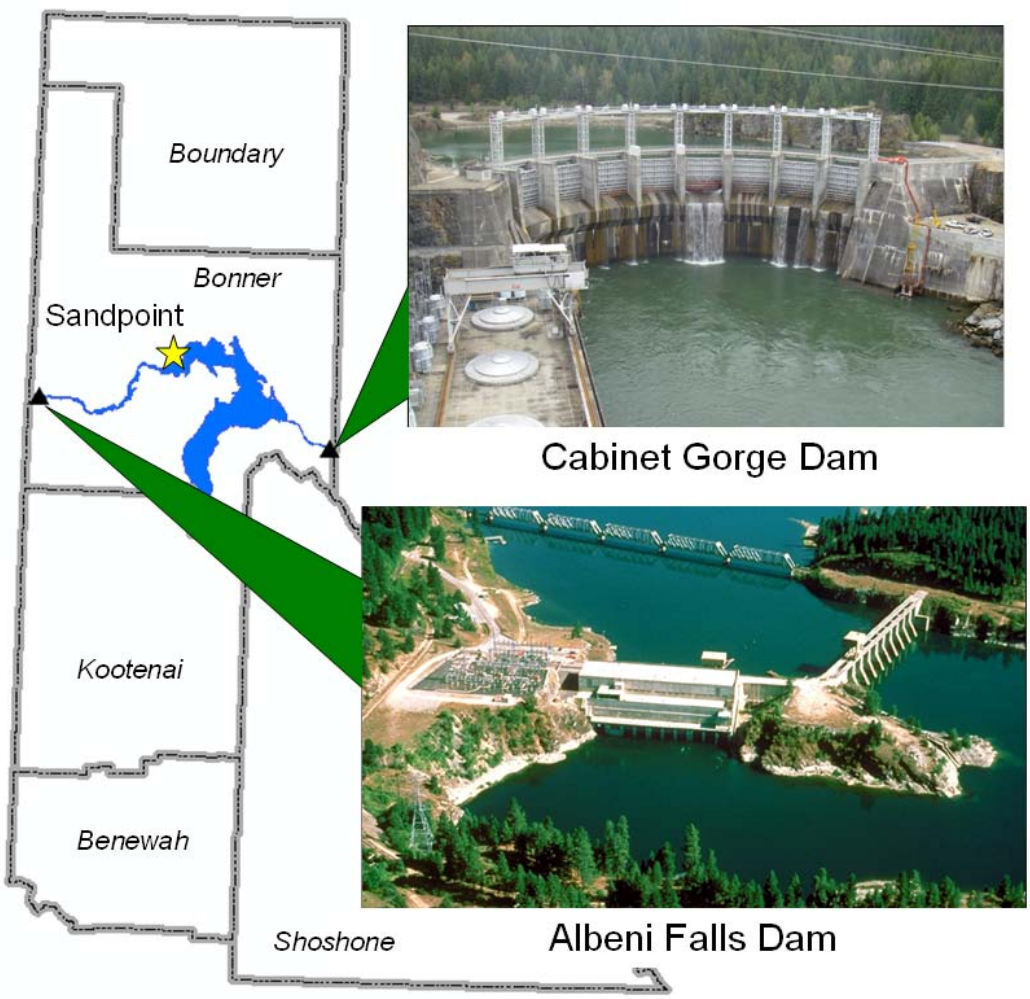
Pend Oreille River and Lake Total Dissolved Gas Total Maximum Daily Load

Addendum to the Pend Oreille Lake Subbasin Assessment and TMDL



Draft

Department of Environmental Quality
June 2008

The cover photo of Albeni Falls was obtained from the internet.

Albeni Falls Dam: http://www.nwd-wc.usace.army.mil/report/alf.htm

The photo of Cabinet Gorge Dam was taken by DEQ staff during a field visit on May 13, 2008.

Pend Oreille River Total Dissolved Gas Total Maximum Daily Load

June 2008

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Acknowledgments

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Abbreviations, Acronyms, and Symbols

§303(d)	Refers to section 303 subsection (d) of the Clean Water Act, or a list of impaired water bodies required by this section
§	Section (usually a section of federal or state rules or statutes)
AU	assessment unit
BMP	best management practice
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)
cfs	cubic feet per second
CWA	Clean Water Act
CWAL	cold water aquatic life
DEQ	Department of Environmental Quality
DO	dissolved oxygen
DWS	domestic water supply
EPA	United States Environmental Protection Agency
GIS	Geographical Information Systems
HUC	Hydrologic Unit Code
IDAPA	Refers to citations of Idaho administrative rules
IDFG	Idaho Department of Fish and Game
LA	load allocation
LC	load capacity
m	meter
m^3	cubic meter
mi	mile
mi^2	square miles
MOS	margin of safety
NB	natural background
nd	no data (data not available)
NFS	not fully supporting
NPDES	National Pollutant Discharge Elimination System
PCR	primary contact recreation
SBA	subbasin assessment
SCR	secondary contact recreation
SS	salmonid spawning
TDG	total dissolved gas
TMDL	total maximum daily load
USFS	United States Forest Service
USGS	United States Geological Survey
WAG	Watershed Advisory Group

WBAG *Water Body Assessment Guidance*

WLA wasteload allocation

WQS water quality standard

Executive Summary

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. Currently, this list must be published every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, which is set at a level to achieve water quality standards.

This document addresses the Pend Oreille River and Pend Oreille Lake located within the Pend Oreille Lake (17010214) and Pend Oreille Subbasins (17010216) in Idaho that have been placed on Idaho's current §303(d) list or identified in this assessment process for exceeding Idaho's total dissolved gas (TDG) saturation water quality criteria.

This TMDL analysis has been developed to comply with Idaho's TMDL schedule. The TMDL is set at a level to meet Idaho water quality standards and outlines load reductions needed to achieve the standard.

The Idaho Department of Environmental Quality (DEQ) first addressed impaired waters within the Pend Oreille Lake Subbasin between 1999 and 2001. The *Pend Oreille Lake Subbasin Assessment and TMDL* (DEQ 2001) outlined sediment and phosphorous load reductions and detailed the subbasin characteristics. Please refer to the *Pend Oreille Lake Subbasin Assessment and TMDL* (DEQ 2001) for detailed descriptions of subbasin characteristics. The starting point for this TMDL is Idaho's 2002 Integrated Report section 5, a list of water quality limited water bodies. The TMDL analysis quantifies pollutant sources and allocates responsibility for load reductions needed to return listed waters to a condition of meeting water quality standards and restoration of beneficial uses.

Subbasin at a Glance

The Pend Oreille Subbasin is part of a larger Clark Fork – Pend Oreille watershed which spans Montana, Idaho, Washington, and Canada (Figure 1). At the confluence with the Columbia River, the Pend Oreille River drains an area of approximately 25,820 square miles. Subbasins included in the larger river basin include the Lower, Middle and Upper Clark Fork, North Fork Flathead, Middle Fork Flathead, Stillwater, Flathead Lake, South Fork Flathead, Swan, Blackfoot, Lower Flathead, Flintrock, Bitterroot, Lake Pend Oreille, Priest and Pend Oreille.

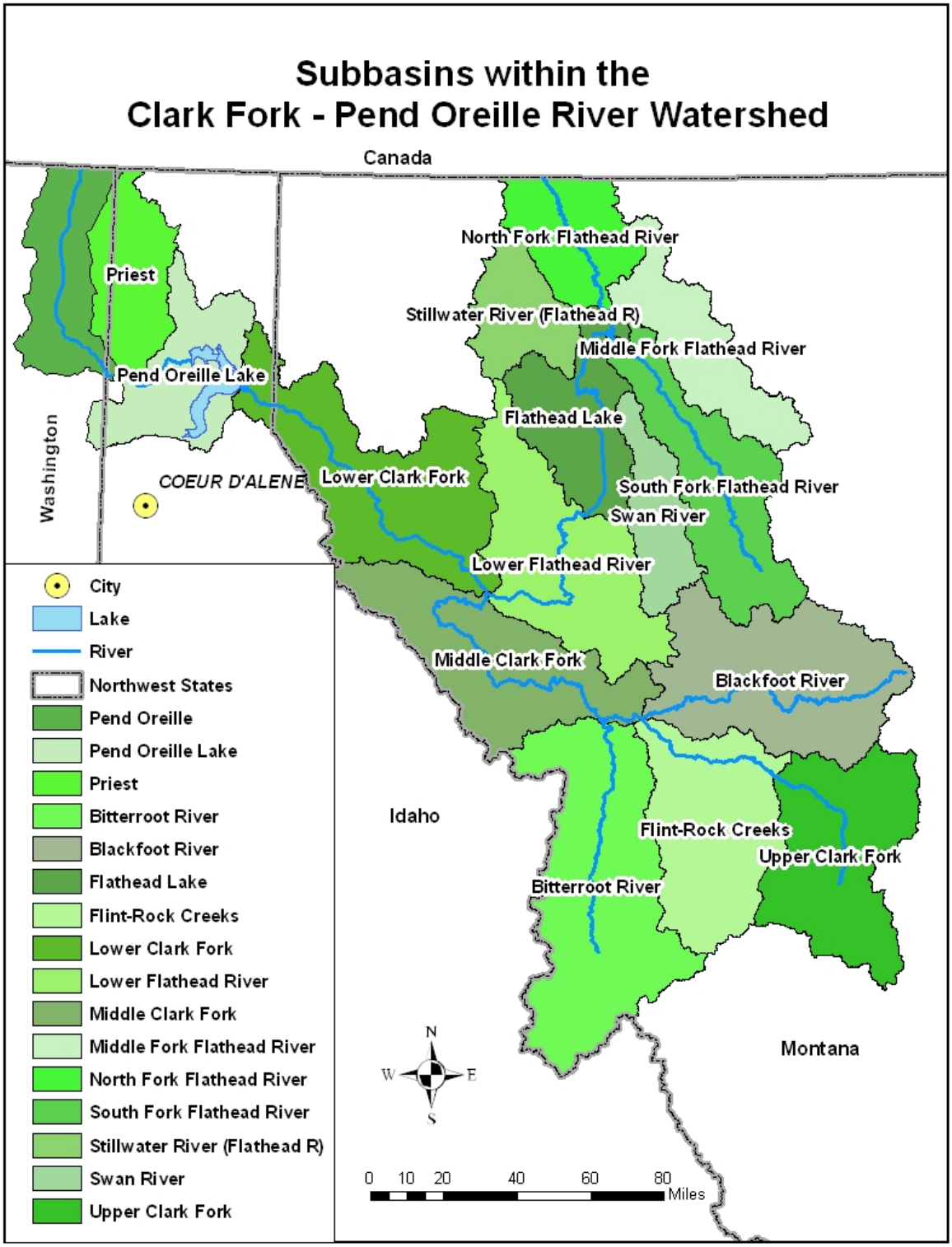


Figure 1. Subbasins within the Clark Fork - Pend Oreille River watershed.

The Pend Oreille Subbasin (17010214), located in northern Idaho, encompasses approximately 765,000 acres (1,195 square miles) and ranges in elevation from a high of

7,550 feet to a low of 2,050 feet above mean sea level (Figure 2). Land ownership in the subbasin consists of federal, state, and private. Land use activities within the subbasin include silviculture, agriculture, grazing, rural and urban development, and recreational uses.

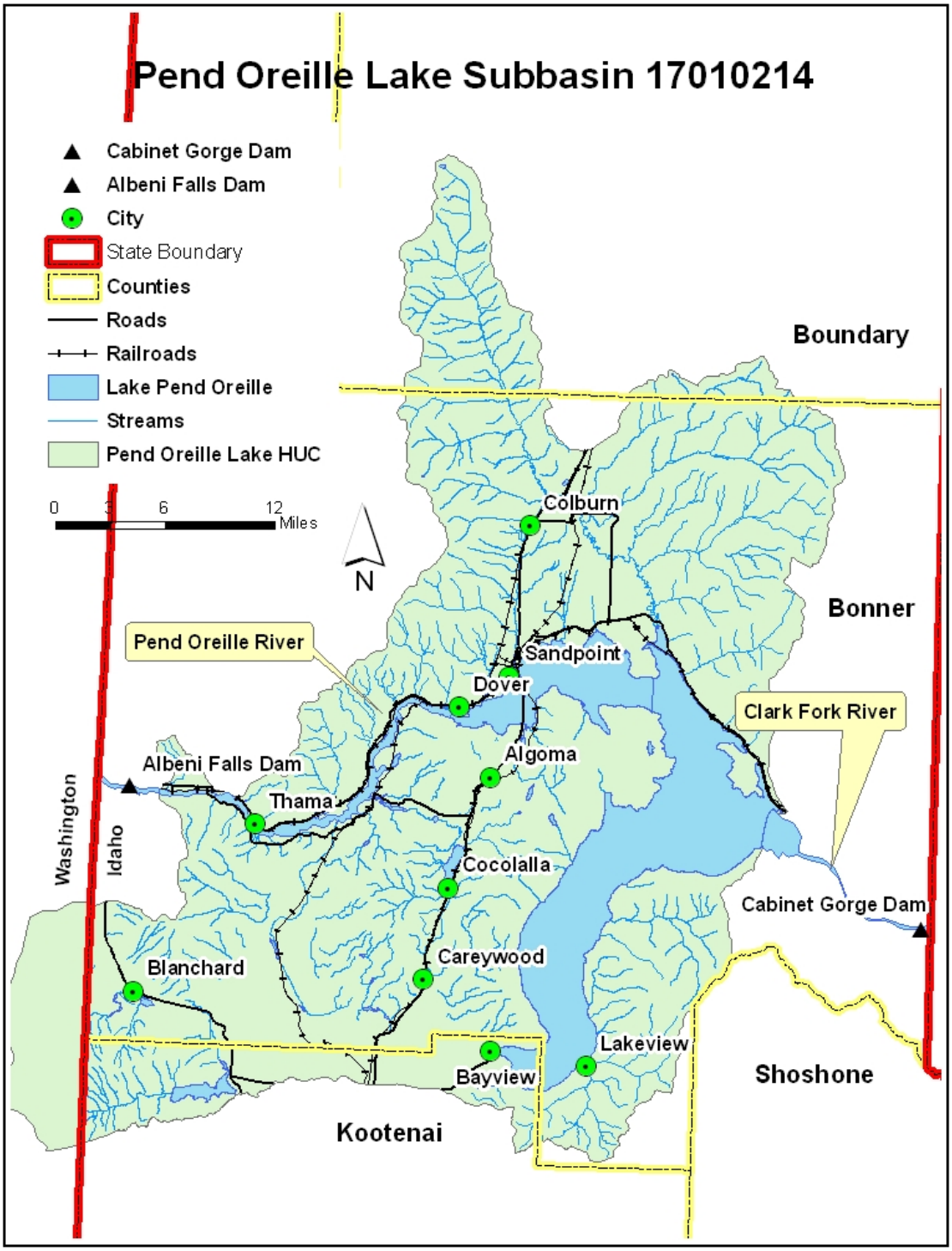


Figure 2. Pend Oreille Lake Subbasin (17010214).

Key Findings

The Pend Oreille River has been identified as exceeding Idaho's TDG water quality standard of 110% saturation and has been included in section 5 of Idaho's Integrated Report. During the development of this report Lake Pend Oreille was also identified as failing Idaho TDG water quality standard. The Pend Oreille River and lake are failing to meet the TDG water quality standard due to dissolved gas entering the water column from upstream sources in Montana, and from spillage at Cabinet Gorge and Albeni Falls Dams. Water is spilled at the Cabinet Gorge and Albeni Falls Dams during times of runoff when river discharge exceeded the powerhouse capacity.

The beneficial use to be protected by this TMDL is aquatic life uses. Fish exposed to TDG can develop gas bubble trauma or gas bubble disease. Gas bubble trauma occurs when TDG is transferred into the bloodstream in solution, and is then released as a gas while still in the body of the fish. As a result gas bubbles form within the body cavity, fins, and/or gills. Development of internal gas bubbles can form in many body cavities, disrupting neurological, cardiovascular, respiratory, osmoregulatroy, and other physical functions (Stroud and Nebeker 1976, Weitkamp and Katz 1980, Fidler 1988, and Shrimpton et al 1990a and 1990b). Gas bubble trauma increases the susceptibility of aquatic organisms to other stresses, often resulting in death.

The water quality target set for this TMDL will be the Idaho water quality standard of 110% TDG saturation at atmospheric pressures at the point of sampling. The Pend Oreille River is bracketed into three different assessment units which span two subbasins in Idaho (Table 1, Figure 3). Lake Pend Oreille is identified by one assessment unit (Table 1, Figure 3). DEQ tracks waters in Idaho by assigning an assessment unit (AU) identification number to each water body. The support status of the AU and corresponding water body are then reported to EPA. Assessment units are groups of similar streams that have similar geographical/geological settings and/or land management. Stream order, however, is the main basis for delineating AUs. While ownership can change significantly, the AU remains the same. A description of the methodology used to describe AUs and a list of the AUs can be found in Idaho's *Water Body Assessment Guidance second edition* (Grafe et al 2002).

Table 1. Streams and pollutants for which TMDLs were developed.

Stream name and description	Assessment Unit	Subbasin	Pollutant
Pend Oreille River – Pend Oreille Lake to Priest River	ID17010214PN001_08	Pend Oreille Lake	TDG
Pend Oreille River – Priest River to Strong Island	ID17010214PN002_08	Pend Oreille Lake	TDG
Lake Pend Oreille	ID17010216PN018L_0L	Pend Oreille Lake	TDG
Pend Oreille River – Priest River below Albeni Falls Dam to Idaho/Washington border	ID17010216PN002_08	Pend Oreille	TDG

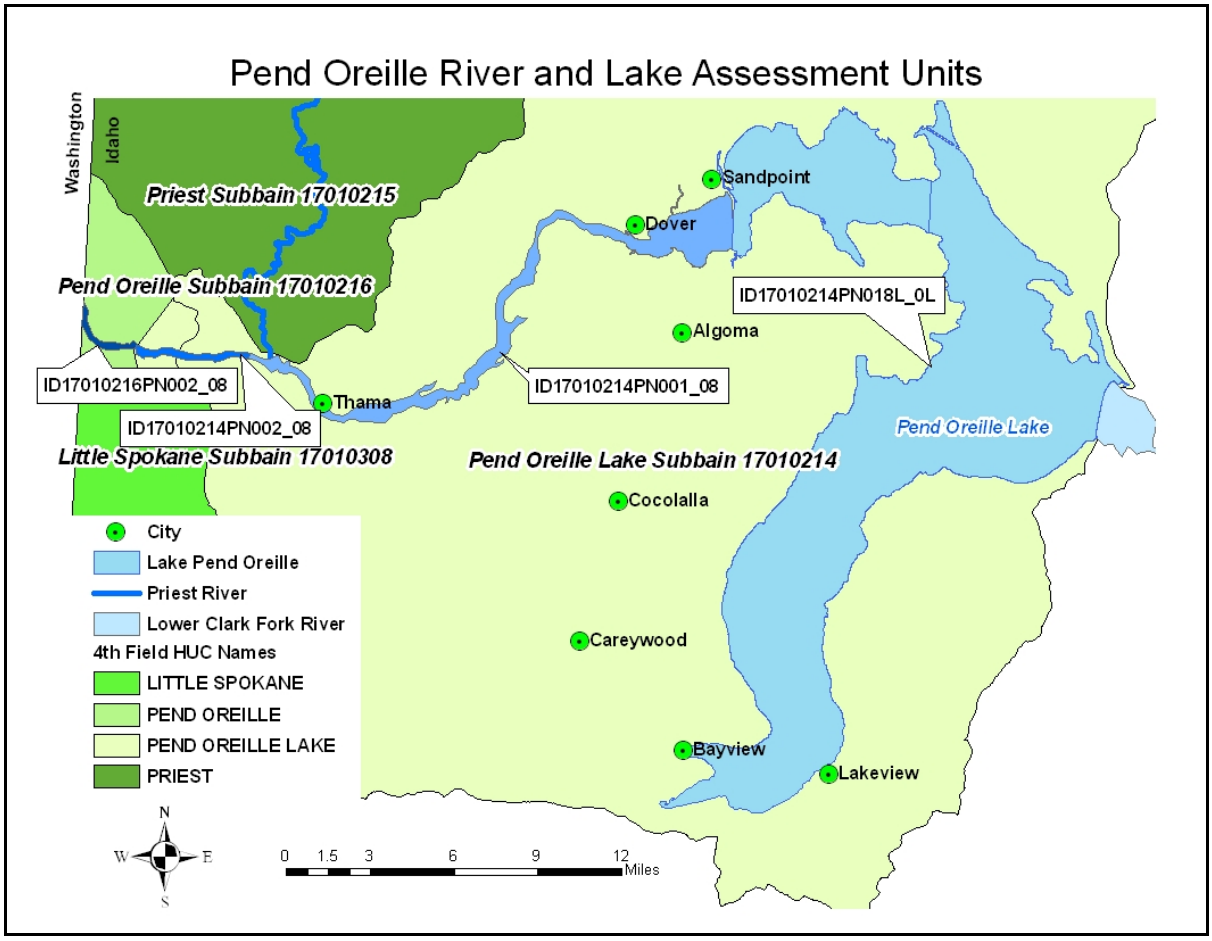


Figure 3. Pend Oreille River and lake assessment units.

Total maximum daily loads were written for all three Pend Oreille River and one Lake Pend Oreille assessment units in Idaho. The TMDLs were written to address excess TDG saturation levels that are exceeding Idaho water quality standards and impairing the designated cold water aquatic life beneficial use (Table 2). Total maximum daily loads for four assessment unit pollutant combinations are included in this document.

Table 2. Summary of assessment outcomes.

Stream name, description and assessment unit	Pollutant	TMDL Completed	Recommended Changes to Integrated Report	Justification
Pend Oreille River – Pend Oreille Lake to Priest River ID17010214PN001_08	TDG	Yes	Move to section 4a[1]	TMDL completed
Pend Oreille River – Priest River to Strong Island ID17010214PN002_08	TDG	Yes	Move to section 4a[1]	TMDL completed
Lake Pend Oreille	TDG	Yes	Move to section 4a[1]	TMDL completed
Pend Oreille River – Pend Oreille River below Albeni Falls Dam to Idaho/Washington border ID17010216PN002_08	TDG	Yes	Move to section 4a[1]	TMDL completed

[1] Section 4a contains assessment unit/pollutant combinations with completed and approved TMDLs.

The Pend Oreille River TDG TMDL addendum was developed to comply with state and Federal CWA requirements with the goal of restoring cold water aquatic life beneficial uses. Below is a list highlighting the findings of this report.

- TDG supersaturation is produced when the Clark Fork River discharge exceeds hydraulic capacity of the Cabinet Gorge Dam powerhouse and water is spilled. During spill events water entrains significant volumes of atmospheric gases that are forced into solution by the increased pressure at depth in the spilling basin.
- TDG supersaturated water from Cabinet Gorge Dam migrates downstream to Lake Pend Oreille and Pend Oreille River resulting in an exceedance of the Idaho TDG water quality standard. A TMDL was written and approved by the United States Environmental Protection Agency (EPA) in 2007 addressing TDG supersaturation in the Clark Fork River in Idaho (DEQ 2007b). This document is a continuation of TMDLs developed addressing TDG supersaturation through the Pend Oreille/Clark Fork Subbasin in Idaho.
- Albeni Falls Dam is a second source of TDG in Idaho. Production of TDG is minimal at Albeni Falls Dam when compared to Cabinet Gorge Dam due to the low hydraulic head created by the dam and the shallow, wide spilling basin.
- Load allocations and reductions in TDG will be given to Cabinet Gorge and Albeni Falls Dams. Water entering Idaho from Montana above 110% saturation will be expected to be passed through the Cabinet Gorge Dam with no net increase in TDG (DEQ 2007b). Water passing through the Albeni Falls Dam is also expected to be passed with no net increase in TDG.

- In a riverine system, TDG levels are typically at equilibrium with atmospheric pressures. Natural sources of TDG include water falls and algae blooms. Natural sources of TDG do not occur within the Pend Oreille River in Idaho, so the entire load allocation and load reductions identified in this TMDL are given to Cabinet Gorge and Albeni Falls Dams.
- A TDG TMDL was written by DEQ in June 2007 for the Lower Clark Fork Subbasin and was approved by EPA on October 22, 2007 (DEQ 2007b). The approved TMDL addresses two assessment units of the Clark Fork River below the Cabinet Gorge Dam (ID17010213PN001_08 and ID17010213PN003_08) and one assessment unite above Cabinet Gorge Dam (ID17010213PN005_08). The TDG load allocations were made to Cabinet Gorge Dam and the Idaho water quality standard of 110% saturation was set as the TMDL target. Addressing TDG production at Cabinet Gorge Dam will reduce TDG levels in the Pend Oreille River above Albeni Falls Dam.
- The Washington state and Kalispel Tribe's TDG water quality standard is the same as Idaho's – less than or equal to 110% saturation. Attainment of the Idaho's water quality standard in the Idaho portion of the river will result in meeting Washington's and the Kalispel Tribe's water quality standard.

