Site Detection Report on Status of Power Measurement Devices at Xiaogushan Hydropower Station (XHP)

Gansu Heihe Hydropower Development Company:

On August 28th, 2008, entrusted by Gansu Heihe hydropower Development Company, the Power Metering Center at Zhangye Power Grid Company fielded a site detection visit to Xiaogushan Hydropower Station (XHP) for the on site test of power meters installed on feeding circuit of 110 KV and 10KV transmission lines, and also carried out detections on the second voltage drop of 110KVPT. The following are the site test findings:

1. Situation of site calibration on power meter:

Classified by the size of installed capacity and the purpose of measurement, the metering devices to measure the electricity generation excluding electricity consumption at XHP fell into Category III type metering devices. Based on the relevant requirements in DL/T448-2000 “Technical administrative code of electric energy metering”, the accuracy for Category III power meters should be 1.0 or 2.0. But in view of the rapid progress of technology, higher accuracy level should be adopted at time of design. Therefore the accuracy level of EGaux meters in the plant was upgraded to 0.5. The power meters installed in the central

control room of XHP are all with type model DSSD51. They are one direction and 0.5 electronic multifunctional power meters. The accuracy of installed power meters is in compliance with the requirements in DL/T448-2000. Due to the operations situation, the calibration engineer could not carry out site check for the three power meters installed on 10KV bus, and must remove them and bring them to the experiment lab in the power metering center at Zhangye Power Grid Company. Except these three meters, all the other meters are measured and tested with satisfactory results.

2. Test situation of the PT second voltage drop:

According to the relevant requirements in DL/T448-2000 "Technical administrative code of electric energy metering", the error of second voltage drop of type III metering devices should not be greater than ±0.5. However, because the total length between the central control room and the second voltage circuit cable is 450m, which is comparatively long, the diameter of the line is 2.5mm^2, which is comparatively thin, the test result of the PT second voltage drop is quite high and beyond the range.

Based on the site test result of 110KV、10KV feeding circuit on electricity energy metering devices and the result of 110KVPT the second voltage drop, for the purpose of cross checking with the

meter readings from the trading meter of the grid company, Zhangye Power Grid Company suggests that Heihe Hydropower Development Company should consider taking the following measures: 1. to change the power metering devices on dual loops of line no. 1117 and 1118 between XHP and Heihe switchyard into bi-directional electronic multifunctional meters with the accuracy of 0.2; 2. According to the test result of the PT second voltage drop, in order to improve the accuracy, the location of auxiliary meters on dual loops of transmission line as line no.1117 and 1118 should be moved from the central control room to the 110KV step up station.

The above are the report and suggestions based on the site test of the power metering devices on the feeding circuit of 110 KV and 10KV transmission lines at XHP. They are put forward for Gansu Heihe Hydropower Development Company's consideration and reference.

Power Metering Center

Zhangye Power Grid Company

September 5, 2008

关于黑河水电开发有限公司小孤山水电站电能计量装置现场检测情况报告

黑河水电开发有限公司：

2008年8月28日应黑河水电开发有限公司委托，由张掖供电公司电能计量中心对小孤山水电站110KV、10KV各馈路电能计量装置分别进行电能表现场测试及110KVPT二次压降测试工作，现将现场检测情况报告如下：

1、电能表现场校验情况：

依据小孤山水电站各台发电机装机容量，可划分为III类计量装置。根据DL/T448-2000《电能计量装置技术管理规程》有关要求，III类计量装置应配电能表精度等级为1.0或2.0，但随着技术的进步，设计单位在设计时采用了更高精度等级的表具，故小孤山电站将精度等级提高为0.5级。小孤山水电站主控制计量屏中安装的电能表，全部都是DSSD51型，单方向、0.5级多功能电子式电能表，所配置的电能表等级符合DL/T448-2000有关规定。因现场当时设备运行情况，现场校验工作人员无法对10KV母线三块电能表进行现场校验，需拆除在张掖供电公司电能计一量中心电能表试验室进行检定外，其余表计现场测试合格。（见电能表现场测试记录）

2、PT二次压降测试情况：

根据DL/T448-2000《电能计量装置技术管理规程》有关

要求，III类计量装置 PT 二次压降测试误差不应大于±0.5，但由于从小孤山主控制室到110KV开关站二次电压回路电缆总长度为450米，线径为2.5mm²，由于二次电缆线较细、长度较长，致使PT二次压降较大，超出误差范围。（见PT二次压降测试记录）

依据张掖供电公司电能计量中心对小孤山水电站110KV、10KV 各馈路电能计量装置电能表现场测试及110KVPT二次压降测试的情况，虽然基本符合DL/T448-2000有关规定，为满足与电站关口表复核监测数据的目的，建议黑河水电开发有限公司进一步提高电能计量的精度，对小孤山水电站有关电能计量装置进行如下改进：1、对小孤山水电站小黑1117和小黑1118双回线计量表计更换为0.2级、双方向多功能电子式电能表；2、根据PT二次压降测试结果，为降低 PT 二次压降的误差，对原主控制室内小黑 1117 和小黑1118双回线计量点移至110KV开关站。

以上是张掖供电公司电能计量中心对小孤山水电站110KV、 10KV 各馈路电能计量装置现场检测现场的报告及其改进建议，供黑河水电开发有限公司参考。

张掖供电公司电能计量中心

2008年9月5日