

**DRAFT RECLAMATION MANUAL RELEASE**

**Comments on this draft release must be submitted to Talmadge Oxford  
([toxford@usbr.gov](mailto:toxford@usbr.gov)) by October 2, 2012.**

The FIST 5-11, “Potential Hazard from Messwandler-Bau Instrument Transformers” is being retired because it is out of date and no longer viable for use in the Reclamation Operations and Maintenance Program. In accordance with Reclamation Manual procedures this FIST will be posted for a minimum of 30 days.

See the following pages for the FIST 5-11, “Potential Hazard from Messwandler-Bau Instrument Transformers”.

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BUREAU OF RECLAMATION  
FACILITIES INSTRUCTIONS, STANDARDS & TECHNIQUES  
Volume 5-11

**POTENTIAL HAZARD FROM  
MESSWANDLER-BAU INSTRUMENT  
TRANSFORMERS**

## DRAFT RECLAMATION MANUAL RELEASE

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### Potential Hazard from Messwandler - Bau Instrument Transformers

During a four year period in the late 1960's and early 1970's, Reclamation experienced five destructive explosions of Messwandler-Bau (MWB) 230-kV and 345-kV current transformers. MWB agreed to rebuild 42 JK-196 units because of a high percent of combustible gas (ranging from 4 to 32 percent), high gas pressure (ranging from 8 to over 30 psi-g), and high power factor (ranging from 0.5 percent to 3.41 percent). This experience leads us to be concerned over future explosive failures affecting the safety of our personnel and the security of nearby power equipment.

Types JK-196 and JTS-345 MWB current transformers manufactured after 1964 are the units that are most prone to failure. It is suspected that the explosive failures are the result of internal corona action which causes buildup of excessive internal gas pressure or leakage paths and ultimate flashover across major insulation.

It is recommended that the following actions be taken on all MWB current transformer Types JK-196, JK-230, JTS-196, and JTS-345; and potential transformer Types UT-196, UT-230, and JOS-196 to prevent additional explosive failures:

1. Install a pressure gage as shown on the attached Drawing No. 1046-ES-131 to provide for convenient periodic monitoring and

recording of the internal gas pressure during routine inspections. Gas pressure in excess of that shown in table 1 should be considered as indication that the instrument transformer may be abnormal and should be tested more frequently or removed from service; however, if the pressure exceeds 15 psi-g, the transformer shall be removed from service immediately.

2. When gas pressure exceeds 10 psi-g, a combustible gas test should be performed immediately. A combustible gas content of over 4 percent indicates that the transformer may be abnormal and should be tested more frequently or removed from service.

3. Perform weekly or periodic visual examination of the units for detecting oil leakage, discoloration or other abnormalities during routine inspections.

4. Establish a periodic Doble test schedule of 2 years for normal MWB units and perform more frequent testing on questionable units. Power factor readings exceeding that permitted by the manufacturer's instruction book (1.0 percent at 20 °C for Types UT-196 and UT-230 and 0.5 percent at 20 °C for all other types listed above) should be considered as an indication that the current transformer is abnormal and should be tested more frequently or removed from service.

| Table 1<br>Normal Operating Pressures |                       |
|---------------------------------------|-----------------------|
| Oil temperature<br>degrees C          | Gas pressure<br>psi-g |
| 25                                    | 5.3                   |
| 30                                    | 5.6                   |
| 35                                    | 6.0                   |
| 40                                    | 6.4                   |
| 45                                    | 7.0                   |

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