1. Subbasin Assessment – Water Quality Concerns and Status

This document contains total maximum daily loads (TMDLs) for the Pend Oreille River and Lake Pend Oreille in Idaho and addresses excess total dissolved gas (TDG).

1.1 Water Quality Limited Assessment Units Occurring in the Subbasin

Section 303(d) of the CWA states that waters that are unable to support their beneficial uses and that do not meet water quality standards must be listed as water quality limited waters. Subsequently, these waters are required to have TMDLs developed to bring them into compliance with water quality standards.

DEQ tracks waters in Idaho by assigning water bodies assessment unit identification numbers. The support status of the assessment unit and corresponding water body are then reported to EPA.

Listed Waters

Table 3 shows the assessment unit/pollutant combinations addressed in this document listed in section 5 of Idaho's 2002 Integrated Report.

Table 3. Impaired Pend Oreille River Segments in Idaho listed in Section 5 of Idaho's 2002 Integrated Report.

Water Body Name	Assessment Unit ID Number	Segment Boundaries	Pollutants	Listing Basis
Pend Oreille River	ID17010214PN001_08	Pend Oreille Lake to Priest River	TDG	DEQ Assessment
Pend Oreille River	ID17010214PN002_08	Priest River to Strong Island	TDG	DEQ Assessment
Pend Oreille River	ID17010216PN002_08	Albeni Falls Dam to Idaho/Washington border	TDG	DEQ Assessment

During the development of this report TDG percent saturation was identified as exceeding Idaho water quality standards within Lake Pend Oreille. As a result of this exceedance Lake Pend Oreille is recommended for inclusion in Idaho's next Integrated Report listing cycle and included in this report (Table 4).

Table 4. Lake Pend Oreille assessment unit in Idaho not listed in Section 5 of Idaho's 2002 Integrated Report but impaired by TDG.

Water Body Name	Assessment Unit ID Number	Segment Boundaries	Pollutants	Listing Basis
Lake Pend Oreille	ID17010214PN018_0L	Clark Fork River confluence to Sagle Slough	TDG	DEQ Assessment

1.2 Applicable Water Quality Standards

Cold water aquatic life, primary contact recreation, and domestic water supply are all designated beneficial uses for the Pend Oreille River above Albeni Falls Dam in Idaho (IDAPA 58.01.02.110.05.). Cold water aquatic life and primary contact recreation are considered presumed uses below Albeni Falls Dam. Cold water aquatic life, salmonid spawning, primary contact recreation, domestic water supply, and special resource water are all designated uses for Lake Pend Oreille (IDAPA 58.01.02.110.05). Existing, designated and presumed uses are discussed below.

Beneficial Uses

Idaho water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and presumed uses as briefly described in the following paragraphs. The *Water Body Assessment Guidance*, second edition (Grafe et al. 2002) gives a more detailed description of beneficial use identification for use assessment purposes.

Existing Uses

Existing uses under the CWA are "those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards." The existing in-stream water uses and the level of water quality necessary to protect the uses shall be maintained and protected (IDAPA 58.01.02.050.02, .02.051.01, and .02.053). Existing uses include uses actually occurring, whether or not the level of quality to fully support the uses exists. A practical application of this concept would be to apply the existing use of salmonid spawning to a water that could support salmonid spawning, but salmonid spawning is not occurring due to other factors, such as dams blocking migration.

Designated Uses

Designated uses under the CWA are "those uses specified in water quality standards for each water body or segment, whether or not they are being attained." Designated uses are simply uses officially recognized by the state. In Idaho these include uses such as aquatic life support, recreation in and on the water, domestic water supply, and agricultural uses. Water quality must be sufficiently maintained to meet the most sensitive use. Designated uses may be added or removed using specific procedures provided for in state law, but the effect must not be to preclude protection of an existing higher quality use such as cold water aquatic life or salmonid spawning. Designated uses are specifically listed for water bodies in Idaho in the Idaho Water Quality Standards (see IDAPA 58.01.02.003.27 and .02.109-.02.160 in addition to citations for existing uses).

Presumed Uses

In Idaho, most water bodies do not yet have specific use designations as identified in the Idaho Water Quality Standards. In the interim, DEQ presumes that most waters in the state will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To protect these so-called "presumed uses," DEQ will apply the

numeric cold water criteria and primary or secondary contact recreation criteria to undesignated waters. If in addition to these presumed uses, an additional existing use exists for the water body (e.g., salmonid spawning), then the numeric criteria for salmonid spawning would also apply (e.g., intergravel dissolved oxygen, temperature). However, if the presumed use is not found to be an existing use, an use designation to that effect is needed before some other aquatic life criteria can be applied in lieu of cold water criteria (IDAPA 58.01.02.101.01).

The Pend Oreille River has multiple beneficial uses (Table 5). The beneficial use to be protected by this TMDL is the designated cold water aquatic life use.

Table 5. Pend Oreille River and lake beneficial uses.

Water Body	Uses[a]	Type of Use
Pend Oreille River – Pend Oreille Lake to Albeni Falls Dam	CWAL, PCR, DWS	Designated
Pend Oreille River – Albeni Falls Dam to Idaho/Washington border	CWAL, PCR	Presumed
Lake Pend Oreille	CWAL, SS, PCR, DWS, SRW	Designated

[a] CWAL – cold water, PCR – primary contact recreation, DWS – domestic water supply, SS – salmonid spawning, SRW – special resource water

Criteria to Support Beneficial Uses

Beneficial uses are protected by a set of criteria, which include *narrative* criteria for pollutants such as sediment and nutrients and *numeric* criteria for pollutants such as bacteria, dissolved oxygen, pH, ammonia, temperature, TDG and turbidity (IDAPA 58.01.02.250). The Idaho numeric water quality criteria for TDG (IDAPA 58.01.02.211.01.b.) states:

> "*The total concentration of dissolved gas not exceeding one hundred and ten percent (110%) of saturation at atmospheric pressure at the point of sample collection.*"

1.3 Pollutant/Beneficial Use Support Status Relationships

Most of the pollutants that impair beneficial uses in streams are naturally occurring, but have increased concentrations, most often, due to human activity. Streams, rivers, and lakes have the potential to naturally increase TDG levels above the Idaho water quality standard of 110% saturation, but in the Pend Oreille River TDG is produced anthropogenically when water is spilled at Cabinet Gorge, Albeni Falls Dam, and upstream sources in Montana. TDG in Lake Pend Oreille is produced at Cabinet Gorge Dam and upstream sources in Montana.

Total Dissolved Gas (TDG)

The Idaho water quality criteria for TDG is 110% saturation or less in order to protect aquatic life beneficial uses. TDG supersaturation occurs during spring runoff, when river discharge exceeds the hydroelectric facilities powerhouse capacity and water is spilled. During spill atmospheric gases become entrained by the increased pressure in the pools below dams, and can remain in the river for significant distances downstream. As the bubbles dissipate and the water enters the downstream reach, excess TDG will remain in solution unless wind- or channel-induced turbulence causes more degassing. Less turbulent reaches below dams are less-effective at dissipating the entrained gases than more turbulent river systems.

TDG supersaturation can cause gas bubble trauma in fish, and may limit habitat due to the potentially lethal presence of elevated gas levels in habitat areas. Gas bubble trauma occurs when TDG is transferred into the bloodstream while in solution and is then released as a gas while still in the body of the fish due to a change in pressure. As a result, gas bubbles form within the body cavity, fins, and/or gills. Development of internal gas bubbles can form in many body cavities, disrupting neurological, cardiovascular, respiratory, osmoregulatroy, and other physical functions (Stroud and Nebeker 1976, Weitkamp and Katz 1980, Fidler 1988, and Shrimpton et al 1990a and 1990b). Gas bubble trauma also increases the susceptibility of aquatic organisms to other stress often resulting in death.

1.4 Summary and Analysis of Existing Water Quality Data

Cabinet Gorge Dam is operated by Avista Utilities and Albeni Falls Dam is operated by the US Army Corps of Engineers (ACE). Avista Utilities has been collecting TDG data annually since 1995. Data collected at Cabinet Gorge Dam shows exceedances of the Idaho TDG water quality standard during periods of spill. The TDG data collected at Albeni Falls Dam by ACE also shows exceedances of Idaho water quality standards.

Flow Characteristics

Flow characteristics of the Pend Oreille and Clark Fork Rivers is dominated by a spring runoff pattern. Flows within the river are highest April through June and lowest July through October (Figure 4 and 5).

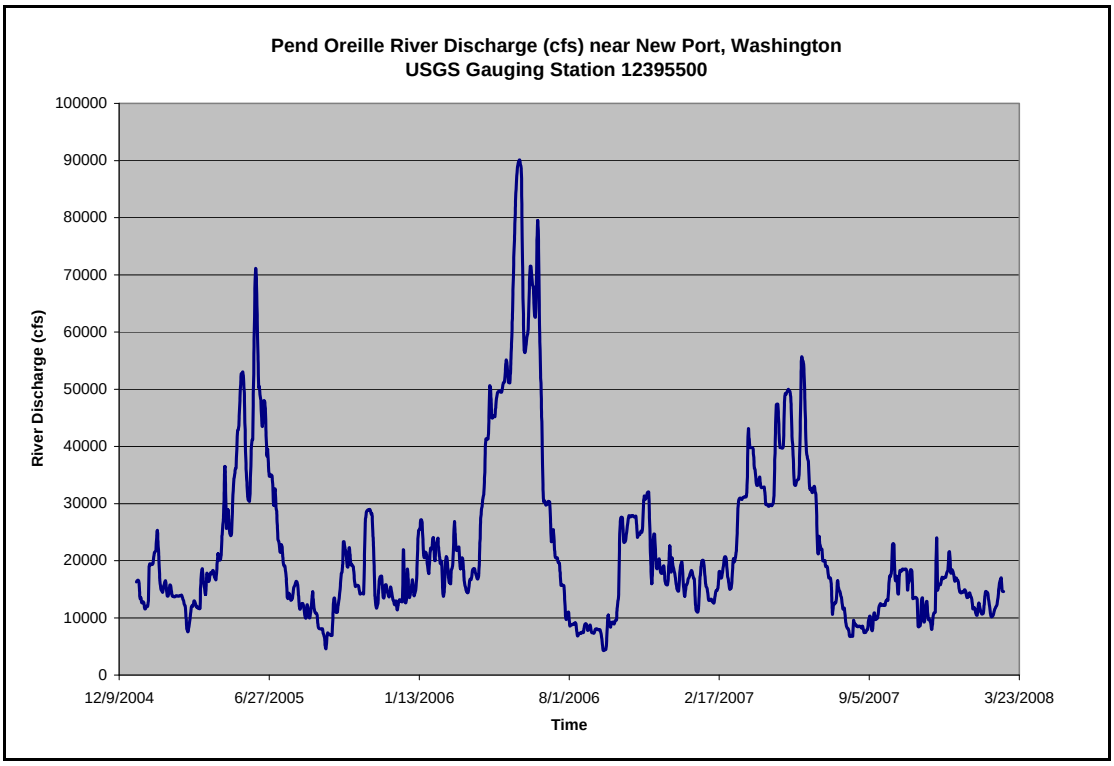


Figure 4. Pend Oreille River discharge at USGS gaging station 12395500 downstream of Albeni Falls Dam near Newport, Washington.

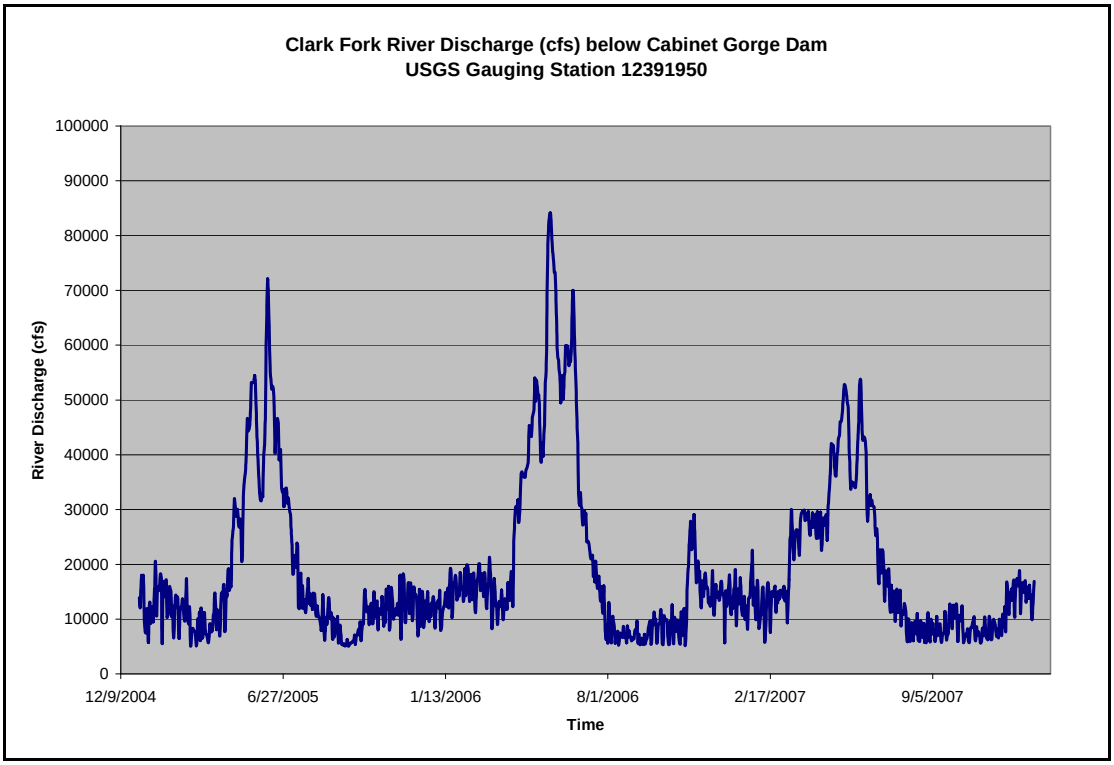


Figure 5. Clark Fork River discharge at USGS gaging station 12391950 downstream of Albeni Falls Dam near Newport, Washington.

Cabinet Gorge and Albeni Falls Dams are operated for power generation, flood control and recreational uses. Water levels in Cabinet Gorge Reservoir and Lake Pend Oreille are maintained in the summer time for boating and fishing, and lowered in the fall in preparation for the spring thaw.

During spring snowmelt, river discharge often exceeds the powerhouse hydraulic capacity at Cabinet Gorge and Albeni Falls Dam. To compensate for these discharge events water is spilled through spill gates. The maximum discharge capacity of the powerhouse at Albeni Falls and Cabinet Gorge Dams is approximately 33,000 cfs and 38,000 cfs respectfully.

Albeni Falls Dam was built on the site of Albeni Falls a natural water fall or rapid sometimes referred to as Villard Falls or Seniaquoteen Falls (US Fish Commission 1894). Prior to construction of Albeni Falls Dam the natural falls were described in a bulleting written by the United State Fish Commission in1894 as "scarcely more than pretty steep rapids"(US Fish Commission 1894).

Based on this historic description it is anticipated that TDG was not produced naturally at this location. Total dissolved gas is most often reduced as water passes over rapids resulting in increased turbulence and water de-gassing. Currently the height at which water is spilled by Albeni Falls Dam is higher than that of the natural Albeni Falls resulting in TDG production.

Water Column Data

Clark Fork River and Lake Pend Oreille

Since 1995, Avista Utilities has been monitoring TDG below Cabinet Gorge Dam during spring runoff periods (generally April – July). Below Cabinet Gorge Dam, peak hourly TDG levels were frequently 125-130% saturation in June. In 2002, levels exceeded 130% saturation about 16% of the time. Due to these frequent exceedances, there is on-going TDG monitoring and a mitigation plan in place. Details are available in *The Gas Supersaturation Control Program for the Cabinet Gorge and Noxon Rapids Hydroelectric Projects* (Avista 2004b). The plan was as approved by the DEQ and USFWS as a part of the required water quality certification for the project operations and as part of their federal license.

Data from 1996-2003 Avista Utilities' annual TDG reports (Parametrix 1996, 1997, 1999a, 1999b, 2000, 2001, 2003, 2004) are summarized in Table 6. Hourly measurements and detail on data collection are available in each report. Data in Table 6 was collected in the Clark Fork River and is intended to help identify the source of elevated TDG seen in the Pend Oreille River above Albeni Falls Dam. The estimated time of travel of elevated TDG from Cabinet Gorge Dam to Albeni Falls Dam was about one week in 2003 (Schneider et al. 2007).

Table 6. Existing TDG levels below Cabinet Gorge Dam.

Year	TDG Maximum (% saturation)	TDG Range During Spill	Days with >110% Saturation	Dates*	Notes
1996	138%	108-138%	18	5/28/1996-7/10/1996	Transect sampling on limited days was done before June 26. Continuous measurement began 6/26. Various spill gate configurations used.
1997	158%	119-158%	71	5/5/1997 - 7/14/1997	Spill was still occurring when monitoring stopped for the year, therefore exceedances likely continued beyond the monitoring dates.
1998	131%	102-131%	41	5/5/1998 - 7/28/1998	
1999	137%	102- 137%	44	5/22/1999 - 7/7/1999	There was a 17 day period where spill occurred, but the equipment malfunctioned. These days are counted in the days >110%.
2000	132%	103 - 132%	34	4/21/2000-6/30/2000	
2001	108%	No spill	0	4/30/2001-7/2/2001	There was no spill at either Noxon Rapids or Cabinet Gorge during 2001.
2002	139%	102-139%	53	4/24/2002-7/29/2002	
2003	130%	101-130%	26	5/1/2003-6/30/2003	Peak TDG level is estimated based on flow due to equipment error during peak flow. Nine days of spill were assumed to exceed based on spill level during the failure period.

*Spill may have begun before recording started, or continued beyond the end date of range. Some years there are gaps in the middle for equipment repair. After 1999, the recorded period typically begins before spill and ends after spill. See individual monitoring reports for specifics of each year. During some time periods, experimentation with spill gates contributed to higher TDG levels. Current operations minimize TDG production.

A large TDG plume was monitored in the northern portion of Lake Pend Oreille in 1997 (Figure 7). A 10% decrease in TDG was observed occurring between the Clark Fork River delta and Sandpoint, however, TDG levels still exceeded 125% saturation at Sandpoint mid-way through the spill period (Parametrix 1997). The study results indicated an extensive lateral distribution of the supersaturated plume in the north arm of the lake (Parametrix 1997). The TDG levels monitored in Lake Pend Oreille near Hope, Idaho have been similar to levels recorded elsewhere in the northern end of the lake, as well as in the Clark Fork River downstream of Cabinet Gorge Dam (Parametrix 2000). Similar studies in 1998 and 1999 also show a TDG plume extending from the Clark Fork River through the northern arm of Lake Pend Oreille and on into the Pend Oreille River (Parametrix 1998, 1999).

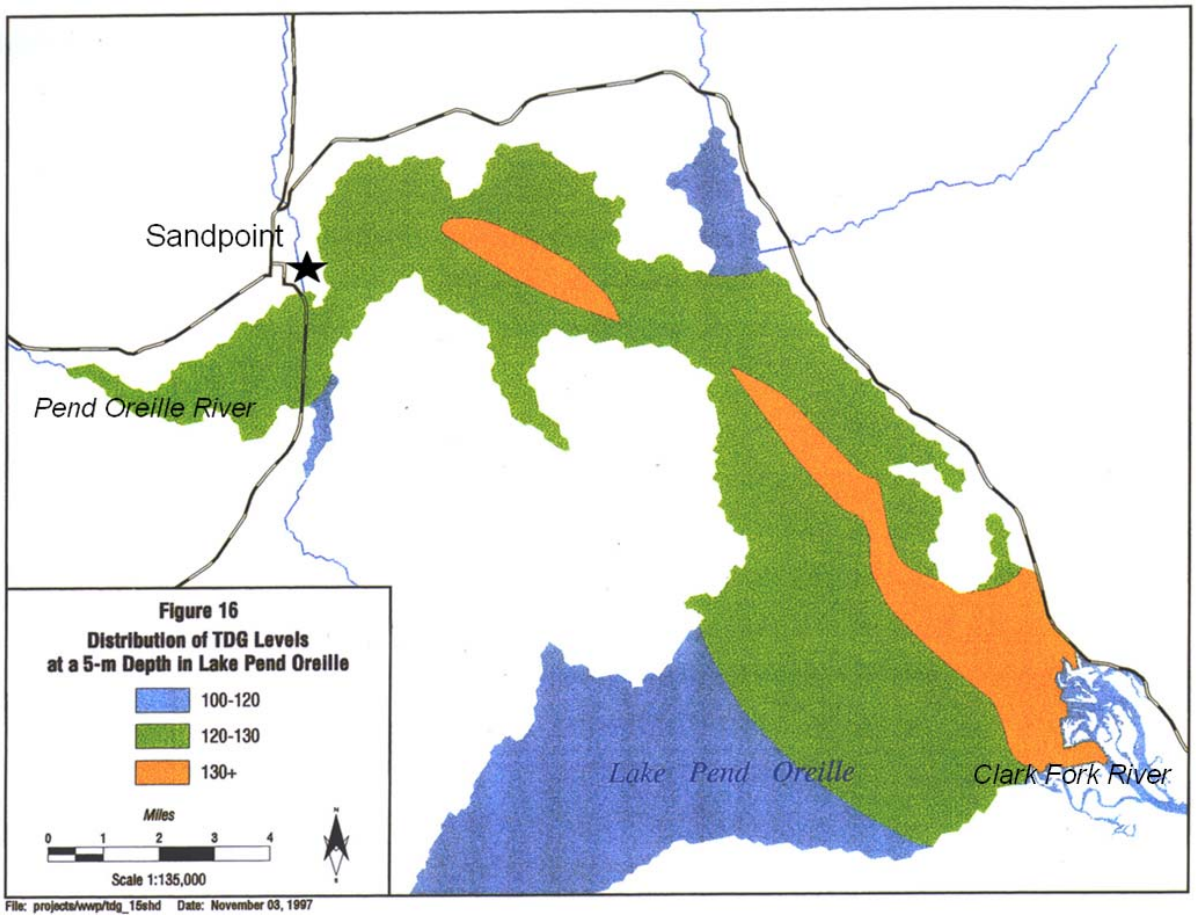


Figure 6. TDG plume monitored in 1997 (reproduced from Parametrix 1997).

Pend Oreille River

Monitoring of Pend Oreille River TDG levels above and below Albeni Falls Dam is conducted by ACE. Total dissolved gas levels above and below Albeni Falls Dam have been shown to exceed Idaho water quality standard of 110% saturation (Figures 8-10). Forebay TDG data was collected near the railroad trestle on the southern shore of the river (Figure 8-10). Tailwater TDG data was collected downstream of the Albeni Falls Dam spill gates also located on the south side of the river (Figure 9-10).

