

## **2009 % TDG Instance Tracking System**

The US Army Corps of Engineers (Corps) tracks the number of instances that the percent TDG exceeds the state water quality standards (WQS) of the 2007 Oregon and Washington water quality standards and designates a cause for each instance during the spill season, April 3 through August 31. Both Oregon and Washington states changed their water quality standards which would affect TDG instance tracking information provided in this appendix. The changes to the state water quality standards were not implemented in 2009 because of the 2008 Biological Opinion litigation. Because of the litigation, the Corps operated consistent with the US District Court of Oregon order, which means the previous TDG monitoring system, with forebay gages and the method for calculating the 12 hour average used in 2007 continued through 2009. The 2007 Oregon and Washington specified method of calculating the “daily % TDG” is an average of the 12 highest hourly readings in a given day. This method of calculating the high 12 hour averages is called the Oregon/Washington method and is used for this appendix.

There are instances that occurred outside of the spill season, but they are not included in this report since they are not associated with spill for fish. The 2007 State water quality standards are 115% in the forebays and 120% in the tailwaters of the Columbia and Snake River dams, under the provisions of the state water quality exemptions granted by the states. The percent TDG instances are based on the daily high 12 hour average.

Table 1 provides a listing of the three causes (types) that are designated to each percent TDG instances when the daily high 12 hour average is exceeded. These definitions of instance types have been evolving since 2003. From 2002 to 2008, 14 instance types were used and in 2009 the definitions were condensed to three types, which included all the previous 14 instance types. Table 2 designates a specific instance type for all the instances at the Corps Lower Columbia and Snake River projects.

**TABLE 1**  
**TYPES OF PERCENT TDG INSTANCE TRACKING**

<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 or lower 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 Bomeville 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**  
**PERCENT TDG INSTANCE TYPE TRACKING**  
**APRIL 2009**

Date	Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	BON TW	Camas FB
4/3/09	Spill Begins	Spill Begins	Spill Begins	Spill Begins	Spill Begins	Spill Begins	Spill Begins	Spill Begins									
4/4/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/5/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/6/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/7/09	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
4/8/09	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
4/9/09	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
4/10/09	---	---	---	---	---	---	---	---	Spill Begins	Spill Begins	Spill Begins	Spill Begins	Spill Begins				
4/11/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/12/09	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---	---
4/13/09	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---	---
4/14/09	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---	---
4/15/09	---	---	2a	---	---	3	---	---	---	---	---	---	---	---	---	---	---
4/16/09	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/17/09	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/18/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/19/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
4/20/09	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	3
4/21/09	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	3
4/22/09	---	---	---	---	3	---	3	3	---	---	---	---	---	---	---	---	---
4/23/09	---	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---
4/24/09	---	---	---	---	1	---	---	3	---	---	---	---	---	---	---	1	---
4/25/09	---	---	---	---	1	---	1	---	---	---	---	---	---	---	---	1	---
4/26/09	---	---	---	---	---	---	3	2a	---	---	---	---	---	---	---	---	---
4/27/09	---	---	---	---	---	---	3	2a	---	---	---	---	---	---	---	2	---
4/28/09	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
4/29/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4/30/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3

**TABLE 2**  
**PERCENT TDG INSTANCE TYPE TRACKING**  
**MAY 2009**

Date	Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	BON TW	Camas FB
5/1/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	---
5/2/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	---
5/3/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
5/4/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	---
5/5/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
5/6/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/7/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/8/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
5/9/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
5/10/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
5/11/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	3
5/12/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/13/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/14/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5/15/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
5/16/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
5/17/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
5/18/2009	---	---	---	---	3	3	3	---	---	---	---	---	---	---	3	---	3
5/19/2009	---	---	---	---	---	---	3	3	---	---	---	---	---	---	---	---	---
5/20/2009	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	1a	---
5/21/2009	---	1	---	---	---	1	---	1	---	---	---	---	---	---	---	1	1
5/22/2009	---	---	1	---	1	1	1	---	---	---	---	---	---	---	1	1	1
5/23/2009	---	---	1	---	1	1	1	1	1	---	---	---	---	---	1	1	1
5/24/2009	---	1	---	---	1	---	1	---	1	---	---	---	---	---	---	---	1
5/25/2009	---	1	1	---	1	1	1	1	---	---	---	---	---	---	---	1	---
5/26/2009	---	1	1	---	1	1	1	1	---	---	---	---	---	---	---	1	1
5/27/2009	---	1	1	---	1	---	1	1	---	---	---	---	---	---	3	1	1
5/28/2009	---	1	2a	---	1	1	1	1	---	---	---	---	1	---	1	1	1
5/29/2009	---	1	2a	---	1	---	1	1	---	---	1	---	1	---	1	1	1
5/30/2009	---	1	1	---	1	1	1	1	---	---	1	---	1	---	1	1	1
5/31/2009	---	1	1	---	1	1	1	1	1	---	1	---	1	---	1	1	1

