

## **TDG INSTANCE TYPES**

### **May 1 – May 31, 2011**

Instances of when TDG levels exceed state water quality standards are classified into “types” which are shown on Table 1. These types are regionally approved and have been used since 2003. The states have requested information on TDG instances which include:

1. Date and times of exceedance
2. Amount of exceedance in percent saturation
3. Explain reason for exceedance
4. Discuss steps taken to fix the problem.

Because TDG instances are events when state TDG standards are exceeded, it is necessary to describe the current legal arrangement of how the state water quality standards are being implemented by the USACE. The March 24, 2011 Spring Operations Court Order requires the Corps to operate according to the 2006 fixed monitoring station (FMS) system, and the 2006 state water quality standards which is referred to as “Roll-Over”. Therefore, the Camas/Washougal FMS, and the Oregon high 12-hour average calculation method are used to manage spill.

During the spill for fish passage season from April through August the Washington Department of Ecology (WDOE) has issued a temporary %TDG Rule Adjustment to their current water quality standards and Oregon Department of Environmental Quality (ODEQ) issued a 5-year %TDG Waiver. The state water quality standards are calculated differently from one another, and also from the 2006 Roll-Over.

USACE is currently tracking and recording the current state water quality standards as follows.

Oregon: [http://www.nwd-wc.usace.army.mil/ftppub/water\\_quality/12hr/or/201104.html](http://www.nwd-wc.usace.army.mil/ftppub/water_quality/12hr/or/201104.html)

Washington: [http://www.nwd-wc.usace.army.mil/ftppub/water\\_quality/12hr/wa/201104.html](http://www.nwd-wc.usace.army.mil/ftppub/water_quality/12hr/wa/201104.html)

Comparison of OR & WA: [http://www.nwd-wc.usace.army.mil/ftppub/water\\_quality/12hr/201104.html](http://www.nwd-wc.usace.army.mil/ftppub/water_quality/12hr/201104.html)

Table 2 provides the TDG instances according to the Oregon high 12-hour average calculation method that occurred in the May 2011 spill for fish passage season.

Table 3 lists the project 7Q10 flows criteria which define when water quality standards no longer apply. Table 3 also shows when the 7Q10 flow criteria were exceeded during May 2011, which are the highlighted areas and provides the average daily flows for the lower Columbia and Snake River projects.

Table 1

<b>Types of Instance</b>	
<b>Type 1 Condition</b>	<b>TDG levels exceed the TDG standard due to exceeding powerhouse capacity at run-of-river projects resulting in spill above the BiOp fish spill levels. This condition type includes:</b>
	<ul style="list-style-type: none"> <li>• High runoff flows and flood control efforts.</li> <li>• BPA load requirements are lower than actual powerhouse capacity.</li> <li>• Involuntary spill at Mid Columbia River dams resulting in high TDG levels entering the lower Columbia River.</li> <li>• Involuntary spill at Snake River dams resulting in high TDG levels entering the lower Columbia River.</li> </ul>
<b>Type 1a Condition</b>	<b>Planned and unplanned outages of hydro power equipment including generation unit, intertie line, or powerhouse outages.</b>
<b>Type 2 Exceedance</b>	<b>TDG exceedances due to the operation or mechanical failure of non-generating equipment. This exceedance type includes:</b>
	<ul style="list-style-type: none"> <li>• Flow deflectors unable to function for TDG abatement with tailwater elevations above 19 - 26 feet at Bonneville Dam.</li> <li>• Spill gates stuck in open position or inadvertently left open.</li> <li>• Increased spill in a bulk spill operation to pass debris.</li> <li>• Communication errors, such as teletype were transmitted but change was not timely made or misinterpretation of intent of teletype by Project operator.</li> </ul>
<b>Type 2a Exceedance</b>	<b>Malfunctioning FMS gauge, resulting in fewer TDG or temperature measurements when setting TDG spill caps.</b>
<b>Type 3 Exceedance</b>	<b>TDG exceedances due to uncertainties when using best professional judgment, SYSTDG model and forecasts. This exceedance type includes:</b>
	<ul style="list-style-type: none"> <li>• Uncertainties when using best professional judgment to apply the spill guidance criteria, e.g., travel time, degassing, and spill patterns.</li> <li>• Uncertainties when using the SYSTDG model to predict the effects of various hydro system operations, temperature, degassing, and travel time.</li> <li>• Uncertainties when using forecasts for flows, temperature and wind.</li> <li>• Unanticipated sharp rise in water temperature (a 1.5 degree F. or greater change in a day).</li> <li>• Bulk spill pattern being used which generated more TDG than expected.</li> </ul>