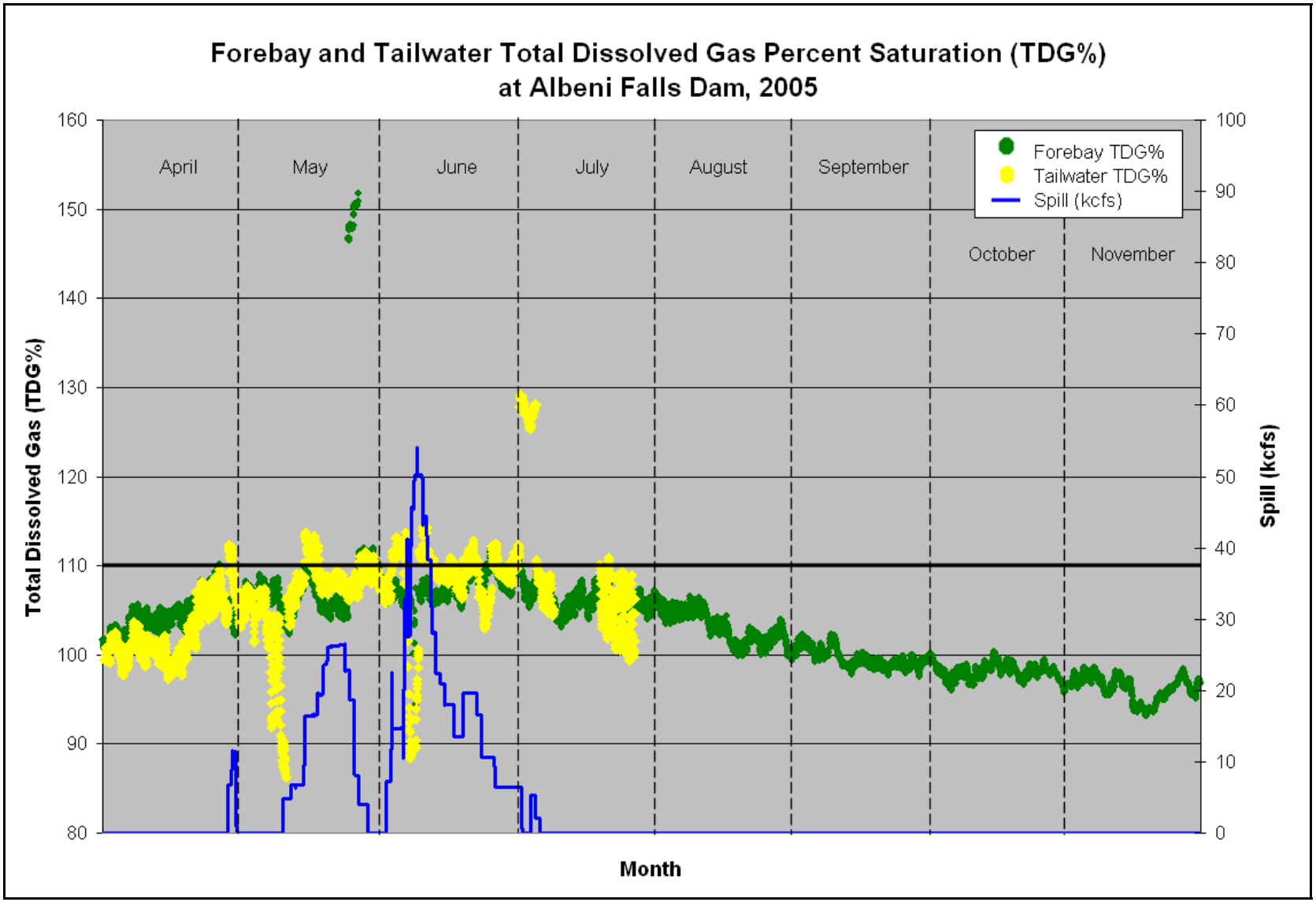


Figure 7. Forebay and Tailwater total dissolved gas percent saturation (TDG%) at Albeni Falls Dam, 2005.

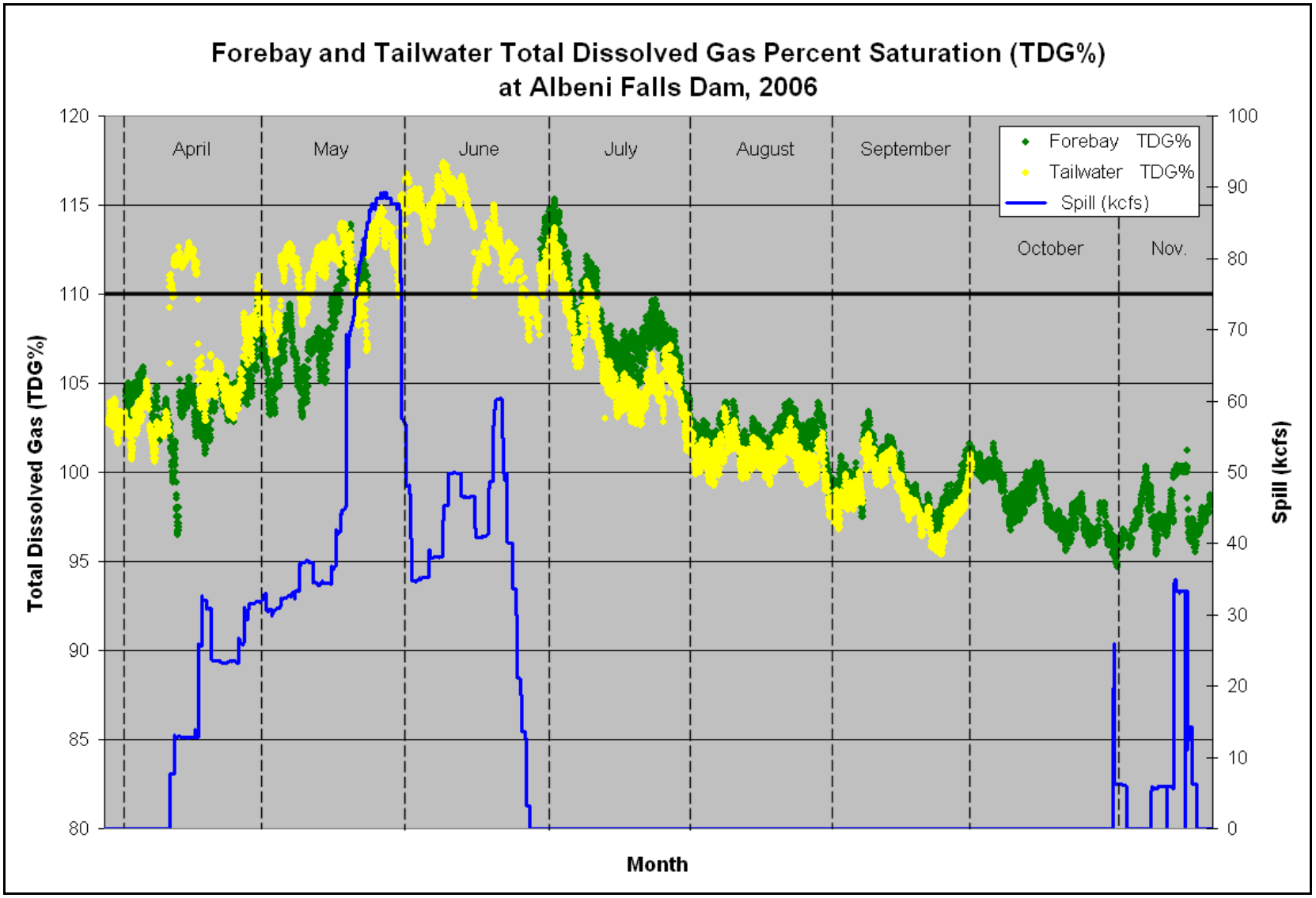


Figure 8. Forebay and Tailwater total dissolved gas percent saturation (TDG%) at Albeni Falls Dam, 2006.

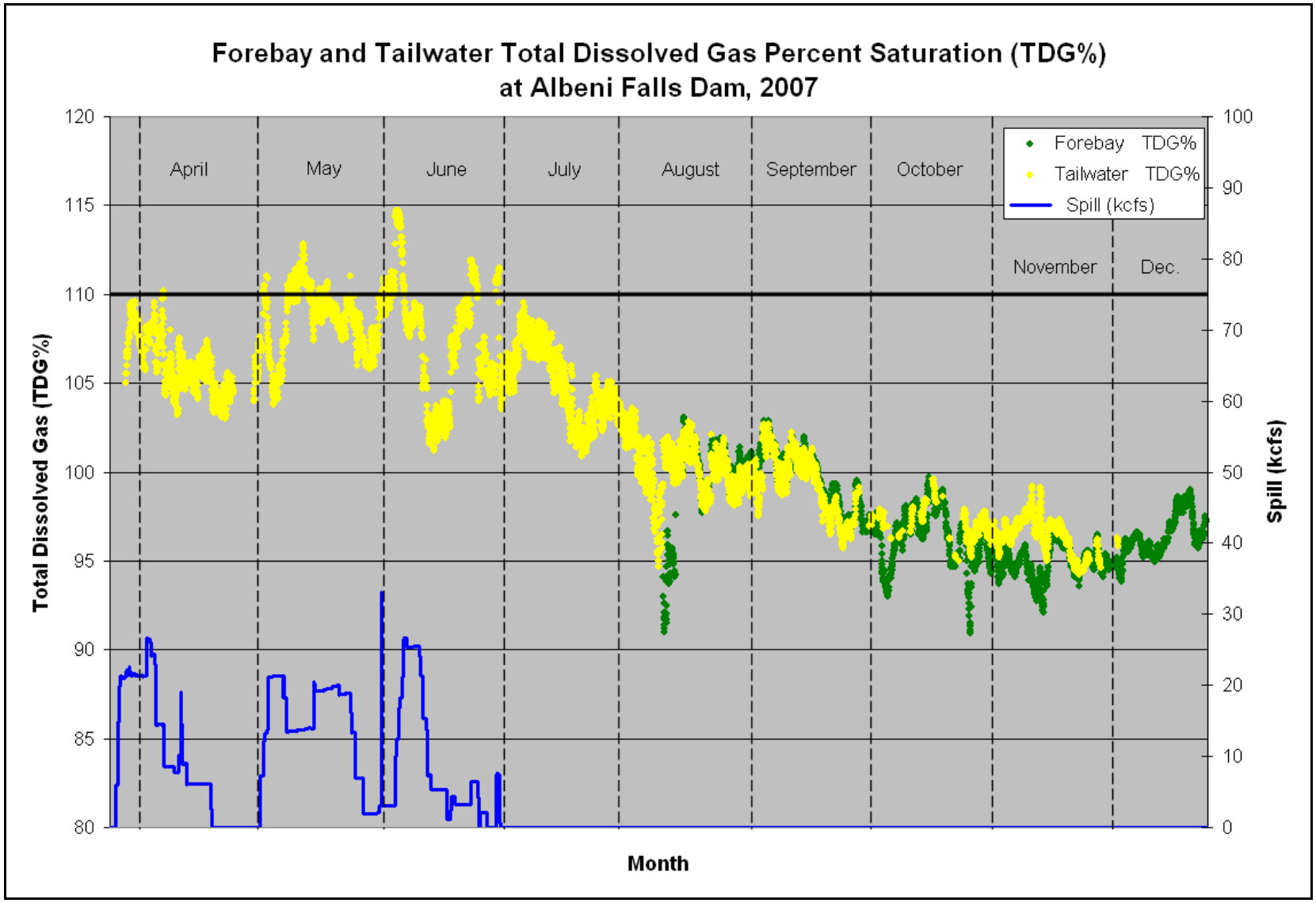


Figure 9. Forebay and Tailwater total dissolved gas percent saturation (TDG%) at Albeni Falls Dam, 2007.

TDG can be either produced, reduced, or transported at Albeni Falls Dam depending on the amount of spill, the number of spill gates open during spill, and forebay TDG levels. During spill in 2006 and 2007 the Idaho water quality standard was exceeded April through July. The highest TDG percent saturation for this period was recorded on June 8, 2006 at 117.3%. Tailwater TDG levels typically do not exceed 110% saturation when Albeni Falls is not spilling water. If tailwater TDG levels exceeds 110% saturation during times of no spill the elevated TDG levels are attributed to spill at Cabinet Gorge Dam.

A study conducted in 2003 by ACE showed that 43 kcfs (33 kcfs through the powerhouse and 10 kcfs spilled through all ten spill gates open one foot) can be passed at Albeni Falls Dam with little or no TDG production when spill is distributed through all ten spill gates open one foot (Schneider et al. 2007). This spill amount resulting in minimal or no TDG production is highly dependent on the number of spill gates open. Comparing Pend Oreille River discharge and TDG percent saturation below Albeni Falls Dam indicates TDG production above 110% saturation can occur at approximately 26.2 kcfs (Figure 10).

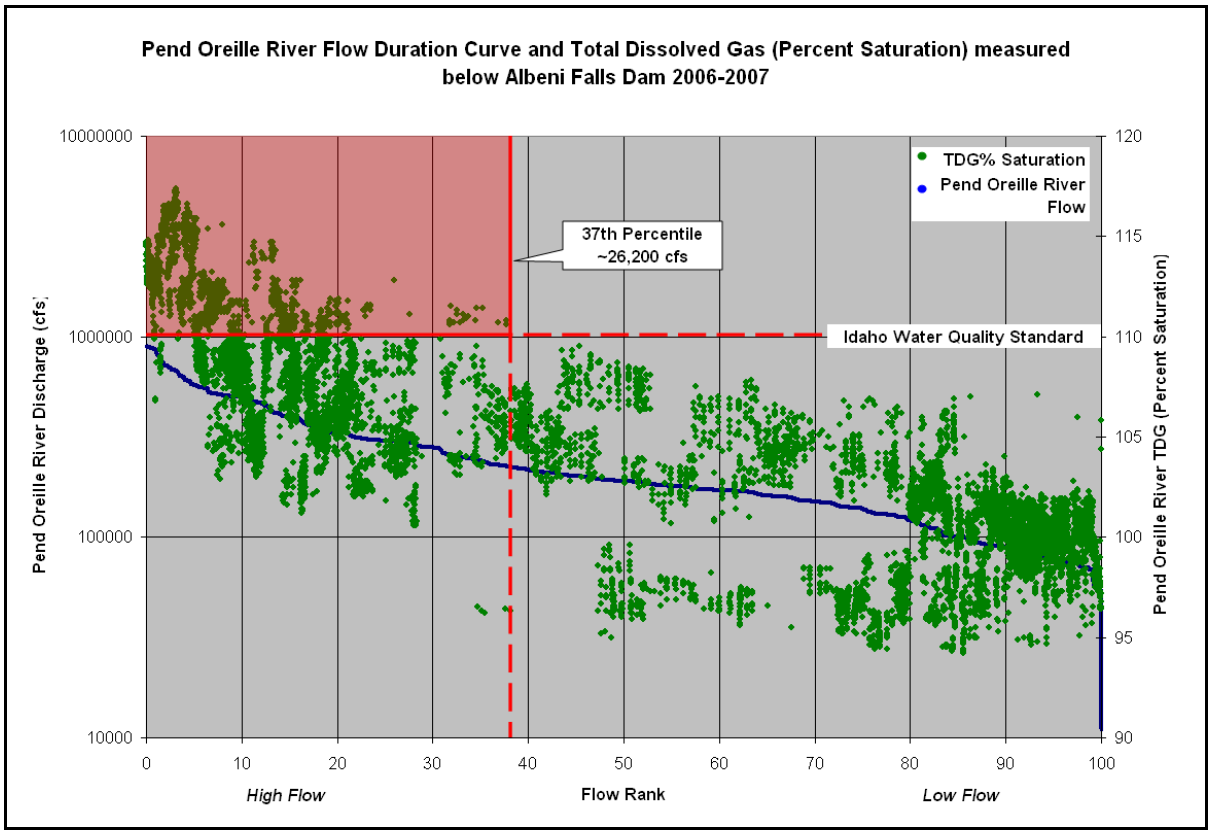


Figure 10. Pend Oreille River flow duration curve and total dissolved gas (percent saturation) measured below Albeni Falls Dam 2006-2007.

TDG% saturation values in Figure 10 were overlain the Pend Oreille flow duration curve to visually represent river discharge and TDG production. All tailwater TDG data was removed when forebay TDG% saturation was above 110%. Based on data from 2006 and 2007 (representing typical Pend Oreille River flow patterns with associated TDG data) TDG% saturation can exceed Idaho water quality standard when Pend Oreille River discharge approaches 26.2 kcfs. Twenty-six thousand two hundred cubic feet per second is well below

the 43 kcfs (33 kcfs powerhouse capacity plus 10 kcfs spill) estimated to produce little or no TDG (Schneider et al. 2007). Production of TDG below 43 kcfs maybe a result of spill occurring in only a few of the ten possible spill bays and reduced river discharge passing through the powerhouse.

Due to the low hydraulic head and shallow stilling basin Albeni Falls Dam produces significantly less TDG than Cabinet Gorge Dam, but is still capable of producing TDG in excess of the Idaho water quality standard when forebay waters are less than 110% saturation (Figure 10).

Biological and Other Data

Since the construction of hydropower facilities in northern Idaho, native fish populations have been declining in the area (PBTTAT 1998). The largest impact to bull trout and other fisheries populations comes from the Cabinet Gorge Dam upstream of Lake Pend Oreille and Albeni Falls Dam downstream of the lake. Impacts include loss of access to upstream habitat, artificially high lake levels, fluctuating flows and TDG levels that are in exceedance of Idaho water quality standards during high flow events (PBTTAT 1998).

When constructed, the Cabinet Gorge Dam cut off access to 46 percent of bull trout spawning and rearing habitat available at the time of construction (PBTTAT 1998). The earlier construction of Thompson Falls Dam in Montana cut off a much larger portion of the habitat in the early 1900s (PBTTAT 1998).

Recent studies by Avista Utilities, in coordination with resource and regulatory agencies have explored the impacts of TDG supersaturation on fisheries populations. While it is clear there is some displacement, there was still some question as to the extent of impact the increased gas levels have on fish populations in the river.

To test the effects of TDG in the Pend Oreille River, fish were placed in live cages on two different occasions. A cage was placed in the Clark Fork River near the mouth approximately seven miles downstream of Cabinet Gorge Dam at White's boat launch. On June 20, rainbow and cutthroat trout were placed in the cage and suffered 100% mortality within four days (Parametrix 1997). During the live cage study TDG percent saturation levels were near 140% (Parametrix 1997).

During the second live cage test, fish filled cages were placed at the Johnson Creek fish hatchery and at White's boat launch. During this test TDG percent saturation ranged between 123% and 138% (Parametrix 1997). Surviving trout during this test exhibited gas bubble trauma , as evidenced by bubbles in paired fins, the lateral line, the opercular area (gill cover), and other body areas (Parametrix 1997).

Although the fish in the 1997 experiment were confined to cages and unable to compensate for increased TDG, the experiment identifies the worst case scenario. Fish that consistently remain in shallow water habitats during times of elevated TDG saturation are susceptible to impacts which may result in the development of gas bubble trauma. The TDG Idaho water quality standard is applicable to the entire water column. If conditions are met to protect fish under the 1997 test condition fish will be protected under normal more mobile conditions.

Status of Beneficial Uses

The cold water aquatic life use is impaired as a result of excess TDG. Elevated TDG levels alter aquatic life uses, restrict available habitat, and in sever cases results in death.

Conclusions

Increased TDG percent saturation occurring above Albeni Falls Dam is produced at Cabinet Gorge Dam and passed through the Pend Oreille River and lake system in Idaho. Spill at Albeni Falls Dam has the capability of transmitting elevated TDG, increase or reducing TDG from upstream to downstream depending on forebay TDG levels and the spill configuration. The production of TDG at Cabinet Gorge and Albeni Falls Dam is impacting aquatic life uses in the Pend Oreille River throughout Idaho.

Due to violations of Idaho's TDG water quality standard, a TDG TMDL was developed for all portions of the Pend Oreille River and lake in Idaho. Water quality violation occur during spring snow melt when river discharge exceeds the powerhouse capacity of Cabinet Gorge and Albeni Falls Dams and water is spilled.

1.5 Data Gaps

Continued fish sampling efforts throughout the northern portion of the lake and the Pend Oreille River above and below Albeni Falls Dam is needed to further assess TDG effects on fisheries.

2. Subbasin Assessment–Pollutant Source Inventory

This section discusses known sources of TDG in the Pend Oreille River and lake. Information on point and nonpoint sources is summarized and data gaps are identified for future research and monitoring.

2.1 Sources of Pollutant of Concern

The pollutant of concern, TDG, is generated at the Cabinet Gorge and Albeni Falls Dams. The TDG production at Cabinet Gorge and Albeni Falls Dams is considered non-point source although the pollutant is generated by known sources.

Total Dissolved Gas (TDG)

The courts have characterized dams as point sources for which NPDES permits will not be issued for certain parameters, including TDG. Therefore, TDG is addressed through TMDL allocations, instead of through the NPDES permit process. The Cabinet Gorge Dam powerhouse has a hydraulic capacity of approximately 38,000 cfs. When river flows exceed this powerhouse capacity, excess flow spills, entraining gases in the water at supersaturated levels. While spill gates are operated to reduce the entrainment of gases, as flows increase and spill increases, typically during spring snow melt, TDG pollution is created. These entrained gases remain in the water column into Lake Pend Oreille and the Pend Oreille River, restricting available fisheries habitat.

Manipulation of the spill gates at Albeni Falls can limit the production of TDG; however, the forebay often exceeds 110% saturation. The source of TDG in excess of 110% saturation in the Albeni Falls forebay is Cabinet Gorge Dam. Reduction is TDG production at Cabinet Gorge Dam will reduce TDG production occurring at Albeni Falls Dam during spill.

Pollutant Transport

TDG levels can remain high for significant distances, absent opportunities for the water to degas (e.g., rapids, turbulent water, or other gas releasing flow situations). There are no rapids between Cabinet Gorge and Albeni Falls Dam, and the only degassing occurs due to wind action on the Clark Fork River, Pend Oreille Lake and Pend Oreille River. The estimated travel time for TDG from Cabinet Gorge Dam to Albeni Falls Dam was one week in the spring of 2003 (Schneider et al. 2007).

2.2 Data Gaps

Additional data would be helpful to help characterize the inputs of possible natural sources of TDG. Natural sources of TDG are not anticipated to be contributing to TDG super-saturation but additional data exploring these sources would eliminate them as possible contributors. Monitoring TDG percent saturation in the Pend Oreille Lake northern pool will help identify the extend of TDG pollution and help track progress in meeting the TDG TMDL goals.

3. Subbasin Assessment – Summary of Past and Present Pollution Control Efforts

Clark Fork River – Cabinet Gorge Dam

As part of the Federal Energy Regulatory Commission (FERC) relicensing of the Cabinet Gorge Dam, Avista Utilities entered into an agreement with DEQ and the US Fish and Wildlife Service to develop a plan to reduce TDG produced by the Cabinet Gorge Dam, *Final Gas Supersaturation Control Program of the Clark Fork Project* (Avista 2004b). As a result Avista Utilities developed the Gas Supersaturation Control Program (GSCP) and submitted the plan to DEQ in December 2002. DEQ reviewed and approved the GSCP in February 2004. The GSCP is intended to fulfill the related requirements of the Settlement Agreement (Appendix F5, and Articles 413, 432, and Appendix D of the FERC License, Avista 2004).

Requirements of the protection, mitigation and enhancement (PM&E) section of the GSCP include the following:

- Proposed operational procedures to minimize TDG production from the facility
- Proposed TDG monitoring and reporting requirements, including requirements to evaluate effectiveness of control and mitigation, and
- Proposed strategies to control gas supersaturation downstream of Cabinet Gorge Dam.

The purpose of the proposed GSCP is to indentify the specific operational procedures in which Avista Utilities will undertake to address TDG production at Cabinet Gorge Dam and gas supersaturation in the downstream waters. The GSCP also addresses TDG and other monitoring activities, structural modifications downstream or upstream of Cabinet Gorge Dam, and any other mitigation measures that Avista Utilities will undertake to address the issue of TDG production (Avista 2004).

Pend Oreille River – Albeni Falls Dam

TDG levels above and below Albeni Falls Dam were monitored from May through June 2003 to identify dam operations which result in the lowest production of TDG. The TDG levels monitored in the forebay were supersaturated throughout the study period from upstream sources, frequently in excess of 110% (Schneider et al. 2007).

During the 2003 study at Albeni Falls Dam, TDG saturation above the dam was not uniform (Schneider et al. 2007). Discharge from Priest River five miles upstream from Albeni Falls does not mix well with the Pend Oreille River and as a result TDG levels are lower along the north shore of the forebay (Schneider et al. 2007). The highest TDG levels recorded during the 2003 monitoring occurred along the left (south) bank of the forebay (Schneider et al. 2007).

Exceedances of Idaho water quality criteria occurred during spill in the spring of 2003 at Albeni Falls Dam. Monitoring equipment was placed in the forebay, directly downstream of the dam, and approximately 1.5 miles downstream of the dam. During the monitoring period

TDG saturation varied depending upon the spill gate configuration. Findings of the 2003 report indicate that opening all ten spill gates one foot spilled the largest amount of water without causing a measurable increase in TDG (Schneider et al. 2007). Opening all ten spill gates one foot will spill approximately 10 kcfs, when additional water is needed to be spilled spill gates are opened further resulting in greater TDG production.

In comparison the spill gate configuration which produced the greatest increase in TDG occurred when 60% of the river discharge was spilled over only six spill bays (Schneider et al. 2007). Spilling water through only six spill bays increased TDG levels by an average of 4.1 percent of saturation (Schneider et al. 2007). Implementation of these findings will help to reduce the TDG saturation created at Albeni Falls Dam during spill.

4. Total Maximum Daily Load

A TMDL prescribes an upper limit on discharge of a pollutant from all sources so as to assure water quality standards are met. It further allocates this load capacity (LC) among the various sources of the pollutant. Pollutant sources fall into two broad classes: point sources, each of which receives a wasteload allocation (WLA); and nonpoint sources, each of which receives a load allocation (LA). Natural background (NB), when present, is considered part of the LA, but is often broken out on its own because it represents a part of the load not subject to control. Because of uncertainties regarding quantification of loads and the relation of specific loads to attainment of water quality standards, the rules regarding TMDLs (Water quality planning and management, 40 CFR Part 130) require a margin of safety (MOS) be a part of the TMDL.

