

# **Condition Assessment Manual**

## *Pelton Turbine Inspection Form and Check List*



Revision 1.0, 12/08/2011

## Pelton Turbine - Inspection Form

### General Information:

Date of Site Visit: \_\_\_\_\_ Unit No. \_\_\_\_\_

Source/s of data: \_\_\_\_\_

Plant Name: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Age: \_\_\_\_\_

Rated Output (MW): \_\_\_\_\_ Max. Output (MW): \_\_\_\_\_ Rated Speed (rpm): \_\_\_\_\_

Rated net head (ft) \_\_\_\_\_ Max. net head (ft): \_\_\_\_\_ Max. Efficiency (%): \_\_\_\_\_

General Turbine Description: \_\_\_\_\_

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Maintenance History / Major Repairs Description:

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### Runner:

Size (Diameter): \_\_\_\_\_ Weight: \_\_\_\_\_ Shaft Orientation: \_\_\_\_\_

Main Shaft Size (At runner connection): \_\_\_\_\_ Shaft Material: \_\_\_\_\_

Number of Buckets: \_\_\_\_\_ Surface Finish: \_\_\_\_\_

Disc Material: \_\_\_\_\_ Bucket Material: \_\_\_\_\_

Bucket Bolt Connection [Yes/No]: \_\_\_\_\_ Bolt Material: \_\_\_\_\_

Bucket Grind Profile Template available: \_\_\_\_\_

Addition specification data:

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**Housing/Pit Size:**

Housing Size (H x L x W): \_\_\_\_\_

Pit Size (H x L x W): \_\_\_\_\_

Housing Material: \_\_\_\_\_ Pit Material: \_\_\_\_\_

Addition specification data:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Nozzle Assemblies:**

Number of Jets: \_\_\_\_\_ Seat Size (Diameter): \_\_\_\_\_

Design type of Nozzle (internal/external): \_\_\_\_\_

Seat Material: \_\_\_\_\_ Housing Material: \_\_\_\_\_ Needle Material: \_\_\_\_\_

Nominal Discharge Rate: \_\_\_\_\_

Addition specification data:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Distributor/Manifold:**

Number of Outlets: \_\_\_\_\_

Pipe Size (Diameter): \_\_\_\_\_

Pipe Material: \_\_\_\_\_ Internal Surface Finish: \_\_\_\_\_

Addition specification data:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Pelton Turbine Check List				
Topic	Yes	No	N/A	Comments/Details
<b>Maintenance &amp; Major Repair History</b>				
Bucket cavitation repair?				
Bucket erosion repair?				
Bucket crack repair?				
Bucket re-coating with different material? <i>[Very hard metals, polymeric coatings, ceramics]</i>				
Have original bucket contour templates been used on any repair? <i>[ Repair weld ground to original geometry]</i>				
Has Runner been replaced with like original runner or new runner design?				
Is the Runner accessible for visual inspections? <i>[Identify if de-watering is an option for interior inspection.]</i>				
Have all plant records regarding Runner maintenance, repairs, operating conditions, performance data, etc. been requested/gathered?				

Pelton Turbine Check List - Continued				
Topic	Yes	No	N/A	Comments/Details
<b>Maintenance &amp; Major Repair History - Continued</b>				
Is there evidence of previous housing repair work?  <i>[If so, when were the repairs done and for what reason? Are previous maintenance reports available?]</i>				
Is there evidence of previous pit modifications?  <i>[If so, when were the modifications done and for what reason? Are previous maintenance reports available?]</i>				
Is the housing/pit accessible for visual inspections?  <i>[Identify if de-watering is an option for interior inspection.]</i>				
Have all plant records regarding housing/pit maintenance, repairs, operating conditions, performance data, etc. been requested/gathered?				
Has there been replacement of nozzles or needle tips?				
Has there been replacement or repair of deflectors?				

<b>Pelton Turbine Check List - Continued</b>				
<b>Topic</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments/Details</b>
<b>Equipment Condition Assessment</b>				
Is there evidence of bucket surface corrosion?				
Is there evidence of erosion or cavitation on the bucket surface?				
Is there cracking in bucket root area?				
Can measurement to engineering drawings be made for the minimum bucket thickness?				
Can measurement to engineering drawings be made for the bucket splitter width?				
What is the condition of the bucket bolts?				
Can servomotor (needle) leakage rate be assessed?				

Pelton Turbine Check List - Continued				
Topic	Yes	No	N/A	Comments/Details
<b>Maintenance &amp; Major Repair History - Continued</b>				
Has there been repair of nozzles or needle tips?				
Has there been replacement of needle servomotors?				
Has there been repair of needle servomotors?				
Is the housing/pit accessible for visual inspections?  <i>[Identify if de-watering is an option for interior inspection.]</i>				
Have all plant records regarding nozzles assemblies' maintenance, repairs, operating conditions, performance data, etc. been requested/gathered?				
Have all plant records regarding distributor/manifold maintenance, repairs, operating conditions, performance data, etc. been requested/gathered?				

Pelton Turbine Check List - Continued				
Topic	Yes	No	N/A	Comments/Details
<b>Equipment Condition Assessment -Continued</b>				
Can servomotor (needle) pressure (as % governor pressure) be assessed?				
Is there evidence of surface finish or erosion damage to needle tip?				
Is there evidence of surface finish or erosion damage to nozzle?				
Is there evidence of surface finish or erosion damage to nozzle seat needle?				
Is there evidence leakage when nozzle closed?				

Pelton Turbine Check List - Continued				
Topic	Yes	No	N/A	Comments/Details
<b>Equipment Condition Assessment -Continued</b>				
What is the condition of bushings on deflectors?				
What is the surface condition of deflectors?				
What is the condition of deflector servomotor?				
What is the annual maintenance/service on nozzle (\$/year)?				

