NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

February 24, 2010

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

RE: NERC Notice of Penalty regarding Turlock Irrigation District, FERC Docket No. NP10-18-000

Dear Ms. Bose:

On November 13, 2009, NERC submitted a Notice of Penalty regarding Turlock Irrigation District (TID) in the referenced proceeding. By this filing, the North American Electric Reliability Corporation (NERC), the Western Electricity Coordinating Council (WECC) and Turlock Irrigation District (TID) provide the following information in support of the pending Notice of Penalty.

The cause of the Westley-Walnut 230 kV line relay was a tree contact approximately eighteen miles from the Westley 230 kV substation. Following the tree contact, the Westley-Walnut 230 kV primary relaying scheme failed to operate because a communication switch was incorrectly toggled "off" at the Walnut Substation. This communication failure caused the back-up relaying scheme to operate and a mis-coordination between the Westley relay scheme for the Westley-Walnut 230 kV line and the Parker relay scheme for the Westley-Parker 230 kV line relays caused the Westley-Parker 230 kV line to open-end at Parker.

Specifically, TID has a switch at Walnut Substation that turns the permissive trip signal on and off. When the fault occurred the switch was in the incorrect position due to human error. Therefore, the Walnut Substation relay and the Westley relay did not communicate properly. Westley then held onto the fault and TID's relay cleared the fault. After TID's relay opened the Walnut breakers, the fault current seen by the Parker relay increased. Modesto Irrigation District's (MID's) back-up relay at the Parker substation sensed a ground fault and tripped before the relay at Westley could trip. If Westley had cleared the fault prior to the Parker breakers opening, the Parker-Westley line would not have open-ended. In conclusion, the relay at Walnut was unable to send a permissive trip signal because the switch was in the incorrect position; this caused the relays at Parker to mis-coordinate.

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TID and MID conducted testing on the Walnut-Westley line and discovered that the switch at Walnut was in the incorrect operating position. The switch has now been placed into the correct operating position and relabeled to prevent future mistakes. MID reviewed the relay settings and proposed changes at Westley, Parker, and Walnut to improve coordination. These proposed changes have now been implemented.

Sequence of Events

TIME (ESTIMATE) PST	EVENT DESCRIPTION
1353	Westley-Parker 230 kV line open-ended at Parker and Westley-Walnut 230 kV line relayed. MID's automatic load shedding scheme initiated, tripping approximately 81 MW of firm load. TID's automatic load shedding scheme initiated, tripping approximately 73 MW of firm load. Westley-Parker 230 kV line open-ended at Parker. Reports indicate the Westley-Walnut 230 kV line relayed due to vegetation in the line. 86 MW of load was interrupted, and MID reports 115 kV lines relayed.
1358	SOL overload begins on transformer banks. Actual flow exceeds transformer bank MVA limit.
1359	MID restored 15 MW of firm load (MID SCADA log indicates that 12 MW of load was restored at 1430).
1403	MID reports to Transmission Operator (TOP) that there is the possibility of shedding load to alleviate the overload.
1405	TID and MID confirm that Westley-Parker is open at Parker. MID attempted to close at Parker but unable to close due to the large phase angle.
1407	Balancing Authority (BA) notified Reliability Coordinator (RC) of the line outage and transformer bank SOL overload.
1415	Transformer banks reach maximum loading.
1416	MID notified TOP that there is no system overload.
1418	MID manually shed 35 MW of firm load. Transformer bank flow reduced but remains above the limit.
1422	TOP ordered MID to shed 50 MW of load. MID reports shedding 50 MW.

TIME (ESTIMATE) PST	EVENT DESCRIPTION
1436	BA ordered TOP to have MID shed an additional 35 MW of firm load for the transformer bank overload. MID reports to TOP will comply with order of 35 MW of load shed.
1438	RC instructed TID to shed 15 MW to assist unloading transformer banks. MID manually shed 22 MW of firm load.
1439	SOL violation ends on the transformer banks.
1442	RC inquired if TID had shed 15 MW of load. TID reported that 15 MW of generation had been increased. RC directed TID to also shed 15 MW of load.
1443	MID and TID de-energized the Westley-Parker 230 kV line and open-ended the Tracy-Westley 230 kV line in order to parallel at Westley.
1445	Westley-Parker 230 kV line returned to service. TID shed 20 MW of firm load.
1447	TOP notified MID to begin pick-up load.
1456	TID returned 20 MW of firm load.
1457	MID firm load restored.
1502	TID sent message reporting loss of the Westley-Walnut 230 kV line.
1506	TID firm load restored.
1527	RC declared EEA1 for TID.
1551	Westley-Walnut 230 kV line tested okay and returned to service.
1559	TID sent message reporting return of Westley-Walnut 230 kV line.
1600	RC sent message reporting termination of EEA1 for TID.

Based on coordinated investigation of the Westley Line Outages and Load Shedding, the following were among the conclusions and recommendations reached regarding the August 29, 2007 event, as detailed below.

Conclusion No. 1
The Balancing Authorities were operating within established NERC Reliability Standards and WECC Minimum Operating Reliability Criteria (MORC) at the time of the event.

Conclusion No. 2
Due to a lack of real-time telemetry, flows on the radial lines were used to determine loading levels.

Conclusion No. 3
Automatic load shedding schemes operated correctly, immediately mitigating transformer bank overloads and tie overloads.

Conclusion No. 4
Both MID and TID did not cut schedules to zero from Westley as this transmission path was open following the loss of the Westley-Walnut 230 kV line and the open-ending of the Westley-Parker 230 kV line at Parker.

Recommendation No. 4
The operating procedure for Westley will be modified, and the MID and TID operators will be trained regarding cutting schedules through Westley.

Conclusion No. 5
The schedules through Westley should have been cut immediately and replaced with an emergency assistance from the neighboring Balancing Authority.

Recommendation No. 5
An operating procedure for Westley will be created, and the MID and TID operators will be trained regarding emergency assistance for energy and transmission for this outage.

Conclusion No. 6
The MID operators reduced generation levels, resulting in additional load shedding which would have been significantly reduced or eliminated due to the incorrect readings from meter saturation.

Recommendation No. 6
MID will modify the monitoring point to read line totals instead of the metering towers.

Conclusion No. 7
The Westley-Walnut 230 kV line faulted to ground through vegetation in the right-of-way.

Recommendation No. 7
Clearances will no longer be estimated. During line inspections and after all right-of-way tree trimming operations, measured tree height will be the method used to determine Clearance 1 and Clearance 2 distances as per the TID Transmission Vegetation Management Plan.

Conclusion No. 8
The primary protection communication at the Walnut Substation was in the off position for the Westley-Walnut 230 kV line. When the vegetation contact occurred, the Walnut back-up scheme cleared the fault. The Parker back-up relay sensed the fault and tripped before the primary or back-up relays at Westley could clear the fault. With the protection communication

off, mis-coordination occurred between the Westley relay scheme for the Westley-Walnut 230 kV line and the Parker relay scheme for the Westley-Parker 230 kV line.

Recommendation No. 8
The relay maintenance procedure for Walnut will be modified and the TID technicians will be trained regarding the position of the protection communication switch at Walnut. TID and MID will review the relay settings to address coordination between Westley, Walnut, and Parker relays.

Please contact me if you have any questions.

Sincerely,

/s/ Rebecca J. Michael
Rebecca J. Michael
Assistant General Counsel for North American Electric Reliability Corporation