Practically, the margin of safety is a reduction in the load capacity that is available for allocation to pollutant sources. The natural background load is also effectively a reduction in the load capacity available for allocation to humanmade pollutant sources. This can be summarized symbolically as the equation: LC = MOS + NB + LA + WLA = TMDL. The equation is written in this order because it represents the logical order in which a loading analysis is conducted. First the load capacity is determined. Then the load capacity is broken down into its components: the necessary margin of safety is determined and subtracted; then natural background, if relevant, is quantified and subtracted; and then the remainder is allocated among pollutant sources. When the breakdown and allocation are completed the result is a TMDL, which must equal the load capacity.

Another step in a loading analysis is the quantification of current pollutant loads by source. This allows the specification of load reductions as percentages from current conditions, considers equities in load reduction responsibility, and is necessary in order for pollutant trading to occur. The load capacity must be based on critical conditions – the conditions when water quality standards are most likely to be violated. If protective under critical conditions, a TMDL will be more than protective under other conditions. Because both load capacity and pollutant source loads vary, and not necessarily in concert, determination of critical conditions can be more complicated than it may appear on the surface.

A load is fundamentally a quantity of a pollutant discharged over some period of time, and is the product of concentration and flow. Due to the diverse nature of various pollutants, and the difficulty of strictly dealing with loads, the federal rules allow for “other appropriate measures” to be used when necessary. These “other measures” must still be quantifiable, and relate to water quality standards, but they allow flexibility to deal with pollutant loading in more practical and tangible ways. The rules also recognize the particular difficulty of quantifying nonpoint loads and allow “gross allotment” as a load allocation where available data or appropriate predictive techniques limit more accurate estimates. For certain pollutants whose effects are long term, such as sediment and nutrients, EPA allows for seasonal or annual loads.

4.1 In-stream Water Quality Targets

The goal of the TDG TMDL is to meet the Idaho water quality standard (IDAPA 58.01.02.250.01.b.) and restore impaired waters to “full support of all beneficial uses” (Idaho

Code 39.3611.3615). This TMDL will develop loading capacities and load reductions to meet the numeric Idaho water quality standard of TDG concentrations no greater than one hundred and ten percent (110%) of saturation at atmospheric pressures at the point of sample collection (IDAPA 58.01.02.250.01.b). Achieving 110% saturation in Idaho will meeting the downstream water quality standards of Washington and the Kalispel Tribe

Design Conditions

The critical time period is the time when exceedances of water quality standards are most likely to occur. For TDG, this is during runoff flows, which generally occur between May and July. Excess TDG is a concern anytime the flows exceed the capacity of hydroelectric facilities and spill occurs. The powerhouse capacity for the Cabinet Gorge Dam is about 38,000 cfs and the powerhouse capacity for Albeni Falls Dam is about 33,000 cfs.

Target Selection

Idaho's TDG water quality standard is numeric and set at 110% saturation (IDAPA 58.01.02.250.01.b.). Idaho water quality standards state that *the total concentration of dissolved gas not exceeding one hundred and ten percent (110%) of saturation at atmospheric pressure at the point of sample collection*. IDAPA 58.01.02.300 also states that:

> The DEQ Director has the following authority:
>
> a. To specify the applicability of the gas supersaturation standard with respect to excess stream flow conditions; and
>
> b. To direct that all known and reasonable measures be taken to assure protection of the fishery resource; and
>
> c. To require that operational procedures or project modifications proposed for compliance for dissolved gas criterion do not contribute to increased mortalities to juvenile migrants or impose serious delays to adult migrant fishes.

The target for this TMDL is 110% saturation or less. The water quality standard is based upon literature values that suggest levels above 110% saturation create the potential for adverse impacts to fish populations, through displacement and physical harm in the form of gas bubble trauma. The TDG water quality standard is designed to protect aquatic life.

Monitoring Points

There are established continuous monitoring stations in the Cabinet Gorge forebay and below Cabinet Gorge Dam, near the Cabinet Gorge fish hatchery. These locations will continue to be used as TDG monitoring stations on the Clark Fork River. Monitoring stations established by ACE along the Pend Oreille River above and below Albeni Falls Dam will be used to track TDG production associated with the operation of Albeni Falls Dam.

Although this TMDL does not allocate a load or load reduction to the Clark Fork River, the Clark Fork River is hydraulically connected to the Pend Oreille River and acts a conduit of TDG to the Pend Oreille River. Due to this the hydraulic connection, monitoring TDG levels in the Clark Fork River will help to evaluate the potential impact to the Pend Oreille River and direct implementation activities. The TDG load allocations and load reduction are

identified for the Lower Clark Fork River in the *Lower Clark Fork River Subbasin Assessment and TMDL* (DEQ 2007b).

4.2 Load Capacity

The load capacity for the Pend Oreille River and lake is set at the water quality standard of 110% saturation. Setting the TDG load capacity at 110% saturation ensures aquatic life uses are protected and Idaho water quality standards are met.

4.3 Estimates of Existing Pollutant Loads

Regulations allow that loadings "...may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading," (Water quality planning and management, 40 CFR § 130.2(I)). An estimate must be made for each point source. Nonpoint sources are typically estimated based on the type of sources (land use) and area (such as a subwatershed), but may be aggregated by type of source or land area. To the extent possible, background loads should be distinguished from human-caused increases in nonpoint loads.

In conjunction with the relicensing of Avista Utilities' Clark Fork and Noxon Rapids hydroelectric projects, and subsequent to the 1999 Settlement Agreement for operation of the projects and FERC license renewal (2001), monitoring of TDG levels during the spill season has occurred since 1995. A summary of these data is shown in Table C-1 (Appendix C) and annual TDG levels above and below Cabinet Gorge Dam are presented in Appendix C.

TDG levels have been monitored at Albeni Falls Dam by ACE. The TDG data collected above and below Albeni Falls Dam show TDG saturation above 110% during non-spill and spill periods. A summary of this data is shown in Table 8, Figures 8 – 10 and in Appendix C.

Nonpoint Source Existing Load

While produced by known sources, TDG is considered a nonpoint source pollutant. There are no point sources of TDG in the basin, therefore there are no wasteload allocations.

Cabinet Gorge Dam

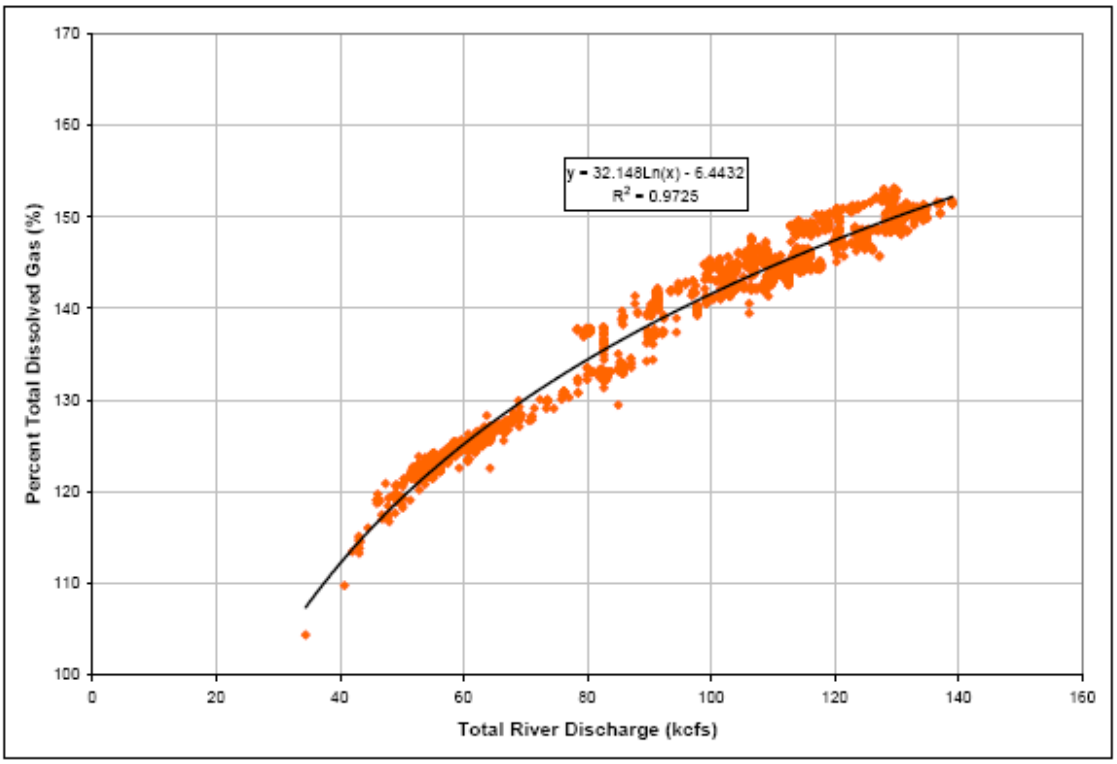
Background levels of TDG are not known for the Pend Oreille or Clark Fork Rivers. Therefore, the TDG allocation for the Clark Fork River at the Idaho/Montana border is considered to be an aggregate of natural background and all other nonpoint source loads of TDG. Existing data indicate that the Montana sources of TDG are occurring above Noxon Rapids Hydroelectric Project, as modifications required by the Settlement Agreement and subsequent Gas Supersaturation Control Program (2004) show no net increase in TDG even during times of spill at Noxon Rapids. Table 7 summarizes existing TDG loads above and below Cabinet Gorge Dam.

Table 7. Summary of Existing TDG levels above and below Cabinet Gorge Dam.

Load Type	Location	Range of Existing TDG Levels (% saturation)	Method

Nonpoint and natural background	Aggregate of nonpoint source loads in Montana and background at Cabinet Gorge forebay	99-126%	Actual Measurement in Cabinet Gorge forebay 1996-2003
Nonpoint and background	Below Cabinet Gorge Dam	101-158%	Actual Measurement below Cabinet Gorge Dam 1996-2003

TDG levels in the Clark Fork River are directly correlated with spill volume, and river flow at Cabinet Gorge Dam (Figure 8). Under current operations, spill at Cabinet Gorge Dam is involuntary, that is, it only occurs when river flows exceed powerhouse capacity. For example, when spill volume at Cabinet Gorge Dam reaches 10,000 cfs, an increase of 10% TDG is seen, and with spill at 30,000 cfs (river flow 63,000 cfs), an increase of 20% is seen (incoming TDG levels at this flow ranged from 105 – 115% saturation). Once river flow reaches 100,000 cfs, levels below Cabinet Gorge tend to be reach 140% saturation, with forebay TDG levels typically exceeding the 110% saturation standard as well.



Note: Total gas level vs. river discharge assumes powerhouse is operating at maximum capacity for the indicated total river discharge, in addition to the required discharge through the spillway.

Figure 11. Measured downstream TDG levels from Cabinet Gorge using "Best Gate" data points. (Reproduced from Avista 2004).

Albeni Falls Dam

Ranges of the existing TDG percent saturation values recorded above and below Albeni Falls Dam are outlined in Table 8.

Table 8. Summary of TDG (% saturation) above and below Albeni Falls Dam recorded 2005-2007.

Load Type	Location	Range of Existing TDG (% saturation)	Method
Nonpoint	Above Albeni Falls Dam	90.9 – 151.8%*	Actual Measurement in Albeni Falls forebay
Nonpoint	Below Albeni Falls Dam	94.2 – 117.4%*	Actual Measurement below Albeni Falls Dam

* Refer to Appendix C for measured TDG values greater than or equal to 110% saturation during 2005-2007 above and below Albeni Falls Dam.

4.4 Load Allocation

Elevated TDG levels in Pend Oreille River above Albeni Falls Dam occurs during periods of spill at the Cabinet Gorge Dam located upstream on the Clark Fork River near the Idaho/Montana border. The load allocations are determined by the following and set in the EPA approved *Lower Clark Fork River Subbasin Assessment and TMDL* (DEQ 2007b).

Cabinet Gorge Dam; LC = $LA_{\text{Below Cabinet Gorge Dam}}$ = 110% saturation

If Cabinet Gorge Dam forebay levels of TDG are above the 110% saturation water quality standard, the load allocation below Cabinet Gorge Dam is equal to TDG levels in the forebay (i.e., no net increase) (*Lower Clark Fork Subbasin Assessment and Total Maximum Daily Load*, DEQ 2007).

Because the Cabinet Gorge Dam has an allocation of zero when incoming levels exceed 110% saturation, Avista Utilities is required to maintain no net increase in TDG levels between monitoring areas in the Cabinet Gorge forebay and below the dam to be in compliance with water quality standards.

Achieving TDG levels in compliance with Idaho water quality standards at Cabinet Gorge Dam will result in Pend Oreille River TDG levels above Albeni Falls Dam meeting Idaho water quality standards. No other structures man-made or natural contribute to elevated TDG levels between Cabinet Gorge and Albeni Falls Dam.

Pend Oreille River and Lake

Albeni Falls Dam; LC = $LA_{\text{Below Albeni Falls Dam}}$ = 110% saturation

If levels of TDG are above the 110% saturation water quality standard in the Albeni Falls forebay, the load allocation below Albeni Falls Dam is equal to TDG levels in the forebay (i.e., no net increase). If TDG levels are below 110% saturation operations of the dam are not to increase TDG levels above 110% saturation (Table 9).

Table 9. TDG (% saturation) capacity for the Pend Oreille River and lake.

Stream Name	Assessment Unit	TDG (% saturation) Capacity

Pend Oreille River – Pend Oreille lake outlet to Priest River	ID17010214PN001_08	TDG less than or equal to 110% saturation
Pend Oreille River – Priest River to Strong Island	ID17010214PN002_08	TDG less than or equal to 110% saturation
Lake Pend Oreille	ID17010214PN018L_0L	TDG less than or equal to 110% saturation
Pend Oreille River – Below Albeni Falls Dam to Idaho/Washington border	ID17010216PN002_08	TDG less than or equal to 110% saturation

Because TDG is produced at known sources, Cabinet Gorge and Albeni Falls Dams, the entire load allocation is given to these producers. The load allocation for the Cabinet Gorge Dam has been established in the *Lower Clark Fork Subbasin Assessment and TMDL* (DEQ 2007b). The load allocation has been established in this document for the Albeni Falls Dam so that Idaho water quality standards are achieved during all flow conditions.

Margin of Safety

Due to the conservative nature of the criterion itself, and site specific information that indicates 110% saturation is protective of beneficial uses, the margin of safety will be considered implicit.

Seasonal Variation

The target will not vary seasonally; however, periods of exceedance have only been observed at times of spill, which correlate with spring peak flows. It is possible that due to extenuating circumstances (such as emergency maintenance), spill may occur at other times of the year, therefore the 110% saturation TMDL target will apply year-round.

Reasonable Assurance

Achievement of the goals identified in the Avista Cabinet Gorge GSCP will result in reduced TDG levels and attainment of Idaho water quality standards above Albeni Falls Dam. Refer to section *3.0 Past and Present Pollution Control Efforts*. The *Lower Clark Fork River Subbasin Assessment and TMDL* (DEQ 2007b) has identified pollutant load reductions needed by Cabinet Gorge Dam to meet Idaho water quality standards and has been approved by EPA, attainment of these reductions will directly impact TDG levels in the Pend Oreille River.

Opening all ten spill bays one foot at Albeni Falls Dam will spill the greatest volume of water (10 kcfs) with minimal or not TDG production. Implementation of this operation procedure is currently possible. When the spill capacity of 10 kcfs is exceeded additional TDG is produced and additional implementation action will be required.

Background

There are no known natural sources of TDG that result in substantial loading or water quality standards violations in the Pend Oreille River.

Reserve

There is no reserve amount allocated, as no additional sources of TDG are anticipated or feasible due to the consistent exceedances during peak flows.

4.5 Implementation Strategies TDG

In the case of TDG, DEQ is the designated lead management agency responsible for TMDL implementation and will make every effort to address past, present, and future pollution problems in an attempt to link them to watershed characteristics and management practices designed to improve water quality and restore the beneficial uses of the water body. DEQ recognizes that implementation strategies for TMDLs may need to be modified if monitoring shows that the TMDL goals are not being met or significant progress is not being made toward achieving the goals.

Time Frame

The Final Gas Supersaturation Control Program (GSCP) (Avista 2004b) outlines commitments and steps to substantially reduce TDG production from Cabinet Gorge Dam and offset the impacts through mitigation efforts. The GSCP also outlines operations at Noxon Rapids Dam and at Cabinet Gorge Dam that have lowered TDG levels since 1999. Due to the complexity of potential operational changes needed to reduce TDG below Cabinet Gorge Dam, a timeframe of ten years is expected to reduce impacts of TDG to levels that are not impacting beneficial uses. Due to recent engineering concerns, the GSCP approved in 2004 will be reviewed in 2007 for feasibility. If revised, the approach must comply with state water quality standards and meet the intent of the TMDL. Similar to Montana DEQ's responsibility to ensure meeting Idaho water quality standards at the border, so must Idaho DEQ allocate TDG reductions to meet Washington and Kalispel Tribal TDG standards downstream in the Pend Oreille River. If appropriate, DEQ may withdraw and/or modify the current TMDL in response to a revised GSCP.

Opening all ten spill bays at Albeni Falls Dam when river discharge exceeds the powerhouse capacity (33 kcfs) and the spill volume is less than 10 kcfs will result in minimal TDG production (Schneider et al. 2007). The time frame for implementing this action is non-existent and can be implemented when discharge exceeds power house capacity and spill volumes are less than 10 kcfs (Schneider et al. 2007). When spill volumes exceed 10 kcfs additional implementation actions will be required to insure that Albeni Falls Dam does not produce TDG in excess of 110% saturation (Figure 9).

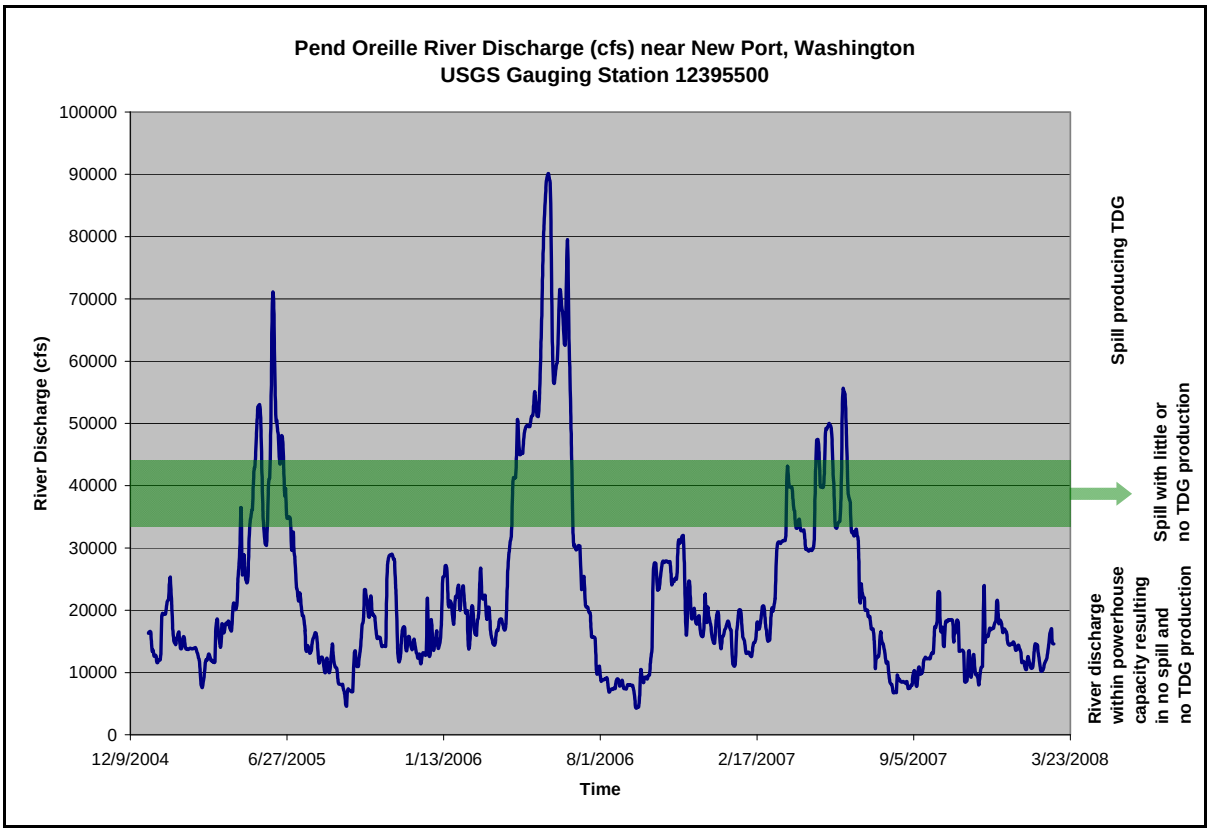


Figure 12. Pend Oreille River discharge (cfs) near New Port, Washington USGS gauging station 12395500.

Approach

No net increase in TDG production from operation of the Cabinet Gorge Dam is expected when the GSCP was fully implemented as written. Recent developments in the engineering design of the preferred option outlined in the GSCP have indicated that this level of TDG reduction may not be achievable by the bypass tunnel design (Avista 2007a, 2007b). The GSCP (2004) includes provisions to evaluate the effectiveness of the proposed bypass tunnel, and then decide whether to proceed or investigate other alternatives for action. Actual methods of TDG abatement may change as approved by DEQ and other regulatory agencies in a revised GSCP. DEQ will continue to work with Avista Utilities and the Settlement committee to ensure that the TDG impacts are reduced, offset or otherwise mitigated through revisions to the GSCP.

Implementation of ACE 2003 study at Albeni Falls Dam will result in minimal TDG production as a function of dam operation. Opening all ten spill gate to one foot during periods of river discharge in excess of the powerhouse capacity in 2003 showed a minimal increase in TDG levels when spill volume was less than or equal to 10 kcfs. TDG saturation levels recorded in the forebay of Albeni Falls Dam are a result of TDG produced at Cabinet Gorge Dam. Implementation of the GSCP will reduce TDG levels throughout the Pend Oreille River including the Albeni Falls Dam forebay.

Responsible Parties

Avista Utilities is responsible for implementing the GSCP as a condition of its FERC license to operate. In addition to regulatory agencies, there is a multi-stakeholder group established to monitor progress toward achieving the goals of the settlement, which include reducing TDG impacts through mitigation projects and actual reduction of TDG production from the Cabinet Gorge Dam.

The ACE is responsible for the operation of Albeni Falls Dam.

Monitoring Strategy

Monitoring by Avista Utilities using DEQ approved methodology occurs above and below Cabinet Gorge Dam and will continue throughout the life of the FERC license. Monitoring at Albeni Falls Dam will be conducted by ACE and will include monitoring locations above and below the facility.

Pollutant Trading

Pollutant trading (aka water quality trading) is a contractual agreement to exchange pollution reductions between two parties. Pollutant trading is a business-like way of helping to solve water quality problems by focusing on cost-effective, local solutions to problems caused by pollutant discharges to surface waters. Pollutant trading is voluntary. Parties trade only if both are better off as a result of the trade. Trading allows parties to decide how to best reduce pollutant loadings within the limits of certain requirements. The appeal of trading emerges when pollutant sources face substantially different pollutant reduction costs. Typically, a party facing relatively high pollutant reduction costs compensates another party to achieve an equivalent, though less costly, pollutant reduction.

Pollutant trading is recognized in Idaho's Water Quality Standards at IDAPA 58.01.02.054.06. Currently, DEQ's policy is to allow for pollutant trading as a means to meet TMDLs, thus restoring water quality limited water bodies to compliance with water quality standards. The Pollutant Trading Guidance document sets forth the procedures to be followed for pollutant trading.

Trading Components

The major components of pollutant trading are trading parties (buyers and sellers) and credits (the commodity being bought and sold). Additionally, ratios are used to ensure environmental equivalency of trades on water bodies covered by a TMDL. All trading activity must be recorded in the trading database through the Idaho Clean Water Cooperative, Inc.

Both point and nonpoint sources may create marketable credits. Credits are a reduction of a pollutant beyond a level set by a TMDL. Point sources create credits by reducing pollutant discharges below NPDES effluent limits which are set initially by the wasteload allocation. Nonpoint sources create credits by implementing approved BMPs that reduce the amount of pollutant run-off. Nonpoint sources must follow specific design, maintenance, and monitoring requirements for that BMP, apply discounts to credits generated if required, and provide a water quality contribution to ensure a net environmental benefit. The water quality contribution also ensures the reduction (the marketable credit), is surplus to the reductions

the TMDL assumes the nonpoint source is achieving to meet the water quality goals of the TMDL.

