberty-Parker 230 kV line Pinnacle Peak-Davis 230 kV line West Phoenix-Parker 230 kV line	CW (east-west)	5700
22	APS	Four Corners-Central Arizona Four Corners-Moenkopi 500-kV line Four Corners-Cholla 345-kV lines 1&2	CW (east-west)	2325
23	APS	Four Corners 345/500-kV Transformer with Four Corners Unit 5 out of service or at greatly reduced output	CW (low-high)	840
30	WACM	TOT 1A transmission path Hayden-Artesia-Vernal 138 kV Meeker-Rangely-Bonanza 138 kV Bears Ears-Bonanza-Mona 345 kV	CW (east-west)	550
31	WACM	TOT 2A transmission path Hesperus-San Juan 345 kV line Lost Canyon-Shiprock 230 kV line Durango-Shiprock 115 kV line	CW (north-south)	650

<u>Path Code</u>	<u>Path Opr</u>	<u>Qualified Transfer Path</u>	<u>Qualifying Direction *</u>	<u>Path Transfer Capability-MW**</u>
36	WACM	TOT 3 transmission path Laramie River-Ault 345-kV line Laramie River-Story 345-kV line Archer-Ault 230-kV line Sidney-N. Yuma 230-kV line Sidney-Sterling 115-kV line Cheyenne-Rockport 115-kV line	CW (north-south)	1605

\* Direction in which the Path is qualified to request Unscheduled Flow relief:  
 CCW = Counterclockwise direction  
 CW = Clockwise direction

\*\* These values are nominal. The actual value may change with system conditions.  
 Accommodation levels are based on the path transfer capability available at the time.