**TABLE 2**  
**PERCENT TDG INSTANCE TYPE TRACKING**  
**JUNE 2009**

Date	Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	BON TW	Camas FB
6/1/2009	---	1	1	---	1	1	1	1	1	1	1	---	1	---	1	1	1
6/2/2009	---	1	1	---	1	1	1	1	---	---	1	---	1	---	1	1	1
6/3/2009	---	---	1	---	1	1	1	1	---	---	1	---	1	---	1	1	1
6/4/2009	---	---	1	---	1	1	1	---	---	---	1	---	1	---	1	1	1
6/5/2009	---	---	1	---	1	1	1	1	---	---	1	1	---	---	---	1	1
6/6/2009	---	1	---	---	1	1	1	1	---	---	---	1	---	---	---	1	---
6/7/2009	---	1	---	---	1	1	1	1	---	---	---	1	---	---	---	1	---
6/8/2009	---	1	1	---	1	1	1	1	---	1	---	1	---	---	---	1	1
6/9/2009	---	---	1	---	1	---	1	---	---	---	---	1	---	---	3	1	1
6/10/2009	---	---	---	---	1	---	1	---	---	---	---	1	---	---	---	1	1
6/11/2009	---	---	---	---	1	---	1	---	---	---	---	1	---	---	---	---	1
6/12/2009	---	---	---	---	1	---	1	---	---	---	---	---	---	---	---	---	---
6/13/2009	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---
6/14/2009	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---
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6/16/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/17/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/18/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/19/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/20/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/21/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/22/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/23/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/24/2009	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---	3
6/25/2009	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---	---
6/26/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/27/2009	---	---	---	---	---	---	---	---	---	---	---	---	3	---	---	---	---
6/28/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6/29/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
6/30/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3

**TABLE 2  
PERCENT TDG INSTANCE TYPE TRACKING  
JULY 2009**

	Low Gran FB	Low Gran TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb FB	Ice Harb TW	McNary FB	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	BON TW	Camas FB
7/1/2009	---	---	---	---	---	---	---	---	---	---	---	---	3	---	2a	---	3
7/2/2009	---	---	---	---	---	---	---	---	---	---	---	---	3	---	2a	---	3
7/3/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	3
7/4/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	3	---	3
7/5/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	3
7/6/2009	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
7/7/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/8/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/9/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/10/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/11/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/12/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/13/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/14/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/15/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/16/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/17/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/18/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/19/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/20/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/21/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/22/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/23/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7/24/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/25/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/26/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/27/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/28/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
7/29/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/30/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
7/31/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3

**TABLE 2**  
**PERCENT TDG INSTANCE TYPE TRACKING**  
**AUGUST 2009**

	Low Gran. FB	Low Gran. TW	Little Goose FB	Little Goose TW	Low Monu. FB	Low Monu. TW	Ice Harb. FB	Ice Harb. TW	McNary FB	McNary TW	John Day FB	John Day TW	The Dalles FB	The Dalles TW	BON FB	BON TW	Camas FB
8/1/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
8/2/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/3/2008	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---
8/4/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	3
8/5/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---
8/6/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/7/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/8/2008	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
8/9/2008	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	3
8/10/2008	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	3
8/11/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
8/12/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/13/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/14/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/15/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/16/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/17/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/18/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
8/19/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
8/20/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
8/21/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/22/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/23/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/24/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/25/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/26/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/27/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
8/28/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/29/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/30/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8/31/2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<b>Total</b>	<b>0</b>	<b>15</b>	<b>19</b>	<b>0</b>	<b>26</b>	<b>21</b>	<b>44</b>	<b>25</b>	<b>4</b>	<b>5</b>	<b>9</b>	<b>7</b>	<b>11</b>	<b>0</b>	<b>32</b>	<b>24</b>	<b>66</b>
<b>Grand Total</b>	<b>308</b>																