Watershed Protection

Trades must be implemented so that the overall water quality of the water bodies covered by the TMDL are protected. To do this, hydrologically-based ratios are developed to provide that trades between sources distributed throughout the TMDL water bodies result in environmentally equivalent or better outcomes at the point of environmental concern. In addition, localized adverse impacts to water quality are not allowed.

Trading Framework

In order for pollutant trading to be authorized it must be specifically mentioned within a TMDL document. After adoption of an EPA-approved TMDL, DEQ, in concert with the WAG, must develop a pollutant trading framework document as part of an implementation plan for the watershed that is the subject of the TMDL. The elements of a trading document are described in DEQ's Pollutant Trading Guidance (IDEQ 2003a) available on the Web at http://www.deq.idaho.gov/water/prog_issues/waste_water/pollutant_trading/pollutant_trading_guidance_entire.pdf. As of this writing, the only two watersheds for which pollutant trading frameworks have been developed are the Lower Boise River watershed and the Upper Snake Rock/Mid Snake.

Construction Storm Water and TMDL Waste Load Allocations

Construction Storm Water

The Clean Water Act requires operators of construction sites to obtain permit coverage to discharge storm water to a water body or to a municipal storm sewer. In Idaho, EPA has issued a general permit for storm water discharges from construction sites. In the past storm water was treated as a non-point source of pollutants. However, because storm water can be managed on site through management practices or when discharged through a discrete conveyance such as a storm sewer, it now requires a National Pollution Discharge Elimination System (NPDES) Permit.

The Construction General Permit (CGP)

If a construction project disturbs more than one acre of land (or is part of larger common development) that will disturb more than one acre), the operator is required to apply for permit coverage from EPA after developing a site-specific Storm Water Pollution Prevention Plan.

Storm Water Pollution Prevention Plan (SWPPP)

In order to obtain the Construction General Permit operators must develop a site-specific Storm Water Pollution Prevention Plan. The operator must document the erosion, sediment, and pollution controls they intend to use, inspect the controls periodically and maintain the best management practices (BMPs) through the life of the project

Construction Storm Water Requirements

When a stream is on Idaho's § 303(d) list and has a TMDL developed DEQ now incorporates a gross waste load allocation (WLA) for anticipated construction storm water activities. TMDLs developed in the past that did not have a WLA for construction storm water

activities will also be considered in compliance with provisions of the TMDL if they obtain a CGP under the NPDES program and implement the appropriate Best Management Practices.

Typically there are specific requirements you must follow to be consistent with any local pollutant allocations. Many communities throughout Idaho are currently developing rules for post-construction storm water management. Sediment is usually the main pollutant of concern in storm water from construction sites. The application of specific best management practices from *Idaho's Catalog of Storm Water Best Management Practices for Idaho Cities and Counties* is generally sufficient to meet the standards and requirements of the General Construction Permit, unless local ordinances have more stringent and site specific standards that are applicable.

4.6 Conclusions

A TDG TMDL was developed for the Pend Oreille River and lake (Table 10). During spring peak flows, Idaho's water quality standard can be exceeded by a significant amount, impairing aquatic life beneficial uses. On-going efforts to reduce TDG at Cabinet Gorge Dam are a part of the Project's FERC license. Through achievement of the goals outlined in the GSCP, TDG levels will be reduced throughout the Pend Oreille River and lake in Idaho. Manipulation of the Albeni Fall Dam spill gates will help to reduce TDG levels in the Pend Oreille River below Albeni Falls Dam to the Idaho/Washington border. Additional implementation actions will be needed at Albeni Falls Dam to reduce TDG during spill in excess of 10 kcfs.

Table 10. Summary of assessment outcomes.

Stream name, description and assessment unit	Pollutant	TMDL Completed	Recommended Changes to Integrated Report	Justification
Pend Oreille River – Pend Oreille Lake to Priest River ID17010214PN001_08	TDG	Yes	Move to section 4a	TMDL completed
Pend Oreille River – Priest River to Albeni Falls Dam ID17010214PN002_08	TDG	Yes	Move to section 4a	TMDL completed
Lake Pend Oreille – Clark Fork River to Sagle Slough	TDG	Yes	Move to section 4a[1]	TMDL completed
Pend Oreille River – Albeni Falls Dam to Idaho/Washington border ID17010216PN002_08	TDG	Yes	Move to section 4a	TMDL completed

[1] Assessment unit was not included in Idaho's 2002 Integrated Report. Assessment unit is recommended for impaired waters listing and inclusion into Integrated Report section 4a.

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GIS Coverages

Restriction of liability: Neither the state of Idaho nor the Department of Environmental Quality, nor any of their employees make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information or data provided. Metadata is provided for all data sets, and no data should be used without first reading and understanding its limitations. The data could include technical inaccuracies or typographical errors. The Department of Environmental Quality may update, modify, or revise the data used at any time, without notice.

Glossary

305(b)	Refers to section 305 subsection "b" of the Clean Water Act. The term "305(b)" generally describes a report of each state's water quality and is the principle means by which the U.S. Environmental Protection Agency, Congress, and the public evaluate whether U.S. waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of the remaining problems.
§303(d)	Refers to section 303 subsection "d" of the Clean Water Act. 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to U.S. Environmental Protection Agency approval.
Aeration	A process by which water becomes charged with air directly from the atmosphere. Dissolved gases, such as oxygen, are then available for reactions in water.
Anthropogenic	Relating to, or resulting from, the influence of human beings on nature.
Aquatic	Occurring, growing, or living in water.
Assessment Unit (AU)	A segment of a water body that is treated as a homogenous unit, meaning that any designated uses, the rating of these uses, and any associated causes and sources must be applied to the entirety of the unit.
Beneficial Use	Any of the various uses of water, including, but not limited to, aquatic life, recreation, water supply, wildlife habitat, and aesthetics, which are recognized in water quality standards.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (commonly known as the Clean Water Act), as last reauthorized by the Water Quality Act of 1987, establishes a process for states to use to develop information on, and control the quality of, the nation's water resources.

Cubic Feet per Second

A unit of measure for the rate of flow or discharge of water. One cubic foot per second is the rate of flow of a stream with a cross-section of one square foot flowing at a mean velocity of one foot per second. At a steady rate, once cubic foot per second is equal to 448.8 gallons per minute and 10,984 acre-feet per day.

Designated Uses

Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act.

Discharge

The amount of water flowing in the stream channel at the time of measurement. Usually expressed as cubic feet per second (cfs).

Exceedance

A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.

Existing Beneficial Use or Existing Use

A beneficial use actually attained in waters on or after November 28, 1975, whether or not the use is designated for the waters in Idaho's *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02).

Flow

See *Discharge*.

Fully Supporting

In compliance with water quality standards and within the range of biological reference conditions for all designated and exiting beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).

Fully Supporting Cold Water

Reliable data indicate functioning, sustainable cold water biological assemblages (e.g., fish, macroinvertebrates, or algae), none of which have been modified significantly beyond the natural range of reference conditions.

Geographical Information Systems (GIS)

A georeferenced database.

Hydrologic Unit

One of a nested series of numbered and named watersheds arising from a national standardization of watershed delineation. The initial 1974 effort (USGS 1987) described

four levels (region, subregion, accounting unit, cataloging unit) of watersheds throughout the United States. The fourth level is uniquely identified by an eight-digit code built of two-digit fields for each level in the classification. Originally termed a cataloging unit, fourth field hydrologic units have been more commonly called subbasins. Fifth and sixth field hydrologic units have since been delineated for much of the country and are known as watershed and subwatersheds, respectively.

Hydrologic Unit Code (HUC)

The number assigned to a hydrologic unit. Often used to refer to fourth field hydrologic units.

Limiting Factor

A chemical or physical condition that determines the growth potential of an organism. This can result in a complete inhibition of growth, but typically results in less than maximum growth rates.

Limnology

The scientific study of fresh water, especially the history, geology, biology, physics, and chemistry of lakes.

Load Allocation (LA)

A portion of a water body's load capacity for a given pollutant that is given to a particular nonpoint source (by class, type, or geographic area).

Load(ing)

The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Loading is the product of flow (discharge) and concentration.

Load(ing) Capacity (LC)

A determination of how much pollutant a water body can receive over a given period without causing violations of state water quality standards. Upon allocation to various sources, and a margin of safety, it becomes a total maximum daily load.

Margin of Safety (MOS)

An implicit or explicit portion of a water body's loading capacity set aside to allow the uncertainly about the relationship between the pollutant loads and the quality of the receiving water body. This is a required component of a total maximum daily load (TMDL) and is often incorporated into conservative assumptions used to develop the TMDL (generally within the calculations and/or models). The MOS is not allocated to any sources of pollution.

National Pollution Discharge Elimination System (NPDES)	A national program established by the Clean Water Act for permitting point sources of pollution. Discharge of pollution from point sources is not allowed without a permit.
Nonpoint Source	A dispersed source of pollutants, generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and non-irrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Not Fully Supporting Cold Water	At least one biological assemblage has been significantly modified beyond the natural range of its reference condition.
Point Source	A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable “point” of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater.
Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Pollution	A very broad concept that encompasses human-caused changes in the environment which alter the functioning of natural processes and produce undesirable environmental and health effects. This includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Runoff	The portion of rainfall, melted snow, or irrigation water that flows across the surface, through shallow underground zones (interflow), and through ground water to creates streams.

Subbasin

A large watershed of several hundred thousand acres. This is the name commonly given to 4th field hydrologic units (also see Hydrologic Unit).

Subbasin Assessment (SBA)

A watershed-based problem assessment that is the first step in developing a total maximum daily load in Idaho.

Total Maximum Daily Load (TMDL)

A TMDL is a water body's load capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual bases. A TMDL is equal to the load capacity, such that load capacity = margin of safety + natural background + load allocation + wasteload allocation = TMDL. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.

Wasteload Allocation (WLA)

The portion of receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. Wasteload allocations specify how much pollutant each point source may release to a water body.

Water Quality Criteria

Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, or industrial processes.

Water Quality Standards

State-adopted and U.S. Environmental Protection Agency-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water Table

The upper surface of ground water; below this point, the soil is saturated with water.

Watershed

1) All the land which contributes runoff to a common point in a drainage network, or to a lake outlet. Watersheds are infinitely nested, and any large watershed is composed of smaller "subwatersheds." 2) The whole geographic region which contributes water to a point of interest in a water body.

Appendix A. Unit Conversion Chart

Table A-1. Metric - English unit conversions.

	English Units	Metric Units	To Convert	Example
Distance	Miles (mi)	Kilometers (km)	1 mi = 1.61 km 1 km = 0.62 mi	3 mi = 4.83 km 3 km = 1.86 mi
Length	Inches (in) Feet (ft)	Centimeters (cm) Meters (m)	1 in = 2.54 cm 1 cm = 0.39 in 1 ft = 0.30 m 1 m = 3.28 ft	3 in = 7.62 cm 3 cm = 1.18 in 3 ft = 0.91 m 3 m = 9.84 ft
Area	Acres (ac) Square Feet (ft^2) Square Miles (mi^2)	Hectares (ha) Square Meters (m^2) Square Kilometers (km^2)	1 ac = 0.40 ha 1 ha = 2.47 ac 1 ft^2 = 0.09 m^2 1 m^2 = 10.76 ft^2 1 mi^2 = 2.59 km^2 1 km^2 = 0.39 mi^2	3 ac = 1.20 ha 3 ha = 7.41 ac 3 ft^2 = 0.28 m^2 3 m^2 = 32.29 ft^2 3 mi^2 = 7.77 km^2 3 km^2 = 1.16 mi^2
Volume	Gallons (gal) Cubic Feet (ft^3)	Liters (L) Cubic Meters (m^3)	1 gal = 3.78 L 1 L= 0.26 gal 1 ft^3 = 0.03 m^3 1 m^3 = 35.32 ft^3	3 gal = 11.35 L 3 L = 0.79 gal 3 ft^3 = 0.09 m^3 3 m^3 = 105.94 ft^3
Flow Rate	Cubic Feet per Second (cfs)[a]	Cubic Meters per Second (m^3/sec)	1 cfs = 0.03 m^3/sec 1 m^3/sec = 35.31cfs	3 ft^3/sec = 0.09 m^3/sec 3 m^3/sec = 105.94 ft^3/sec
Concentration	Parts per Million (ppm)	Milligrams per Liter (mg/L)	1 ppm = 1 mg/L[b]	3 ppm = 3 mg/L
Weight	Pounds (lbs)	Kilograms (kg)	1 lb = 0.45 kg 1 kg = 2.20 lbs	3 lb = 1.36 kg 3 kg = 6.61 lb
Temperature	Fahrenheit (°F)	Celsius (°C)	°C = 0.55 (F - 32) °F = (C x 1.8) + 32	3 °F = -15.95 °C 3 °C = 37.4 °F

[a] 1 cfs = 0.65 million gallons per day; 1 million gallons per day is equal to 1.55 cfs.

[b] The ratio of 1 ppm = 1 mg/L is approximate and is only accurate for water.

Appendix B. Data Sources

Table B-1. Data sources for the Pend Oreille River total dissolved gas total maximum daily load.

Data Source	Type of Data	When Collected
US Geological Survey	River discharge	October 1997 – October 2007
Parametrix, Inc.	Cabinet Gorge Dam Total Dissolved Gas Monitoring	1995 – 2007
US Army Corps of Engineers	Albeni Falls Dam Total Dissolved Gas Monitoring	2003
Idaho DEQ	GIS	Na

Appendix C. Total Dissolved Gas Data

Data from 1996-2003 Avista Utilities' annual TDG reports (Parametrix 1996, 1997, 1999a, 1999b, 2000, 2001, 2003, 2004) are summarized below. Hourly measurements and detail on data collection are available in each report.

Table C-1. Existing TDG levels below Cabinet Gorge Dam.

Year	TDG Maximum	Range TDG during spill (% saturation)	Days with >110%	Dates*	Notes
1996	138%	108-138%	18	5/28/1996-7/10/1996	Transect sampling on limited days was done before June 26. Continuous measurement began 6/26. Various spill gate configurations used.
1997	158%	119-158%	71	5/5/1997 - 7/14/1997	Spill was still occurring when monitoring stopped for the year, therefore exceedances likely continued beyond the monitoring dates.
1998	131%	102-131%	41	5/5/1998 - 7/28/1998	
1999	137%	102- 137%	44	5/22/1999 - 7/7/1999	There was a 17 day period where spill occurred, but the equipment malfunctioned. These days are counted in the days >110%.
2000	132%	103 - 132%	34	4/21/2000-6/30/2000	
2001	108%	No spill	0	4/30/2001-7/2/2001	There was no spill at either Noxon Rapids or Cabinet Gorge during 2001.
2002	139%	102-139%	53	4/24/2002-7/29/2002	
2003	130%	101-130%	26	5/1/2003-6/30/2003	Peak TDG level is estimated based on flow due to equipment error during peak flow. Nine days of spill were assumed to exceed based on spill level during the failure period.

*Spill may have begun before recording started, or continued beyond the end date of range. Some years there are gaps in the middle for equipment repair. After 1999, the recorded period typically begins before spill and ends after spill. See individual monitoring reports for specifics of each year. During some time periods, experimentation with spill gates contributed to higher TDG levels. Current operations minimize TDG production.

Table C-2. TDG levels in Cabinet Gorge forebay.

Year	TDG Maximum (% saturation)	TDG Range (% saturation)	Days > 110% saturation	Dates of Record	Notes
1996	126%	109-126%	18	6/6/1996-7/2/1996	Different spill gate operation was experimented with during this time to determine the optimum operation scenarios to reduce TDG levels
1997	126%	104-126%	55	5/5/1997-7/14/1997	
1998	119%	100-119%	6	6/16/1998-7/28/1998	
1999	111%	99-111%	2	4/7/1999-7/13/1999	
2000	107%	99-107%	0	5/10/2000-6/29/2000	
2001	106%	99-106%	0	4/26/2001-7/2/2001	
2002	116%	99-116%	35	4/24/2002-7/29/2002	
2003	111%	100-111%	4	5/1/2003-6/24/2003	

Data from ACE spill study are summarized below. Hourly measurements and detail on data collection are available in each report (Schneider et al 2007).

Table C-3. TDG ranges above Albeni Falls Dam.

Year	TDG Maximum (% saturation)	TDG Range (% saturation)	Days >110% saturation	Dates*	Notes
2003	115%	103-115%	15	6/3/2003-6/12/2003	Dates coincide with the peak and tail-end of the largest spill volume in 2003.

Table C-4. TDG ranges at Transect 2, 550 feet downstream of Albeni Falls Dam.

Year	TDG Maximum (% saturation)	TDG Range (% saturation)	Days >110% saturation	Dates*	Notes
2003	119%	105-119%	41	5/6/2203-5/15/2003, 5/19/2003-5/21/2003, 5/26/2003-5/29/2003, 6/2/2003-6/27/2003	

Table C-5. TDG ranges at Transect 3, 1.5 miles downstream of Albeni Falls Dam.

Year	TDG Maximum	Range TDG during spill	Days with >110%	Dates*	Notes
2003	119%	102-119%	27	5/6/2203-5/7/2003, 5/26/2003-5/29/2003, 6/2/2003-6/25/2003	

Table C-6. Albeni Falls forebay TDG percent saturation greater than or equal to 110%, barometric and total gas pressure collected in 2005.

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	Forebay TDG%
4/26/05	17	702.9	773	110
4/26/05	18	702.2	773	110.1
4/26/05	19	702	773	110.1
4/26/05	20	701.9	772	110
5/16/05	15	694.8	765	110.1
5/16/05	16	694.9	765	110.1
5/16/05	17	694.6	764	110
5/16/05	18	694.4	764	110
5/25/05	6	714.6	1048	146.7
5/25/05	7	715.4	1049	146.6
5/25/05	8	715.9	1049	146.5
5/25/05	9	715.4	1049	146.6
5/25/05	10	715.2	1049	146.7
5/25/05	11	714.6	1055	147.6
5/25/05	12	713.9	1056	147.9
5/25/05	13	713.4	1057	148.2
5/25/05	14	713.5	1057	148.2
5/25/05	15	712.8	1056	148.2
5/25/05	16	712.2	1056	148.3
5/25/05	17	711.7	1055	148.2
5/25/05	18	711.5	1055	148.3
5/25/05	19	711.7	1054	148.1
5/25/05	20	711.8	1054	148.1
5/25/05	21	712	1054	148
5/25/05	22	712.3	1054	148
5/25/05	23	712.6	1055	148
5/25/05	24	712.7	1054	147.9
5/26/05	1	712.7	1054	147.9
5/26/05	2	712.7	1054	147.9
5/26/05	3	713.1	1054	147.8
5/26/05	4	713.1	1055	147.9
5/26/05	5	713.4	1055	147.9
5/26/05	6	714.2	1055	147.7
5/26/05	7	713.7	1055	147.8
5/26/05	8	713.2	1057	148.2
5/26/05	9	712.8	1064	149.3
5/26/05	10	712.5	1065	149.5
5/26/05	11	712.3	1069	150.1
5/26/05	12	711.5	1070	150.4
5/26/05	13	710.9	1069	150.4

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	Forebay TDG%
5/26/05	14	710.5	1068	150.3
5/26/05	15	710	1067	150.3
5/26/05	16	709.6	1067	150.4
5/26/05	17	708.9	1067	150.5
5/26/05	18	708.7	1067	150.5
5/26/05	19	708.5	1067	150.6
5/26/05	20	708.5	1066	150.5
5/26/05	21	708.6	1066	150.4
5/26/05	22	708.7	1067	150.6
5/26/05	23	708.8	1067	150.5
5/26/05	24	709	1067	150.5
5/27/05	1	709.3	1067	150.4
5/27/05	2	709.2	1067	150.5
5/27/05	3	709.4	1067	150.4
5/27/05	4	709	1067	150.5
5/27/05	5	709.1	1068	150.6
5/27/05	6	709.4	1068	150.5
5/27/05	7	709.6	1068	150.5
5/27/05	8	708.6	1067	150.6
5/27/05	9	708.1	1068	150.8
5/27/05	10	707.7	1068	150.9
5/27/05	11	707.1	1073	151.8
5/27/05	14	705.2	778	110.3
5/27/05	15	704.4	780	110.7
5/27/05	16	704.1	781	110.9
5/27/05	17	703.6	782	111.1
5/27/05	18	702.8	784	111.6
5/27/05	19	702.9	782	111.3
5/27/05	20	702.5	780	111
5/27/05	21	702.7	779	110.9
5/27/05	22	702.8	776	110.4
5/27/05	23	702.9	774	110.1
5/28/05	12	701.6	774	110.3
5/28/05	13	701.1	777	110.8
5/28/05	14	700.7	779	111.2
5/28/05	15	700.5	784	111.9
5/28/05	16	700.1	782	111.7
5/28/05	17	700.2	783	111.8
5/28/05	18	699.5	783	111.9
5/28/05	19	699.2	783	112
5/28/05	20	699.1	782	111.9
5/28/05	21	699.7	781	111.6
5/28/05	22	700	779	111.3
5/28/05	23	700.4	776	110.8
5/28/05	24	701.1	775	110.5
5/29/05	1	701.4	774	110.4
5/29/05	2	701.9	772	110
5/29/05	10	703.4	775	110.2
5/29/05	11	703.1	776	110.4
5/29/05	12	703	778	110.7
5/29/05	13	702.6	779	110.9
5/29/05	14	702.3	780	111.1
5/29/05	15	701.9	782	111.4
5/29/05	16	701.5	782	111.5
5/29/05	17	701.3	782	111.5
5/29/05	18	701.3	782	111.5

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	Forebay TDG%
5/29/05	19	701.3	782	111.5
5/29/05	20	701.5	781	111.3
5/29/05	21	702.2	779	110.9
5/29/05	22	702.5	777	110.6
5/29/05	23	703.1	776	110.4
5/29/05	24	703.8	774	110
5/30/05	11	704.3	776	110.2
5/30/05	12	703.8	778	110.5
5/30/05	13	703.2	781	111.1
5/30/05	14	702.8	783	111.4
5/30/05	15	702.4	784	111.6
5/30/05	16	702.2	785	111.8
5/30/05	17	701.7	785	111.9
5/30/05	18	701.5	785	111.9
5/30/05	19	701.5	783	111.6
5/30/05	20	701.3	782	111.5
5/30/05	21	702	780	111.1
5/30/05	22	701.9	778	110.8
5/30/05	23	701.9	776	110.6
5/30/05	24	701.9	775	110.4
5/31/05	1	702.1	773	110.1
5/31/05	2	702.1	772	110
5/31/05	10	702.9	773	110
5/31/05	12	703	773	110
5/31/05	13	703	774	110.1
5/31/05	14	702.6	774	110.2
5/31/05	15	702.5	775	110.3
5/31/05	16	701.9	775	110.4
5/31/05	17	702.3	774	110.2
5/31/05	18	701.7	773	110.2
5/31/05	19	701.7	773	110.2
5/31/05	20	702.1	772	110
6/20/05	15	705.4	776	110
6/20/05	16	705.2	777	110.2
6/20/05	17	704.5	778	110.4
6/20/05	18	704.9	778	110.4
6/20/05	19	704.9	776	110.1
6/20/05	20	705.1	776	110.1
6/21/05	12	701.3	773	110.2
6/21/05	13	700.4	776	110.8
6/21/05	15	699.2	780	111.5
6/21/05	16	699	781	111.7
6/21/05	17	698.2	781	111.9
6/21/05	18	698.7	781	111.8
6/21/05	19	699.5	779	111.4
6/21/05	20	699.4	778	111.2
6/21/05	21	702	776	110.5
6/21/05	22	700.9	774	110.4
6/22/05	14	703.3	775	110.2
6/22/05	15	703	776	110.4
6/22/05	16	702.8	777	110.6
6/22/05	17	702.2	776	110.5
6/22/05	18	702.5	775	110.3
6/22/05	19	702.1	775	110.4
6/22/05	20	702.2	774	110.2
6/24/05	18	701.7	772	110

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	Forebay TDG%
6/24/05	19	701.5	772	110
6/24/05	20	701.2	772	110.1
6/25/05	12	701.5	774	110.3
6/25/05	13	701.1	777	110.8
6/25/05	14	701.2	779	111.1
6/25/05	15	701.3	781	111.4
6/25/05	16	700.8	782	111.6
6/25/05	17	700.3	783	111.8
6/25/05	18	700.2	783	111.8
6/25/05	19	700.2	783	111.8
6/25/05	20	700.5	783	111.8
6/25/05	21	700.7	783	111.7
6/25/05	22	701.6	782	111.5
6/25/05	23	701.6	780	111.2
6/25/05	24	702.1	779	111
6/26/05	1	701.9	777	110.7
6/26/05	2	701.8	775	110.4
6/26/05	3	702.1	774	110.2
6/26/05	4	702	773	110.1
6/26/05	5	702	772	110
6/26/05	9	702	772	110
6/26/05	10	701.9	773	110.1
6/26/05	11	701	775	110.5
6/26/05	12	700.5	777	110.9
6/26/05	13	700	779	111.3
6/26/05	14	699.7	779	111.3
6/26/05	15	699.5	781	111.7
6/26/05	16	699.3	780	111.5
6/26/05	17	699	780	111.6
6/26/05	18	698.9	781	111.7
6/26/05	19	698.7	780	111.6
6/26/05	20	699.1	778	111.3
6/26/05	21	699.1	777	111.1
6/26/05	22	699.9	776	110.9
6/26/05	23	700.5	773	110.3
6/26/05	24	700	770	110
6/30/05	18	702.7	773	110
6/30/05	19	702.4	774	110.2
6/30/05	20	702.3	774	110.2
6/30/05	21	702.4	774	110.2
6/30/05	22	702.8	773	110
6/30/05	23	702.6	773	110
7/ 1/05	12	703.8	775	110.1
7/ 1/05	13	703.7	777	110.4
7/ 1/05	14	703.1	779	110.8
7/ 1/05	15	703.1	780	110.9
7/ 1/05	16	702.3	781	111.2
7/ 1/05	17	702.3	782	111.4
7/ 1/05	18	702	782	111.4
7/ 1/05	19	702.1	781	111.2
7/ 1/05	20	701.8	781	111.3
7/ 1/05	21	701.7	779	111
7/ 1/05	22	701.7	778	110.9
7/ 1/05	23	702	777	110.7
7/ 1/05	24	701.6	775	110.5
7/ 2/05	1	701.4	774	110.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	Forebay TDG%
7/ 2/05	2	701.4	773	110.2

Table C-7. Albeni Falls forebay TDG percent saturation greater than or equal to 110%, barometric and total gas pressure collected in 2006.