Table 2  
Types of TDG Instances  
May 2011

DATE	Lower	Lower	Little	Little	Lower	Lower	Ice	Ice	McNary	McNary	John	John	The	The	Bon	Bon	Camas
	Granite	Granite	Goose	Goose	Monum.	Monum.	Harbor	Harbor			Day	Day	Dalles	Dalles			
	Forebay	Tailrace	Forebay	Tailrace	Forebay	Tailrace	Forebay	Tailrace	Forebay	Tailrace	Forebay	Tailrace	Forebay	Tailrace	Forebay	Tailrace	Forebay
5/1/2011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/2/2011	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
5/3/2011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/4/2011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/5/2011	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---	---
5/6/2011	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---
5/7/2011	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---
5/8/2011	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
5/9/2011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/10/2011	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	1	---
5/11/2011	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---
5/12/2011	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
5/13/2011	---	---	---	---	---	1	1	---	---	1	---	---	---	---	1	1	---
5/14/2011	---	1	---	1	1	1	1	1	1	1	---	---	---	---	1	1	1
5/15/2011	---	1	---	1	1	1	1	1	1	1	---	---	---	---	---	1	1
5/16/2011	---	1	1	1	1	1	1	1	---	1	---	1	---	---	---	1	1
5/17/2011	---	1	1	1	1	1	1	1	1	1	---	1	---	---	1	1	1
5/18/2011	---	1	1	1	1	1	1	1	1	1	---	N/A	---	---	1	1	1
5/19/2011	---	1	1	1	1	1	1	1	1	1	N/A	N/A	1	1	1	2a	1
5/20/2011	---	1	1	1	1	1	1	1	1	1	N/A	N/A	1	1	1	2a	1
5/21/2011	---	1	1	1	1	1	1	1	1	1	N/A	N/A	1	1	1	2a	1
5/22/2011	---	1	1	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/23/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/24/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/25/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/26/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/27/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/28/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/29/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/30/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/31/2011	---	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Total</b>	<b>0</b>	<b>18</b>	<b>16</b>	<b>18</b>	<b>18</b>	<b>24</b>	<b>23</b>	<b>18</b>	<b>8</b>	<b>10</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>8</b>	<b>20</b>	<b>8</b>

MAY GRAND TOTAL = 197

N/A means that the TDG instances in the project forebay and tailwater are not counted since the project flow exceeded the 7Q10 flows.

**Table 3**  
**Days 7Q10 Daily Average Flows Were Exceeded**  
**May 2011**

<b>Date</b>	<b>LWG (kcf)</b>	<b>LGS (kcf)</b>	<b>LMN (kcf)</b>	<b>IHR (kcf)</b>	<b>MCN (kcf)</b>	<b>JDA (kcf)</b>	<b>TDA (kcf)</b>	<b>BON (kcf)</b>
<b>7Q10 Flow Criteria</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>447</b>	<b>454</b>	<b>461</b>	<b>467</b>
5/15/2011	140.2	134.2	139.0	143.2	347.3	351.8	338.0	358.8
5/16/2011	175.3	167.7	173.5	175.2	385.8	383.6	366.7	377.0
5/17/2011	203.4	195.4	209.7	213.8	422.9	438.6	423.5	430.3
5/18/2011	188.7	183.4	198.7	202.1	437.8	454.9	442.3	447.5
5/19/2011	173.0	164.3	173.2	178.7	422.0	457.9	445.0	454.3
5/20/2011	158.6	152.6	160.6	166.9	421.5	463.9	450.0	458.6
5/21/2011	158.7	147.0	155.4	160.9	416.4	467.3	451.2	462.1
5/22/2011	163.2	155.9	162.2	168.6	443.0	474.3	461.1	468.9
5/23/2011	171.0	163.0	169.9	174.3	452.2	476.7	457.1	470.7
5/24/2011	182.6	173.2	180.8	186.9	480.2	493.6	471.7	483.0
5/25/2011	187.6	174.1	189.2	191.9	473.1	495.3	477.8	484.7
5/26/2011	196.1	178.4	193.5	198.4	470.1	490.8	476.6	492.3
5/27/2011	200.0	182.7	200.2	204.2	461.7	483.0	462.1	482.7
5/28/2011	201.7	186.8	206.8	209.2	481.9	501.7	486.5	498.1
5/29/2011	182.3	167.3	184.4	190.9	495.5	507.7	491.9	496.2
5/30/2011	171.7	158.7	171.1	178.3	499.4	518.3	497.3	501.5
5/31/2011	162.1	148.2	158.4	163.8	480.6	509.1	494.5	506.5

The gray highlighted days represent when the 7Q10 flow criteria were exceeded.  
7Q10 is the average peak annual flow for seven consecutive days that has a  
recurrence interval of ten years and they are established in the TMDLs