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
5/16/06	16	706.6	779	110.2
5/16/06	17	705.9	779	110.4
5/16/06	18	705.6	779	110.4
5/16/06	19	705.7	778	110.2
5/16/06	20	705.7	777	110.1
5/17/06	10	706.8	779	110.2
5/17/06	11	706.6	781	110.5
5/17/06	12	706	783	110.9
5/17/06	13	705.5	785	111.3
5/17/06	14	704.4	786	111.6
5/17/06	15	704.4	788	111.9
5/17/06	16	704	788	111.9
5/17/06	17	703.6	789	112.1
5/17/06	18	703.3	790	112.3
5/17/06	19	703	789	112.2
5/17/06	20	702.8	788	112.1
5/17/06	21	703.1	788	112.1
5/17/06	22	703.5	787	111.9
5/17/06	23	703.6	786	111.7
5/17/06	24	704	786	111.6
5/18/06	1	704	785	111.5
5/18/06	2	704.3	784	111.3
5/18/06	3	704	783	111.2
5/18/06	4	704.4	782	111
5/18/06	5	704.4	781	110.9
5/18/06	6	704.3	780	110.7
5/18/06	7	704.5	779	110.6
5/18/06	8	704	781	110.9
5/18/06	9	703.8	783	111.2
5/18/06	10	703.3	785	111.6
5/18/06	11	702.9	787	112
5/18/06	12	702.8	789	112.3
5/18/06	13	702.5	790	112.4
5/18/06	14	701.8	792	112.9
5/18/06	15	701.4	793	113.1
5/18/06	16	700.7	792	113
5/18/06	17	699.9	792	113.2
5/18/06	18	699.6	790	112.9
5/18/06	19	700	788	112.6
5/18/06	20	700.1	786	112.3
5/18/06	21	700.5	784	111.9
5/18/06	22	700.4	784	111.9
5/18/06	23	701.3	783	111.6
5/18/06	24	701.8	782	111.4
5/19/06	1	702.5	781	111.2
5/19/06	2	702.3	780	111.1
5/19/06	3	702.1	780	111.1
5/19/06	4	702.3	780	111.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
5/19/06	5	702.3	779	110.9
5/19/06	6	702.3	779	110.9
5/19/06	7	702.6	779	110.9
5/19/06	8	702.9	781	111.1
5/19/06	9	702.8	783	111.4
5/19/06	10	702.8	786	111.8
5/19/06	11	702.1	789	112.4
5/19/06	12	701.8	792	112.9
5/19/06	13	701.6	794	113.2
5/19/06	14	701	796	113.5
5/19/06	15	700.5	798	113.9
5/19/06	16	700.2	797	113.8
5/19/06	17	700.5	795	113.5
5/19/06	18	701.3	792	112.9
5/19/06	19	701	790	112.7
5/19/06	20	702.1	788	112.2
5/19/06	21	701.6	787	112.2
5/19/06	22	702.7	785	111.7
5/19/06	23	702.3	784	111.6
5/19/06	24	702.1	782	111.4
5/20/06	1	702	780	111.1
5/20/06	2	701.6	779	111
5/20/06	3	701.4	778	110.9
5/20/06	4	700.9	777	110.9
5/20/06	5	700.7	777	110.9
5/20/06	6	701.3	776	110.6
5/20/06	7	701.3	776	110.6
5/20/06	8	701.4	777	110.8
5/20/06	9	701.4	777	110.8
5/20/06	10	701.3	777	110.8
5/20/06	11	702.4	776	110.5
5/20/06	12	702.4	777	110.6
5/20/06	13	703.3	779	110.8
5/20/06	14	703.7	781	111
5/20/06	15	702.8	782	111.3
5/20/06	16	703.5	782	111.2
5/20/06	17	702.5	782	111.3
5/20/06	18	702.5	781	111.2
5/20/06	19	703.1	779	110.8
5/20/06	20	702.7	778	110.7
5/20/06	21	703	776	110.4
5/20/06	22	703.3	775	110.2
5/20/06	23	703.4	774	110
5/20/06	24	702.8	773	110
5/21/06	10	700.7	771	110
5/21/06	11	700.1	774	110.5
5/21/06	12	699.7	776	110.9
5/21/06	13	699	778	111.3
5/21/06	14	698.1	778	111.4
5/21/06	15	697.8	777	111.4
5/21/06	16	697.5	777	111.4
5/21/06	17	697.8	777	111.4
5/21/06	18	698.1	776	111.2
5/21/06	19	697.7	775	111.1
5/21/06	20	698.1	774	110.9
5/21/06	21	698.5	772	110.5

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
5/21/06	22	698.5	771	110.4
5/21/06	23	699.6	770	110.1
5/21/06	24	699.4	770	110.1
5/22/06	1	699.1	770	110.1
5/22/06	2	699.7	770	110
5/22/06	3	698.9	770	110.2
5/22/06	4	698.6	770	110.2
5/22/06	5	698.2	771	110.4
5/22/06	6	697.7	771	110.5
5/22/06	7	697.6	773	110.8
5/22/06	8	697.5	775	111.1
5/22/06	9	697.3	777	111.4
5/22/06	10	697.5	778	111.5
5/22/06	11	696.8	779	111.8
5/22/06	12	696.5	782	112.3
5/22/06	14	695.4	786	113
5/22/06	15	697.2	784	112.4
5/22/06	16	696.1	782	112.3
5/22/06	17	696.6	783	112.4
5/22/06	18	696.8	784	112.5
5/22/06	19	696.9	784	112.5
5/22/06	20	697.5	782	112.1
5/22/06	21	698.3	779	111.6
5/22/06	22	699.3	778	111.3
5/22/06	23	700	777	111
5/22/06	24	700.8	776	110.7
5/23/06	1	702.1	776	110.5
5/23/06	2	702	775	110.4
5/23/06	3	702.9	775	110.3
5/23/06	4	704.2	775	110.1
5/23/06	5	704.2	775	110
5/23/06	7	705.8	777	110.1
5/23/06	8	705.7	779	110.4
5/23/06	9	706.3	781	110.6
5/23/06	10	706.2	784	111
6/29/06	20	708.4	801	113.1
6/29/06	22	709.1	798	112.5
6/29/06	23	709.3	797	112.4
6/29/06	24	709.8	796	112.1
6/30/06	1	709.4	794	111.9
6/30/06	2	709.8	793	111.7
6/30/06	3	709.4	792	111.6
6/30/06	4	709.9	791	111.4
6/30/06	5	710.4	790	111.2
6/30/06	6	710.7	790	111.2
6/30/06	7	710.4	790	111.2
6/30/06	8	710.4	791	111.3
6/30/06	9	710.5	792	111.5
6/30/06	10	709.9	794	111.8
6/30/06	11	709.9	795	112
6/30/06	12	709	798	112.6
6/30/06	13	708.6	800	112.9
6/30/06	14	708	801	113.1
6/30/06	15	707.9	803	113.4
6/30/06	16	707.5	804	113.6
6/30/06	17	707	806	114

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
6/30/06	18	706.3	807	114.3
6/30/06	19	706.4	807	114.2
6/30/06	20	706.2	806	114.1
6/30/06	21	706.2	805	114
6/30/06	22	706.6	804	113.8
6/30/06	23	706.4	802	113.5
6/30/06	24	707.3	800	113.1
7/ 1/06	1	707.2	799	113
7/ 1/06	2	707.3	797	112.7
7/ 1/06	3	707.3	796	112.5
7/ 1/06	4	707.4	795	112.4
7/ 1/06	5	707.6	794	112.2
7/ 1/06	6	708.4	794	112.1
7/ 1/06	7	707.8	794	112.2
7/ 1/06	8	707.7	795	112.3
7/ 1/06	9	708.1	796	112.4
7/ 1/06	11	707.6	799	112.9
7/ 1/06	12	706.7	801	113.3
7/ 1/06	13	706.4	803	113.7
7/ 1/06	14	705.8	805	114.1
7/ 1/06	15	705.3	807	114.4
7/ 1/06	16	704.9	808	114.6
7/ 1/06	17	704.7	808	114.7
7/ 1/06	18	704.1	808	114.8
7/ 1/06	19	704.5	808	114.7
7/ 1/06	20	704	807	114.6
7/ 1/06	21	704.5	805	114.3
7/ 1/06	22	705.3	804	114
7/ 1/06	23	705.1	802	113.7
7/ 1/06	24	705.3	800	113.4
7/ 2/06	1	705.4	800	113.4
7/ 2/06	2	706	799	113.2
7/ 2/06	3	706.2	797	112.9
7/ 2/06	4	706.9	796	112.6
7/ 2/06	5	707.2	796	112.6
7/ 2/06	6	707	795	112.4
7/ 2/06	7	707	795	112.4
7/ 2/06	8	707	797	112.7
7/ 2/06	9	706.7	797	112.8
7/ 2/06	10	706.8	799	113
7/ 2/06	11	706.3	800	113.3
7/ 2/06	12	706.3	803	113.7
7/ 2/06	13	705.8	805	114.1
7/ 2/06	14	705.7	807	114.4
7/ 2/06	15	705.1	809	114.7
7/ 2/06	16	705.2	811	115
7/ 2/06	17	704.4	811	115.1
7/ 2/06	18	704.2	812	115.3
7/ 2/06	19	704.1	812	115.3
7/ 2/06	20	704.2	811	115.2
7/ 2/06	21	705	810	114.9
7/ 2/06	23	705.6	806	114.2
7/ 2/06	24	705.9	803	113.8
7/ 3/06	1	706.2	802	113.6
7/ 3/06	2	707.1	799	113
7/ 3/06	3	706.4	797	112.8

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
7/ 3/06	4	706.7	795	112.5
7/ 3/06	5	707	794	112.3
7/ 3/06	6	707.7	794	112.2
7/ 3/06	7	707.9	793	112
7/ 3/06	8	707.9	793	112
7/ 3/06	9	708	794	112.2
7/ 3/06	10	707.6	797	112.6
7/ 3/06	11	707.7	799	112.9
7/ 3/06	12	707.4	801	113.2
7/ 3/06	13	706.8	803	113.6
7/ 3/06	14	706.5	805	113.9
7/ 3/06	15	706.2	806	114.1
7/ 3/06	16	706.1	807	114.3
7/ 3/06	17	706.1	808	114.4
7/ 3/06	18	705.9	809	114.6
7/ 3/06	19	705.8	808	114.5
7/ 3/06	20	706.1	807	114.3
7/ 3/06	21	706.2	805	114
7/ 3/06	22	706.7	802	113.5
7/ 3/06	23	706.9	800	113.2
7/ 4/06	1	707.3	796	112.5
7/ 4/06	2	707.4	793	112.1
7/ 4/06	3	707.5	791	111.8
7/ 4/06	4	707.3	789	111.6
7/ 4/06	5	707.5	788	111.4
7/ 4/06	6	707.9	787	111.2
7/ 4/06	7	708.7	786	110.9
7/ 4/06	9	708.1	788	111.3
7/ 4/06	10	707.1	789	111.6
7/ 4/06	11	706.5	789	111.7
7/ 4/06	12	706.2	790	111.9
7/ 4/06	13	706	792	112.2
7/ 4/06	14	705.3	794	112.6
7/ 4/06	15	704.7	795	112.8
7/ 4/06	16	704.2	796	113
7/ 4/06	17	703.8	797	113.2
7/ 4/06	18	703.6	797	113.3
7/ 4/06	19	703.3	796	113.2
7/ 4/06	20	703.1	796	113.2
7/ 4/06	21	703.2	795	113.1
7/ 4/06	22	703.6	793	112.7
7/ 4/06	23	704.1	790	112.2
7/ 4/06	24	705.8	787	111.5
7/ 5/06	1	704.7	785	111.4
7/ 5/06	2	705.1	783	111
7/ 5/06	3	705.2	781	110.7
7/ 5/06	4	705.8	780	110.5
7/ 5/06	5	705.7	778	110.2
7/ 5/06	6	705.2	776	110
7/ 5/06	7	705.3	777	110.2
7/ 5/06	8	705.4	777	110.2
7/ 5/06	9	705.6	778	110.3
7/ 5/06	10	705	779	110.5
7/ 5/06	11	705.1	779	110.5
7/ 5/06	12	704.1	781	110.9
7/ 5/06	13	703.5	783	111.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
7/ 5/06	14	703.1	785	111.6
7/ 5/06	15	703.4	787	111.9
7/ 5/06	16	702.3	788	112.2
7/ 5/06	17	701.8	788	112.3
7/ 5/06	18	701.6	788	112.3
7/ 5/06	19	701.6	788	112.3
7/ 5/06	20	702.3	787	112.1
7/ 5/06	21	702.9	786	111.8
7/ 5/06	22	702.8	783	111.4
7/ 5/06	23	702.7	781	111.1
7/ 5/06	24	703	779	110.8
7/ 6/06	1	703.1	777	110.5
7/ 6/06	2	703.9	774	110
7/ 6/06	16	704.8	776	110.1
7/ 6/06	17	704.9	776	110.1
7/ 6/06	18	705.1	776	110
7/ 6/06	19	704.9	776	110.1
7/ 8/06	17	708.3	780	110.1
7/ 8/06	18	707.5	782	110.5
7/ 8/06	19	707.8	783	110.6
7/ 8/06	20	707.1	783	110.7
7/ 8/06	21	707	783	110.8
7/ 8/06	22	706.9	782	110.6
7/ 9/06	12	704.4	775	110
7/ 9/06	13	703.7	777	110.4
7/ 9/06	14	703.6	778	110.6
7/ 9/06	15	703.3	781	111
7/ 9/06	16	702.7	783	111.4
7/ 9/06	17	701.7	784	111.7
7/ 9/06	18	701.7	785	111.9
7/ 9/06	19	700.6	785	112.1
7/ 9/06	20	700.3	785	112.1
7/ 9/06	21	700.5	784	111.9
7/ 9/06	22	701	783	111.7
7/ 9/06	23	700.1	782	111.7
7/ 9/06	24	700.6	780	111.3
7/10/06	1	700	778	111.1
7/10/06	2	699.9	776	110.9
7/10/06	3	700.2	775	110.7
7/10/06	4	699.8	773	110.5
7/10/06	5	700.1	772	110.3
7/10/06	6	700.1	770	110
7/10/06	10	700.7	772	110.2
7/10/06	11	700.9	772	110.2
7/10/06	12	700.2	774	110.5
7/10/06	13	699.6	775	110.8
7/10/06	14	699.2	777	111.1
7/10/06	15	699.1	778	111.3
7/10/06	16	699.3	779	111.4
7/10/06	17	699.4	780	111.5
7/10/06	18	699.2	781	111.7
7/10/06	19	699	780	111.6
7/10/06	20	699.3	779	111.4
7/10/06	21	699.9	778	111.2
7/10/06	22	700	777	111
7/10/06	23	700.6	774	110.5

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure(mmHg)	Forebay TDG%
7/10/06	24	699.9	773	110.4
7/11/06	1	700.3	771	110.1
7/11/06	13	701.2	772	110.1
7/11/06	14	701	774	110.4
7/11/06	15	700.4	776	110.8
7/11/06	16	700.2	778	111.1
7/11/06	17	699.4	778	111.2
7/11/06	18	699.8	779	111.3
7/11/06	19	699	779	111.4
7/11/06	20	698.8	778	111.3
7/11/06	21	699.6	776	110.9
7/11/06	22	699.8	774	110.6
7/11/06	23	700.1	771	110.1

Table C-8. Albeni Falls tailwater TDG percent saturation greater than or equal to 110%, barometric and total gas pressure collected in 2006.

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
4/10/06	13	702.8	776	110.4	7.7	36.4
4/10/06	14	702.2	778	110.8	7.7	36.4
4/10/06	15	702.1	779	111	7.7	36.5
4/10/06	16	702.1	780	111.1	7.7	36.5
4/10/06	17	702.5	780	111	7.7	36.5
4/10/06	18	702.7	780	111	7.7	36.4
4/10/06	19	701.9	780	111.1	7.7	36.4
4/10/06	20	702.4	778	110.8	7.7	36.4
4/10/06	21	702.7	778	110.7	7.7	36.3
4/10/06	22	703.1	777	110.5	7.7	36.3
4/10/06	23	703.4	777	110.5	7.7	36.3
4/10/06	24	703.3	777	110.5	7.7	36.1
4/11/06	1	703.2	776	110.3	7.7	36
4/11/06	2	703.5	777	110.4	7.7	36.4
4/11/06	3	703.5	778	110.6	7.7	35.8
4/11/06	4	703.8	775	110.1	7.7	36.4
4/11/06	5	704.3	776	110.2	7.7	36.6
4/11/06	6	704.5	776	110.1	7.7	36.1
4/11/06	7	704.8	775	110	7.7	36.9
4/11/06	11	706.9	789	111.6	10.4	39.4
4/11/06	12	707	790	111.7	13.1	41.7
4/11/06	13	707.4	790	111.7	12.9	41.7
4/11/06	14	707.3	791	111.8	12.9	41.8
4/11/06	15	707	792	112	12.9	41.6
4/11/06	16	706.7	792	112.1	12.9	41.4
4/11/06	17	706.5	792	112.1	12.9	41.4
4/11/06	18	706.8	792	112.1	12.9	41.6
4/11/06	19	706.7	791	111.9	12.9	41.9
4/11/06	20	706.8	791	111.9	12.9	41.6
4/11/06	21	707.3	790	111.7	12.9	41.4
4/11/06	22	707.6	790	111.6	12.9	41.4
4/11/06	23	707.8	790	111.6	12.9	41.4
4/11/06	24	707.9	790	111.6	12.9	41.6

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
4/12/06	1	707.9	790	111.6	12.9	41.6
4/12/06	2	708.1	791	111.7	12.9	41.5
4/12/06	3	708.3	791	111.7	12.9	41.7
4/12/06	4	708	791	111.7	12.9	42.2
4/12/06	5	707.7	791	111.8	12.9	41.6
4/12/06	6	707.9	791	111.7	12.9	40.7
4/12/06	7	707.8	791	111.7	13	41.7
4/12/06	8	708	792	111.9	13	41.5
4/12/06	9	708.1	792	111.9	13	41.4
4/12/06	10	707.9	792	111.9	13	41.7
4/12/06	11	707.7	792	111.9	13	41.2
4/12/06	12	707.3	793	112.1	13	41.3
4/12/06	13	707	793	112.2	13	41.3
4/12/06	14	706.5	793	112.2	13	41
4/12/06	15	706.2	795	112.6	13	41.9
4/12/06	16	705.4	792	112.3	12.9	42.2
4/12/06	17	704.7	791	112.3	12.8	42.1
4/12/06	18	705	790	112.1	12.8	41.5
4/12/06	19	705.2	790	112	12.9	41.7
4/12/06	20	705.1	789	111.9	12.8	42.1
4/12/06	21	705	788	111.8	12.8	42.3
4/12/06	22	705.5	788	111.7	12.8	41.9
4/12/06	23	705.9	789	111.8	12.8	41.9
4/12/06	24	705.7	789	111.8	12.9	41.6
4/13/06	1	706	789	111.8	12.9	41.4
4/13/06	2	705.8	789	111.8	12.9	41.4
4/13/06	3	705.5	789	111.8	12.9	41.6
4/13/06	4	706.1	789	111.7	12.9	41.3
4/13/06	5	706.1	789	111.7	12.9	41.8
4/13/06	6	706.4	789	111.7	12.9	41.3
4/13/06	7	707.5	789	111.5	12.9	41.8
4/13/06	8	707.4	790	111.7	12.8	41.7
4/13/06	9	707.6	790	111.6	12.8	41.8
4/13/06	10	708.8	791	111.6	12.8	41.5
4/13/06	11	708.3	792	111.8	12.9	41.9
4/13/06	12	708.2	792	111.8	12.8	41.7
4/13/06	16	706.8	792	112	12.8	42.2
4/13/06	17	706.4	791	112	12.8	41.5
4/13/06	18	706	790	111.9	12.8	41.5
4/13/06	19	705.9	790	111.9	12.8	41.3
4/13/06	20	705.9	789	111.8	12.8	42
4/13/06	21	705.5	788	111.7	12.8	41.3
4/13/06	22	705	788	111.8	12.8	41.8
4/13/06	23	704.1	787	111.8	12.8	41.3
4/13/06	24	703.5	787	111.9	12.8	41.3
4/14/06	1	702.6	787	112	12.8	41.6
4/14/06	2	702.1	786	112	12.8	41.3
4/14/06	3	701.4	786	112.1	12.8	41.6
4/14/06	4	700.8	785	112	12.8	42.1
4/14/06	5	700.5	784	111.9	12.8	41.9
4/14/06	6	700.2	784	112	12.8	41.6
4/14/06	7	699.9	784	112	12.8	41.6
4/14/06	8	699.5	784	112.1	12.7	41.8
4/14/06	9	698.9	783	112	12.7	41.6

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
4/14/06	10	698.7	783	112.1	12.7	41.5
4/14/06	11	698.5	784	112.2	12.8	41.4
4/14/06	12	698	784	112.3	12.8	41.3
4/14/06	13	697.8	784	112.4	12.8	41.6
4/14/06	14	697.8	784	112.4	12.8	41.6
4/14/06	15	697.2	784	112.5	12.8	41.6
4/14/06	16	696.5	784	112.6	12.8	41.6
4/14/06	17	695.9	784	112.7	12.8	41.6
4/14/06	18	695.1	784	112.8	12.8	41.3
4/14/06	19	694.7	784	112.9	12.8	41.9
4/14/06	20	694.9	783	112.7	12.8	41.5
4/14/06	21	695.3	783	112.6	12.8	41.5
4/14/06	22	695.8	782	112.4	12.8	41.5
4/14/06	23	696	782	112.4	12.8	41.3
4/14/06	24	695.9	782	112.4	12.8	41.3
4/15/06	1	696.2	782	112.3	12.8	41.5
4/15/06	2	696.4	783	112.4	12.8	41.3
4/15/06	3	697	783	112.3	12.8	41.3
4/15/06	4	697.3	783	112.3	12.8	41.3
4/15/06	5	697.8	783	112.2	12.8	41.5
4/15/06	6	698	783	112.2	12.8	41.6
4/15/06	7	698.2	784	112.3	12.8	41.4
4/15/06	8	698.3	784	112.3	12.8	41.8
4/15/06	9	698.8	784	112.2	12.8	41.8
4/15/06	10	699.2	784	112.1	12.8	41.6
4/15/06	11	699.6	785	112.2	12.8	41.4
4/15/06	12	699.7	785	112.2	12.8	41.6
4/15/06	13	699.2	785	112.3	12.8	41.5
4/15/06	14	699.4	785	112.2	12.8	41.2
4/15/06	15	699	785	112.3	12.9	41
4/15/06	16	698.9	786	112.5	12.9	41.4
4/15/06	17	698.5	785	112.4	12.9	41.4
4/15/06	18	698.3	785	112.4	12.9	41.4
4/15/06	19	698.1	784	112.3	12.9	41.3
4/15/06	20	698.9	783	112	12.9	41.3
4/15/06	21	699.5	782	111.8	12.9	41.3
4/15/06	22	699.5	782	111.8	12.9	41.3
4/15/06	23	699.8	781	111.6	13.9	41.5
4/15/06	24	699.8	781	111.6	12.9	41.4
4/16/06	1	700.6	781	111.5	12.9	40.8
4/16/06	2	701.3	781	111.4	12.9	40.9
4/16/06	3	701.9	781	111.3	12.9	41.4
4/16/06	4	702.9	781	111.1	12.9	41.5
4/16/06	5	703.1	781	111.1	12.8	41.5
4/16/06	6	703.1	781	111.1	12.8	41.5
4/16/06	7	703.6	782	111.1	12.8	41.4
4/16/06	8	704	782	111.1	12.9	41.1
4/16/06	9	704.8	783	111.1	12.9	41.1
4/16/06	10	705.3	784	111.2	12.9	41.1
4/16/06	11	705.3	785	111.3	12.9	41.2
4/16/06	12	705.2	787	111.6	12.9	41
4/16/06	13	705	787	111.6	12.9	41.2
4/16/06	14	704.7	788	111.8	12.9	41.1
4/29/06	14	706.7	779	110.2	31.9	50.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
4/29/06	15	706.4	779	110.3	31.9	50
4/29/06	16	705.4	780	110.6	31.9	50.3
4/29/06	17	704.9	780	110.7	31.9	50.2
4/29/06	18	704.1	780	110.8	31.9	50
4/29/06	19	703.8	781	111	31.9	50
4/29/06	20	703.5	781	111	31.9	50.2
4/29/06	21	705.7	779	110.4	31.9	50.3
4/29/06	22	705.5	780	110.6	31.8	50
4/29/06	23	705	779	110.5	31.8	50.2
4/29/06	24	706.8	778	110.1	31.8	49.7
4/30/06	1	707.9	779	110	31.8	49.9
4/30/06	2	708.5	780	110.1	31.8	49.7
4/30/06	3	708.6	780	110.1	31.8	49.9
4/30/06	18	711.1	782	110	32.7	50.3
5/ 1/06	11	708.3	779	110	30.6	49.9
5/ 1/06	12	708.2	779	110	30.6	49.9
5/ 4/06	14	711.5	795	111.7	32.3	51.7
5/ 4/06	15	711.5	796	111.9	32.2	51.8
5/ 4/06	16	710.3	796	112.1	32.2	52
5/ 4/06	17	710.5	796	112	32.2	51.5
5/ 4/06	18	710	795	112	32.2	51.6
5/ 4/06	19	709.7	794	111.9	32.2	51.7
5/ 4/06	20	709.7	793	111.7	32.2	52
5/ 4/06	21	710.1	792	111.5	32.1	51.8
5/ 4/06	22	710.2	792	111.5	32.2	51.5
5/ 4/06	23	710.2	792	111.5	32.2	51.8
5/ 4/06	24	709.7	792	111.6	32.2	51.9
5/ 5/06	1	709.8	791	111.4	32.2	51.9
5/ 5/06	2	710	791	111.4	32.2	51.8
5/ 5/06	3	709.6	790	111.3	32.3	51.9
5/ 5/06	4	709.7	790	111.3	32.3	52
5/ 5/06	5	709.8	789	111.2	32.3	52.1
5/ 5/06	6	709.5	788	111.1	32.3	51.9
5/ 5/06	7	709.8	786	110.7	32.3	52.2
5/ 5/06	8	710.6	788	110.9	32.3	51.9
5/ 5/06	9	710.1	789	111.1	32.3	52.1
5/ 5/06	10	709.5	789	111.2	32.4	52.2
5/ 5/06	11	708.9	790	111.4	32.4	52.2
5/ 5/06	12	708.4	791	111.7	32.4	52.1
5/ 5/06	13	707.2	793	112.1	32.4	52.1
5/ 5/06	14	706.9	792	112	32.4	52.1
5/ 5/06	15	706.2	793	112.3	32.4	52.1
5/ 5/06	16	705.9	793	112.3	32.4	51.9
5/ 5/06	17	705	792	112.3	32.4	51.9
5/ 5/06	18	704.8	793	112.5	32.4	52
5/ 5/06	19	704.6	792	112.4	32.5	52.2
5/ 5/06	20	704.3	791	112.3	32.4	52.3
5/ 5/06	21	704.6	791	112.3	32.5	52
5/ 5/06	22	704.5	792	112.4	32.5	51.9
5/ 5/06	23	704.9	793	112.5	32.7	52.5
5/ 5/06	24	705	793	112.5	32.7	52.5
5/ 6/06	1	705	793	112.5	32.7	52.7
5/ 6/06	2	704.6	794	112.7	32.7	52.4
5/ 6/06	3	704.8	793	112.5	32.7	52.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/ 6/06	4	704.4	792	112.4	32.7	52.6
5/ 6/06	5	704.6	791	112.3	32.7	52.8
5/ 6/06	6	704.7	791	112.2	32.7	51.9
5/ 6/06	7	705.1	791	112.2	32.7	52.6
5/ 6/06	8	705.8	790	111.9	32.7	52.5
5/ 6/06	9	705.9	791	112.1	32.7	52.3
5/ 6/06	10	705.1	792	112.3	32.7	52.5
5/ 6/06	11	705.2	793	112.4	32.7	52.5
5/ 6/06	12	705.4	794	112.6	32.7	52.5
5/ 6/06	13	705.8	795	112.6	32.7	52.4
5/ 6/06	14	704.8	795	112.8	32.7	52.7
5/ 6/06	15	704.9	794	112.6	32.5	52.4
5/ 6/06	16	705.5	794	112.5	32.5	52.5
5/ 6/06	17	704.8	794	112.7	32.7	52.5
5/ 6/06	18	705.4	793	112.4	32.7	52.5
5/ 6/06	19	704.9	793	112.5	32.7	52.6
5/ 6/06	20	705.2	792	112.3	32.7	52.7
5/ 6/06	21	705.4	794	112.6	33	51.9
5/ 6/06	22	705.4	794	112.6	33	52.5
5/ 6/06	23	705.9	794	112.5	33.1	52.1
5/ 6/06	24	705.5	794	112.5	33.1	52.2
5/ 7/06	1	705.6	794	112.5	33.2	51.7
5/ 7/06	2	705.4	794	112.6	33.2	52.3
5/ 7/06	3	705.6	793	112.4	33.2	52.1
5/ 7/06	4	706.2	792	112.1	33.2	52.1
5/ 7/06	5	706.2	792	112.1	33.2	52
5/ 7/06	6	706.2	791	112	33.2	52.1
5/ 7/06	7	707.5	790	111.7	33.2	52.2
5/ 7/06	8	706.8	789	111.6	33.1	52.3
5/ 7/06	9	706.6	789	111.7	33.1	52.2
5/ 7/06	10	706.7	789	111.6	33.2	52.4
5/ 7/06	11	706.3	789	111.7	33.2	52.4
5/ 7/06	12	707	790	111.7	33.2	52.6
5/ 7/06	13	706.4	789	111.7	33.2	52.2
5/ 7/06	14	706.7	789	111.6	32.2	52.3
5/ 7/06	15	706.6	790	111.8	33.2	52.3
5/ 7/06	16	706.6	790	111.8	33.3	52.4
5/ 7/06	17	705.8	790	111.9	33.3	52.4
5/ 7/06	18	705.4	789	111.8	33.3	52.4
5/ 7/06	19	705.2	789	111.9	33.3	52
5/ 7/06	20	704.7	789	112	33.3	52.5
5/ 7/06	21	704.7	788	111.8	33.3	52
5/ 7/06	22	704.4	789	112	33.4	51.9
5/ 7/06	23	704.6	788	111.8	33.5	52
5/ 7/06	24	704.8	788	111.8	33.3	51.9
5/ 8/06	1	705.3	787	111.6	33.5	51.9
5/ 8/06	2	705.9	787	111.5	33.5	51.9
5/ 8/06	3	706.4	786	111.3	33.5	52.3
5/ 8/06	4	706.6	786	111.2	33.5	52.4
5/ 8/06	5	706.7	785	111.1	33.5	52.2
5/ 8/06	6	707.5	784	110.8	33.4	52.3
5/ 8/06	7	708.4	784	110.7	33.4	52.1
5/ 8/06	8	708.7	785	110.8	33.4	52.4
5/ 8/06	9	709.1	786	110.8	33.4	52.2

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/ 8/06	10	709.1	787	111	33.4	52.4
5/ 8/06	11	708.9	790	111.4	35.3	54.1
5/ 8/06	12	708.8	787	111	37.2	56.1
5/ 8/06	13	709	785	110.7	37.1	56
5/ 8/06	14	709.2	783	110.4	36.9	56
5/ 8/06	15	709.8	783	110.3	36.9	56.3
5/ 8/06	16	709.4	783	110.4	37.1	56
5/ 9/06	17	712.9	784	110	37.4	56.1
5/10/06	12	716	788	110.1	37.4	56
5/10/06	13	715.3	790	110.4	37.4	55.9
5/10/06	14	714.8	790	110.5	37.5	55.9
5/10/06	15	713.7	791	110.8	37.5	55.9
5/10/06	16	713.5	791	110.9	37.5	55.6
5/10/06	17	712.7	791	111	37.5	55.5
5/10/06	18	712.8	791	111	37.5	55.6
5/10/06	19	712.3	790	110.9	37.4	55.5
5/10/06	20	712.2	790	110.9	37.4	55.7
5/10/06	21	712	791	111.1	37.4	55.7
5/10/06	22	712.3	791	111	37.4	55.6
5/10/06	23	711.7	790	111	37.4	55.7
5/10/06	24	711.7	790	111	37.4	55.7
5/11/06	1	711.3	790	111.1	37.4	55.5
5/11/06	2	710.8	789	111	37.4	55.4
5/11/06	3	710.6	789	111	37.4	55.5
5/11/06	4	710.4	788	110.9	37.3	55.4
5/11/06	5	710	787	110.8	37.3	55.4
5/11/06	6	709.8	786	110.7	37.4	55.6
5/11/06	7	709.9	786	110.7	37.3	55.5
5/11/06	8	709.6	785	110.6	37.4	55.3
5/11/06	9	709.5	785	110.6	37.4	55.7
5/11/06	10	709.4	785	110.7	37.4	55.7
5/11/06	11	708.4	779	110	34.5	53.2
5/11/06	12	708	781	110.3	34.6	52.5
5/11/06	13	708.5	783	110.5	34.7	52.9
5/11/06	14	708.5	786	110.9	34.7	51.8
5/11/06	15	708.5	787	111.1	34.7	51.9
5/11/06	16	708.2	788	111.3	34.7	51.9
5/11/06	17	707.7	788	111.3	34.7	52.2
5/11/06	18	707.3	789	111.6	34.7	52.4
5/11/06	19	706.8	789	111.6	34.7	52.2
5/11/06	20	706.9	788	111.5	34.7	52.2
5/11/06	21	708	789	111.4	34.6	52.3
5/11/06	22	707.2	789	111.6	34.6	52.1
5/11/06	23	707	789	111.6	34.6	52
5/11/06	24	707.2	790	111.7	34.6	52.6
5/12/06	1	706.7	789	111.6	34.5	51.8
5/12/06	2	707.2	791	111.9	34.5	52.5
5/12/06	3	707	790	111.7	34.5	52.2
5/12/06	4	707.1	790	111.7	34.5	52
5/12/06	5	707.3	790	111.7	34.5	51.6
5/12/06	6	707.9	791	111.7	34.5	51.4
5/12/06	7	708.9	791	111.6	34.5	51.9
5/12/06	8	709.2	791	111.5	34.5	51.6
5/12/06	9	709.3	792	111.7	34.4	52.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/12/06	10	709.3	794	111.9	34.3	51.7
5/12/06	11	709	795	112.1	34.3	51.6
5/12/06	12	709.1	796	112.2	34.3	51.8
5/12/06	13	708.6	796	112.3	34.2	51.6
5/12/06	14	708.6	797	112.5	34.2	51.5
5/12/06	15	708.6	798	112.6	34.2	52
5/12/06	16	708.3	797	112.5	34.2	52
5/12/06	17	708	796	112.4	34.2	51.5
5/12/06	18	708.8	795	112.2	34.2	51.2
5/12/06	19	708.7	796	112.3	34.1	51.5
5/12/06	20	709.7	794	111.9	34.1	51.5
5/12/06	21	709.9	793	111.7	34.1	51.5
5/12/06	22	711.1	794	111.7	34.3	52.4
5/12/06	23	710.8	794	111.7	34.3	51.8
5/12/06	24	711.1	795	111.8	34.4	52.2
5/13/06	1	711.1	793	111.5	34.4	52.3
5/13/06	2	711.2	793	111.5	34.4	52.6
5/13/06	3	711.2	793	111.5	34.5	51.8
5/13/06	4	711.8	793	111.4	34.6	51.6
5/13/06	5	712.1	793	111.4	34.6	51.5
5/13/06	6	711.5	793	111.4	34.6	50.9
5/13/06	7	712.9	792	111.1	34.5	52.2
5/13/06	8	712.8	793	111.3	34.5	51.3
5/13/06	9	713.7	794	111.3	34.6	51.7
5/13/06	10	713.5	796	111.6	34.6	51.9
5/13/06	11	713.2	798	111.9	34.7	51.1
5/13/06	12	712.9	799	112.1	34.6	50.9
5/13/06	13	712.6	801	112.4	34.6	51.3
5/13/06	14	712.5	801	112.4	34.6	51.4
5/13/06	15	712	802	112.6	34.6	51.2
5/13/06	16	712	802	112.6	34.6	51.3
5/13/06	17	711.5	802	112.7	34.6	51
5/13/06	18	711	802	112.8	34.6	51.6
5/13/06	19	711.5	801	112.6	34.5	51.5
5/13/06	20	711.5	800	112.4	34.5	51.9
5/13/06	21	712.3	799	112.2	34.5	51.5
5/13/06	22	712.6	798	112	34.5	51.7
5/13/06	23	712.9	798	111.9	34.5	51.7
5/13/06	24	713.1	797	111.8	34.4	51.6
5/14/06	1	713.6	797	111.7	34.4	51.4
5/14/06	2	713.5	796	111.6	34.4	51.5
5/14/06	3	713.7	796	111.5	34.4	51.5
5/14/06	4	714.2	795	111.3	34.4	51.5
5/14/06	5	714.1	795	111.3	34.4	51.3
5/14/06	6	714.7	795	111.2	34.4	51.2
5/14/06	7	714.7	794	111.1	34.4	51.9
5/14/06	8	715.9	794	110.9	34.4	52.1
5/14/06	9	715.6	795	111.1	34.4	51.9
5/14/06	10	715.4	797	111.4	34.5	51.3
5/14/06	11	715.3	799	111.7	34.5	51.5
5/14/06	12	714.5	800	112	34.5	51.1
5/14/06	13	714	801	112.2	34.4	51.3
5/14/06	14	713.3	802	112.4	34.5	50.9
5/14/06	15	713.1	802	112.5	34.4	51.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/14/06	16	712.4	803	112.7	34.4	51.2
5/14/06	17	712.4	803	112.7	34.4	51
5/14/06	18	712.1	803	112.8	34.4	51
5/14/06	19	712.1	802	112.6	34.4	51.1
5/14/06	20	712.3	802	112.6	34.4	51.4
5/14/06	21	712.4	801	112.4	34.4	51.2
5/14/06	22	713	801	112.3	34.4	51.1
5/14/06	23	713.3	801	112.3	34.4	51.2
5/14/06	24	713.4	801	112.3	34.5	51.1
5/15/06	1	713.7	801	112.2	34.5	51.5
5/15/06	2	713.8	801	112.2	34.4	52
5/15/06	3	713.9	802	112.3	34.4	51.9
5/15/06	4	713.6	801	112.3	34.3	52.2
5/15/06	5	713.8	800	112.1	34.3	52.2
5/15/06	6	714	801	112.2	34.3	51.7
5/15/06	7	714.6	800	112	34.4	52.5
5/15/06	8	714.2	800	112	34.4	52.2
5/15/06	9	713.5	801	112.3	34.4	52.5
5/15/06	10	713.5	802	112.4	34.4	53
5/15/06	11	712.3	801	112.4	34.3	53.5
5/15/06	12	712	805	113.1	36.8	55.8
5/15/06	13	711.5	804	113	36.5	55.3
5/15/06	14	710.6	804	113.1	36.4	55.6
5/15/06	15	710.2	803	113.1	36.4	55.6
5/15/06	16	709.8	802	113	36.4	55.6
5/15/06	17	709	802	113.1	36.4	55.5
5/15/06	18	708.5	801	113.1	36.4	55.4
5/15/06	19	708.7	802	113.2	36.4	55.4
5/15/06	20	709.8	800	112.7	36.4	55.7
5/15/06	21	709.5	800	112.8	36.4	55.4
5/15/06	22	710.2	801	112.8	36.4	55.4
5/15/06	23	709.6	800	112.7	36.4	55.8
5/15/06	24	710.7	800	112.6	36.5	55.7
5/16/06	1	710.9	800	112.5	36.5	55.6
5/16/06	2	710.7	800	112.6	36.7	55.3
5/16/06	3	710.8	799	112.4	36.7	55.5
5/16/06	4	711.3	799	112.3	36.7	55.4
5/16/06	5	711.8	799	112.2	36.7	55.2
5/16/06	6	712.2	799	112.2	36.8	55
5/16/06	7	712.3	798	112	36.8	55.5
5/16/06	8	712.4	797	111.9	36.8	55.6
5/16/06	9	712.4	798	112	36.8	55.9
5/16/06	10	711.9	799	112.2	36.8	55.9
5/16/06	11	711.6	800	112.4	36.8	55.7
5/16/06	12	711.2	798	112.2	42	60.4
5/16/06	13	710.9	796	112	41.6	60.2
5/16/06	14	710.3	796	112.1	41.3	59.8
5/16/06	15	710.2	796	112.1	41.3	57.9
5/16/06	16	709.1	797	112.4	41.3	59.8
5/16/06	17	708.9	797	112.4	41.3	59.7
5/16/06	18	708.2	797	112.5	41.4	59.7
5/16/06	19	708.5	797	112.5	41.4	59.6
5/16/06	20	708.1	796	112.4	41.4	59.8
5/16/06	21	709.5	796	112.2	41.6	59.8

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/16/06	22	709.8	796	112.1	41.6	60
5/16/06	23	710	796	112.1	41.6	60
5/16/06	24	710.5	796	112	41.6	60
5/17/06	1	710.7	796	112	41.7	59.8
5/17/06	2	711.1	796	111.9	41.7	59.7
5/17/06	3	711	796	112	41.7	59.9
5/17/06	4	711	796	112	41.7	59.9
5/17/06	5	710.9	795	111.8	41.7	59.8
5/17/06	6	710.8	794	111.7	41.7	59.8
5/17/06	7	710.8	794	111.7	41.7	60.1
5/17/06	8	711.4	794	111.6	41.7	60.6
5/17/06	9	710.6	796	112	41.7	60.5
5/17/06	10	710.5	796	112	41.9	60.3
5/17/06	11	709.1	798	112.5	41.9	60.6
5/17/06	12	709.2	806	113.6	44.2	62.8
5/17/06	13	708.2	806	113.8	44.1	62.6
5/17/06	14	707.7	804	113.6	44.7	63.1
5/17/06	15	707.5	804	113.6	44.5	63.6
5/17/06	16	706.8	803	113.6	44.5	63.4
5/17/06	17	706.4	804	113.8	44.5	63.8
5/17/06	18	705.9	804	113.9	44.5	63.5
5/17/06	19	705.3	804	114	44.5	63.6
5/17/06	20	705.3	803	113.9	44.5	63.6
5/17/06	21	705.8	803	113.8	44.5	63.5
5/17/06	22	706.5	803	113.7	44.7	63.7
5/17/06	23	706.5	803	113.7	44.7	64
5/17/06	24	706.5	802	113.5	44.7	64
5/18/06	1	706.6	801	113.4	44.7	63.5
5/18/06	2	706.7	800	113.2	44.7	64.6
5/18/06	3	706.8	799	113.1	44.7	64.4
5/18/06	4	707.1	797	112.7	44.7	64.1
5/18/06	5	707.1	797	112.7	44.9	64.1
5/18/06	6	707	796	112.6	44.9	64.4
5/18/06	7	707	796	112.6	44.9	64.7
5/18/06	8	707	796	112.6	44.9	65
5/18/06	9	706.8	797	112.8	44.9	65
5/18/06	10	706.1	799	113.2	45	65
5/18/06	11	705.9	800	113.3	45	64.8
5/18/06	12	705.7	802	113.6	45.2	64.9
5/18/06	13	705	803	113.9	45.2	64.9
5/18/06	14	704.4	801	113.7	61.2	67.6
5/18/06	15	704.2	797	113.2	69.4	69.4
5/18/06	16	703.1	796	113.2	64.7	64.7
5/18/06	17	702.3	796	113.3	64.7	64.7
5/18/06	18	702.7	796	113.3	64.7	64.7
5/18/06	19	702.8	795	113.1	64.7	64.7
5/18/06	20	703.2	794	112.9	64.7	64.7
5/18/06	21	703.4	793	112.7	64.7	64.7
5/18/06	22	703.5	792	112.6	64.7	64.7
5/18/06	23	704	791	112.3	64.7	64.7
5/18/06	24	704.8	790	112.1	64.7	64.7
5/19/06	1	704.9	789	111.9	64.7	64.7
5/19/06	2	705.6	787	111.5	69	69
5/19/06	3	705.4	786	111.4	69	69

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/19/06	4	705.3	786	111.4	69	69
5/19/06	5	705.5	785	111.3	69	69
5/19/06	6	705.3	784	111.2	69	69
5/19/06	7	705.6	784	111.1	69	69
5/19/06	9	705.7	787	111.5	69.6	69.6
5/19/06	10	705.7	789	111.8	69.6	69.6
5/19/06	11	705.1	791	112.2	69.6	69.6
5/19/06	12	705	793	112.5	69.8	69.8
5/19/06	13	704.3	794	112.7	69.8	69.8
5/19/06	14	703.9	796	113.1	69.9	69.9
5/19/06	15	703.5	797	113.3	70.3	70.3
5/19/06	16	702.7	797	113.4	70.5	70.5
5/19/06	17	703.4	796	113.2	70.5	70.5
5/19/06	18	704.3	794	112.7	70.5	70.5
5/19/06	19	704	792	112.5	70.5	70.5
5/19/06	20	704.2	790	112.2	70.5	70.5
5/19/06	21	705.4	788	111.7	70.7	70.7
5/19/06	22	705.8	787	111.5	70.7	70.7
5/19/06	23	705.2	785	111.3	70.7	70.7
5/19/06	24	705.2	784	111.2	71.2	71.2
5/20/06	1	705	782	110.9	71.2	71.2
5/20/06	2	704.3	781	110.9	71.2	71.2
5/20/06	3	704	779	110.6	71.9	71.9
5/20/06	4	704	778	110.5	71.9	71.9
5/20/06	5	703.6	778	110.6	71.9	71.9
5/20/06	6	703.7	777	110.4	71.9	71.9
5/20/06	7	704.4	777	110.3	71.9	71.9
5/20/06	8	704.1	777	110.4	73.5	73.5
5/20/06	9	704	778	110.5	73.6	73.6
5/20/06	10	704.1	778	110.5	73.6	73.6
5/20/06	11	705.1	777	110.2	73.9	73.9
5/20/06	12	705.5	778	110.3	74.2	74.2
5/20/06	13	706.2	779	110.3	74.3	74.3
5/20/06	14	706.1	780	110.5	74.3	74.3
5/20/06	15	705.9	781	110.6	74.3	74.3
5/20/06	16	705.9	781	110.6	74.3	74.3
5/20/06	17	705.3	780	110.6	74.3	74.3
5/20/06	18	705.3	779	110.5	74.6	74.6
5/20/06	19	705.6	778	110.3	74.6	74.6
5/20/06	20	705.7	777	110.1	74.6	74.6
5/21/06	14	701	772	110.1	79.2	79.2
5/21/06	15	700.7	772	110.2	79.2	79.2
5/21/06	16	700.5	772	110.2	79.2	79.2
5/21/06	17	700.5	772	110.2	79.7	79.7
5/21/06	18	700.2	772	110.2	79.7	79.7
5/22/06	11	699.7	770	110.1	82.8	82.8
5/22/06	12	699.4	771	110.2	82.8	82.8
5/22/06	13	699	772	110.5	82.8	82.8
5/22/06	14	698.2	771	110.4	82.5	82.5
5/22/06	15	700.1	771	110.1	82.4	82.4
5/22/06	18	699.6	770	110.1	82.9	82.9
5/23/06	11	709	795	112.1	85.1	85.1
5/23/06	12	709.7	797	112.3	85.1	85.1
5/23/06	13	709.6	799	112.6	85.1	85.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/23/06	14	709.5	801	112.9	86	86
5/23/06	15	709.4	803	113.2	86	86
5/23/06	16	709	805	113.5	86	86
5/23/06	17	708.4	805	113.6	86.8	86.8
5/23/06	18	709	806	113.7	86.6	86.8
5/23/06	19	709.3	805	113.5	86.8	86.8
5/23/06	20	709.7	804	113.3	86.8	86.8
5/23/06	21	709.9	803	113.1	86.8	86.8
5/23/06	22	710.2	802	112.9	86.8	86.8
5/23/06	23	711	802	112.8	86.8	86.8
5/23/06	24	710.7	802	112.8	86.8	86.8
5/24/06	1	710.2	801	112.8	86.8	86.8
5/24/06	2	710.4	801	112.8	86.8	86.8
5/24/06	3	710.7	800	112.6	86.8	86.8
5/24/06	4	710.4	800	112.6	86.8	86.8
5/24/06	5	711.4	800	112.4	87.6	87.6
5/24/06	6	711.2	800	112.5	87.6	87.6
5/24/06	7	710.6	800	112.6	87.6	87.6
5/24/06	8	710.7	802	112.8	87.6	87.6
5/24/06	9	710.5	803	113	87.6	87.6
5/24/06	10	710.3	805	113.3	87.6	87.6
5/24/06	11	710	806	113.5	87.6	87.6
5/24/06	12	709.7	807	113.7	87.6	87.6
5/24/06	13	709	807	113.8	87.6	87.6
5/24/06	14	709	808	114	87.6	87.6
5/24/06	15	709.3	808	113.9	87.6	87.6
5/24/06	16	709.3	808	113.9	87.6	87.6
5/24/06	17	709.2	807	113.8	87.6	87.6
5/24/06	18	709.4	807	113.8	86.8	86.8
5/24/06	19	709.5	806	113.6	87.6	87.6
5/24/06	20	709.6	805	113.4	87.6	87.6
5/24/06	21	709.6	804	113.3	87.6	87.6
5/24/06	22	710.5	803	113	87.6	87.6
5/24/06	23	710.5	803	113	87.6	87.6
5/24/06	24	710.8	802	112.8	87.6	87.6
5/25/06	1	710.8	802	112.8	87.6	87.6
5/25/06	2	710.9	803	113	87.6	87.6
5/25/06	3	710.9	803	113	87.6	87.6
5/25/06	4	710.7	803	113	88.4	88.4
5/25/06	5	710.7	802	112.8	88.4	88.4
5/25/06	6	710.5	803	113	88.4	88.4
5/25/06	7	710.7	803	113	88.4	88.4
5/25/06	8	710.5	804	113.2	88.4	88.4
5/25/06	9	710.8	805	113.3	88.4	88.4
5/25/06	10	710.1	806	113.5	88.4	88.4
5/25/06	11	709.4	807	113.8	88.4	88.4
5/25/06	12	708.5	808	114	88.4	88.4
5/25/06	13	707.8	808	114.2	88.4	88.4
5/25/06	14	707.1	807	114.1	88.4	88.4
5/25/06	15	706.4	807	114.2	88.4	88.4
5/25/06	16	705.8	806	114.2	88.4	88.4
5/25/06	17	705.1	806	114.3	88.4	88.4
5/25/06	18	704.8	805	114.2	88.4	88.4
5/25/06	19	703.7	806	114.5	88.4	88.4

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/25/06	20	703.9	804	114.2	88.4	88.4
5/25/06	21	703.4	803	114.2	88.4	88.4
5/25/06	22	704.1	803	114	88.4	88.4
5/25/06	23	704.4	803	114	88.4	88.4
5/25/06	24	704.3	803	114	88.4	88.4
5/26/06	1	703.7	803	114.1	88.4	88.4
5/26/06	2	703.7	804	114.3	88.4	88.4
5/26/06	3	703.5	804	114.3	88.4	88.4
5/26/06	4	702.7	805	114.6	89.2	89.2
5/26/06	5	702.8	805	114.5	88.4	88.4
5/26/06	6	702.9	805	114.5	88.4	88.4
5/26/06	7	702.9	806	114.7	88.4	88.4
5/26/06	8	703.2	807	114.8	88.4	88.4
5/26/06	9	703.1	806	114.6	88.4	88.4
5/26/06	10	703.1	806	114.6	88.4	88.4
5/26/06	11	703.3	806	114.6	88.4	88.4
5/26/06	12	703.2	805	114.5	88.4	88.4
5/26/06	13	703	805	114.5	88.4	88.4
5/26/06	14	702.6	806	114.7	89.2	89.2
5/26/06	15	702.4	804	114.5	89.2	89.2
5/26/06	16	702.2	805	114.6	89.2	89.2
5/26/06	17	702.1	805	114.7	89.2	89.2
5/26/06	18	701.7	804	114.6	89.2	89.2
5/26/06	19	702.2	801	114.1	89.2	89.2
5/26/06	20	702.3	799	113.8	89.2	89.2
5/26/06	21	702.3	797	113.5	89.2	89.2
5/26/06	22	702.3	796	113.3	89.2	89.2
5/26/06	23	702.6	796	113.3	89.2	89.2
5/26/06	24	702.4	794	113	89.2	89.2
5/27/06	1	702.4	793	112.9	89.2	89.2
5/27/06	2	702.3	792	112.8	89.2	89.2
5/27/06	3	702.7	792	112.7	88.4	88.4
5/27/06	4	702.4	792	112.8	88.4	88.4
5/27/06	5	702.2	791	112.6	88.4	88.4
5/27/06	6	702.3	791	112.6	89.2	89.2
5/27/06	7	702.6	791	112.6	89.2	89.2
5/27/06	8	702.5	791	112.6	89.2	89.2
5/27/06	9	702.7	792	112.7	89.2	89.2
5/27/06	10	702.8	794	113	88.4	88.4
5/27/06	11	702.3	796	113.3	88.4	88.4
5/27/06	12	702.5	798	113.6	88.4	88.4
5/27/06	13	701.6	798	113.7	88.4	88.4
5/27/06	14	701.4	799	113.9	88.4	88.4
5/27/06	15	701.6	800	114	88.4	88.4
5/27/06	16	702.3	798	113.6	88.4	88.4
5/27/06	17	702.6	797	113.4	88.4	88.4
5/27/06	18	702.6	799	113.7	88.4	88.4
5/27/06	19	702.8	800	113.8	88.4	88.4
5/27/06	20	703.1	799	113.6	88.4	88.4
5/27/06	21	703.6	799	113.6	88.4	88.4
5/27/06	22	703.4	799	113.6	88.4	88.4
5/27/06	23	704	798	113.3	88.4	88.4
5/27/06	24	704.4	799	113.4	88.4	88.4
5/28/06	1	704	799	113.5	88.4	88.4

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/28/06	2	704	800	113.6	88.4	88.4
5/28/06	3	704.1	799	113.5	88.4	88.4
5/28/06	4	704.2	799	113.5	88.4	88.4
5/28/06	5	704.5	799	113.4	88.4	88.4
5/28/06	6	704.6	799	113.4	88.4	88.4
5/28/06	7	704.9	799	113.3	88.4	88.4
5/28/06	8	705	800	113.5	87.6	87.6
5/28/06	9	705.4	801	113.6	87.6	87.6
5/28/06	10	705.5	800	113.4	87.6	87.6
5/28/06	11	706.1	801	113.4	87.6	87.6
5/28/06	12	706	802	113.6	87.6	87.6
5/28/06	13	705.5	802	113.7	87.6	87.6
5/28/06	14	706	800	113.3	87.6	87.6
5/28/06	15	706.2	799	113.1	87.6	87.6
5/28/06	16	706.6	800	113.2	87.6	87.6
5/28/06	17	706.9	799	113	87.6	87.6
5/28/06	18	706.7	798	112.9	87.6	87.6
5/28/06	19	707.3	797	112.7	87.6	87.6
5/28/06	20	707.8	796	112.5	87.6	87.6
5/28/06	21	708.3	796	112.4	87.6	87.6
5/28/06	22	708.1	795	112.3	87.6	87.6
5/28/06	23	708.3	794	112.1	87.6	87.6
5/28/06	24	708.4	794	112.1	87.6	87.6
5/29/06	1	708.4	794	112.1	87.6	87.6
5/29/06	2	708.5	793	111.9	87.6	87.6
5/29/06	3	709	793	111.8	87.6	87.6
5/29/06	4	709.3	795	112.1	87.6	87.6
5/29/06	5	709.8	793	111.7	87.6	87.6
5/29/06	6	710.4	793	111.6	87.6	87.6
5/29/06	7	710.7	794	111.7	87.6	87.6
5/29/06	8	710.5	795	111.9	87.6	87.6
5/29/06	9	711.3	796	111.9	87.6	87.6
5/29/06	10	711.3	797	112	87.6	87.6
5/29/06	11	711.7	798	112.1	87.6	87.6
5/29/06	12	711.6	800	112.4	86.8	86.8
5/29/06	13	711.9	801	112.5	86.8	86.8
5/29/06	14	711.2	802	112.8	86.8	86.8
5/29/06	15	710.6	802	112.9	86.8	86.8
5/29/06	16	711	802	112.8	87.6	87.6
5/29/06	17	710.7	801	112.7	87.6	87.6
5/29/06	18	710.8	799	112.4	87.6	87.6
5/29/06	19	710.8	798	112.3	87.6	87.6
5/29/06	20	710.8	796	112	87.6	87.6
5/29/06	21	711.8	793	111.4	87.6	87.6
5/29/06	22	712.3	791	111	87.6	87.6
5/29/06	23	712.6	789	110.7	87.6	87.6
5/29/06	24	712.6	789	110.7	87.6	87.6
5/30/06	1	712.7	788	110.6	86.8	86.8
5/30/06	2	713.2	787	110.3	86.8	86.8
5/30/06	3	713.3	786	110.2	86.8	86.8
5/30/06	4	713.7	786	110.1	86.8	86.8
5/30/06	7	714.4	786	110	86.8	86.8
5/30/06	8	714.8	787	110.1	86.8	86.8
5/30/06	9	715.1	789	110.3	76.8	76.8

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/30/06	10	715.2	802	112.1	79.8	79.8
5/30/06	11	714.9	813	113.7	73.6	78.6
5/30/06	12	714.5	819	114.6	61	74.1
5/30/06	13	713.5	821	115.1	57.6	74.8
5/30/06	14	713.3	821	115.1	57.6	74.7
5/30/06	15	712.9	822	115.3	57.5	74.9
5/30/06	16	712.4	823	115.5	57.5	74.7
5/30/06	17	713.1	823	115.4	57.5	74.7
5/30/06	18	712.6	824	115.6	57.3	74.5
5/30/06	19	712.8	824	115.6	57.3	74.4
5/30/06	20	712.7	824	115.6	57.3	74.9
5/30/06	21	712.6	822	115.4	57.3	74.4
5/30/06	22	713.1	822	115.3	57.3	74.3
5/30/06	23	713.2	821	115.1	57.3	74.6
5/30/06	24	713.1	821	115.1	57.3	74.4
5/31/06	1	714.1	821	115	57.1	74.2
5/31/06	2	713.6	820	114.9	57.1	74.4
5/31/06	3	714.1	820	114.8	57.1	74.4
5/31/06	4	713.7	819	114.7	57.1	74.2
5/31/06	5	713.9	818	114.6	57.1	74.2
5/31/06	6	714.2	818	114.5	57.1	74.4
5/31/06	7	713.5	818	114.6	57.1	74.2
5/31/06	8	714.2	818	114.5	57.1	74.2
5/31/06	9	714.2	820	114.8	57.1	74.6
5/31/06	10	713.8	808	113.2	56.5	73.9
5/31/06	11	712.9	812	113.9	51.2	68.9
5/31/06	12	712.5	819	115	50.1	67.5
5/31/06	13	711.7	821	115.4	50.2	67.8
5/31/06	14	711.3	827	116.3	48.7	66.8
5/31/06	15	710.8	828	116.5	48.1	66.6
5/31/06	16	710.5	827	116.4	48.1	66.6
5/31/06	17	710.4	828	116.6	48.1	66.5
5/31/06	18	710.2	828	116.6	48.1	66.3
5/31/06	19	709.5	828	116.7	48.1	66.2
5/31/06	20	709.5	827	116.6	48	66.6
5/31/06	21	710.5	827	116.4	48.1	66.8
5/31/06	22	709.5	827	116.6	48.1	66.7
5/31/06	23	710.2	826	116.3	48.1	66.5
5/31/06	24	710.2	827	116.4	48.1	66.4
6/ 1/06	1	710.2	826	116.3	48.1	66.3
6/ 1/06	2	710	826	116.3	48.1	66.3
6/ 1/06	3	709.9	826	116.4	48.1	66.3
6/ 1/06	4	709.6	825	116.3	48.1	66.5
6/ 1/06	5	710	825	116.2	48.1	66.5
6/ 1/06	6	709.4	825	116.3	48.1	66.5
6/ 1/06	7	709.3	825	116.3	48.1	66.5
6/ 1/06	8	709.6	825	116.3	48.1	67.2
6/ 1/06	9	709.1	826	116.5	48.3	66.9
6/ 1/06	10	708.6	812	114.6	46.1	64.7
6/ 1/06	11	708.1	812	114.7	44.1	63
6/ 1/06	12	707.4	814	115.1	44.2	62.2
6/ 1/06	13	707.3	815	115.2	44.2	62.4
6/ 1/06	14	706.3	816	115.5	44.2	62.3
6/ 1/06	15	705.9	817	115.7	43.3	61.7

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/ 1/06	16	705.4	815	115.5	39.1	58.1
6/ 1/06	17	705.1	813	115.3	34.7	56.7
6/ 1/06	18	705	813	115.3	34.7	56.9
6/ 1/06	19	705.2	814	115.4	34.7	56.8
6/ 1/06	20	705.1	814	115.4	34.7	57.2
6/ 1/06	21	706.4	814	115.2	34.7	56.8
6/ 1/06	22	707.3	814	115.1	34.7	56.9
6/ 1/06	23	707.2	814	115.1	34.7	57.3
6/ 1/06	24	707.8	814	115	34.7	57.3
6/ 2/06	1	708.1	814	115	34.7	57.4
6/ 2/06	2	708.1	814	115	34.7	57.6
6/ 2/06	3	708.1	814	115	34.7	57.2
6/ 2/06	4	708.5	814	114.9	34.7	57.5
6/ 2/06	5	708.6	814	114.9	34.7	57.6
6/ 2/06	6	709	814	114.8	34.8	57
6/ 2/06	7	709.3	815	114.9	34.8	57.2
6/ 2/06	8	708.8	816	115.1	34.8	57.2
6/ 2/06	9	708.2	817	115.4	34.8	56.9
6/ 2/06	10	707.6	818	115.6	34.8	57.5
6/ 2/06	11	707.1	819	115.8	34.8	57.3
6/ 2/06	12	706.6	819	115.9	34.8	57
6/ 2/06	13	707.2	819	115.8	34.7	57.1
6/ 2/06	14	708.3	817	115.3	34.7	57.2
6/ 2/06	15	708.6	818	115.4	34.7	56.8
6/ 2/06	16	708.6	817	115.3	34.6	56.9
6/ 2/06	17	709.1	817	115.2	34.8	56.7
6/ 2/06	18	708.3	817	115.3	34.8	57.2
6/ 2/06	19	708.4	817	115.3	34.8	57.3
6/ 2/06	20	708.5	817	115.3	34.8	57.3
6/ 2/06	21	709	817	115.2	34.8	57.1
6/ 2/06	22	709.9	817	115.1	34.8	57.5
6/ 2/06	23	709.8	817	115.1	34.9	57.1
6/ 2/06	24	709.8	817	115.1	34.9	57.7
6/ 3/06	1	710.2	817	115	34.9	57.2
6/ 3/06	2	710.5	818	115.1	34.9	57.3
6/ 3/06	3	710.9	817	114.9	34.9	57.4
6/ 3/06	4	711.1	818	115	34.9	57.2
6/ 3/06	5	711.4	817	114.8	34.9	57.5
6/ 3/06	6	711.5	817	114.8	35	57.1
6/ 3/06	7	712.6	817	114.7	34.9	57.7
6/ 3/06	8	712.4	818	114.8	35	57.7
6/ 3/06	9	712.1	818	114.9	35	57.4
6/ 3/06	10	712.7	819	114.9	35	57.6
6/ 3/06	11	712	819	115	35	57.6
6/ 3/06	12	712	819	115	35	57.2
6/ 3/06	13	712	819	115	35	57.7
6/ 3/06	14	711.2	821	115.4	35	54.2
6/ 3/06	15	710.8	822	115.6	35.3	51.1
6/ 3/06	16	710.1	823	115.9	35	57.3
6/ 3/06	17	710.1	821	115.6	35	57.4
6/ 3/06	18	709.4	819	115.5	35	57.3
6/ 3/06	19	709.2	819	115.5	35	57.6
6/ 3/06	20	709.3	818	115.3	35	57.3
6/ 3/06	21	709.2	818	115.3	35.1	57.6

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/ 3/06	22	708.8	817	115.3	35.1	58.2
6/ 3/06	23	708.7	815	115	35.1	57.7
6/ 3/06	24	708.4	814	114.9	35.1	57.9
6/ 4/06	1	708.1	813	114.8	35.1	57.5
6/ 4/06	2	707.3	812	114.8	35.2	57.6
6/ 4/06	3	707.2	812	114.8	35.2	57.7
6/ 4/06	4	706.9	811	114.7	35.2	57.7
6/ 4/06	5	706.4	810	114.7	35.2	57.5
6/ 4/06	6	706.5	809	114.5	35.2	57.3
6/ 4/06	7	706.3	808	114.4	35.2	57.6
6/ 4/06	8	705.3	808	114.6	35.2	57.2
6/ 4/06	9	705.2	807	114.4	35.2	57.2
6/ 4/06	10	705.3	807	114.4	35.2	57.7
6/ 4/06	11	705.3	806	114.3	35.2	57.7
6/ 4/06	12	705.5	806	114.2	35.2	57.7
6/ 4/06	13	705.9	806	114.2	35.2	57.5
6/ 4/06	14	706.1	806	114.1	35.2	57.7
6/ 4/06	15	706.3	806	114.1	35.2	57.7
6/ 4/06	16	706.4	806	114.1	35.2	57.9
6/ 4/06	17	706.7	805	113.9	35.2	57.7
6/ 4/06	18	706.9	805	113.9	35.2	57.5
6/ 4/06	19	707.2	804	113.7	35.2	57.7
6/ 4/06	20	707.7	804	113.6	35.2	57.9
6/ 4/06	21	708.1	804	113.5	35.2	57.6
6/ 4/06	22	708.7	804	113.4	35.2	57.6
6/ 4/06	23	708.6	804	113.5	35.2	57.6
6/ 4/06	24	708.8	804	113.4	35.2	57.8
6/ 5/06	1	708.9	803	113.3	35.3	57.7
6/ 5/06	2	709	804	113.4	35.3	57.6
6/ 5/06	3	709.1	803	113.2	35.3	57.9
6/ 5/06	4	709.4	802	113.1	35.3	57.8
6/ 5/06	5	709.9	803	113.1	35.3	57.6
6/ 5/06	6	709.9	802	113	35.3	57.3
6/ 5/06	7	710.2	802	112.9	35.3	57.7
6/ 5/06	8	710.5	803	113	35.3	58
6/ 5/06	9	710.7	803	113	35.3	58
6/ 5/06	10	710.8	804	113.1	35.3	58
6/ 5/06	11	710.2	805	113.3	35.3	57.6
6/ 5/06	12	709.9	813	114.5	37.9	60.4
6/ 5/06	13	709.5	813	114.6	39.1	61.1
6/ 5/06	14	709.1	813	114.7	39.1	61.1
6/ 5/06	15	708.9	813	114.7	39.1	61.3
6/ 5/06	16	708.5	813	114.8	39.1	61
6/ 5/06	17	708.4	813	114.8	37.9	60.1
6/ 5/06	18	707.9	814	115	37.9	60.1
6/ 5/06	19	708	813	114.8	37.9	60.1
6/ 5/06	20	707.8	813	114.9	38	60.1
6/ 5/06	21	708.3	811	114.5	38	60.2
6/ 5/06	22	708.9	811	114.4	38	60.2
6/ 5/06	24	708.8	810	114.3	38	60.3
6/ 6/06	1	709.2	809	114.1	38	60.3
6/ 6/06	2	709.1	808	114	38	60.3
6/ 6/06	3	709.6	809	114	38	60.1
6/ 6/06	4	709.7	809	114	38	60.2

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/ 6/06	5	709.8	809	114	38	60.2
6/ 6/06	6	710	809	113.9	38	60
6/ 6/06	7	710.5	809	113.9	38	60.2
6/ 6/06	8	710.7	809	113.8	38	60
6/ 6/06	9	710.5	810	114	38	60.3
6/ 6/06	10	709.7	811	114.3	38.1	60.2
6/ 6/06	11	709.9	812	114.4	38.1	66.4
6/ 6/06	12	709.4	812	114.5	38.1	60.5
6/ 6/06	13	708.7	813	114.7	38.1	60.5
6/ 6/06	14	708.7	814	114.9	38.1	60.5
6/ 6/06	15	708	815	115.1	38.1	60.5
6/ 6/06	16	707.9	816	115.3	38.1	60.6
6/ 6/06	17	707.3	816	115.4	38.1	60.6
6/ 6/06	18	707.3	816	115.4	38.1	60.3
6/ 6/06	19	707	816	115.4	38.1	60.3
6/ 6/06	20	707	816	115.4	38.1	60.7
6/ 6/06	21	707.2	815	115.2	38.1	60.4
6/ 6/06	22	707.8	815	115.2	38.1	60.4
6/ 6/06	23	708.1	815	115.1	38.1	60.4
6/ 6/06	24	708.2	816	115.2	38.1	60.1
6/ 7/06	1	708	815	115.1	38.1	60.3
6/ 7/06	2	708.1	816	115.2	38.1	60.3
6/ 7/06	3	708	815	115.1	38.1	60.5
6/ 7/06	4	708	816	115.2	38.1	60.5
6/ 7/06	5	707.9	816	115.3	38.1	60.1
6/ 7/06	6	708.3	816	115.2	38.1	60
6/ 7/06	7	708.4	816	115.2	38.1	60.5
6/ 7/06	8	708.4	816	115.2	38.1	60.2
6/ 7/06	9	707.6	818	115.6	38.1	60.2
6/ 7/06	10	707.2	818	115.7	38.1	60.3
6/ 7/06	11	706.7	820	116	38.1	60.4
6/ 7/06	12	706.4	821	116.2	38.1	60.3
6/ 7/06	13	705.9	822	116.4	38.1	60.3
6/ 7/06	14	705.1	822	116.6	38.1	60.3
6/ 7/06	15	706.4	822	116.4	38.1	60.3
6/ 7/06	16	706.3	820	116.1	38	60.7
6/ 7/06	17	706.3	819	116	38	60.3
6/ 7/06	18	705.6	819	116.1	38	60.5
6/ 7/06	19	705.3	819	116.1	38.1	60.8
6/ 7/06	20	705.6	818	115.9	38.1	60.8
6/ 7/06	21	705.4	819	116.1	38.1	59.9
6/ 7/06	22	705.9	819	116	38.2	59.7
6/ 7/06	23	705.6	820	116.2	38.2	59.9
6/ 7/06	24	705.9	819	116	38.2	59.8
6/ 8/06	1	706	819	116	38.2	59.9
6/ 8/06	2	705.7	819	116.1	38.2	60
6/ 8/06	3	706.6	818	115.8	38.2	60.4
6/ 8/06	4	706	817	115.7	38.2	60.7
6/ 8/06	5	705.9	817	115.7	38.2	60.5
6/ 8/06	6	706.5	817	115.6	38.2	59.9
6/ 8/06	7	707.6	817	115.5	38.2	60.1
6/ 8/06	8	707.9	816	115.3	38.1	60.5
6/ 8/06	9	708	817	115.4	38.1	60.2
6/ 8/06	10	708	816	115.2	38.1	60.5

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/ 8/06	11	708.4	817	115.3	38.1	60.4
6/ 8/06	12	708.6	817	115.3	39.3	62.1
6/ 8/06	13	708.6	818	115.4	41.8	64.1
6/ 8/06	14	708.3	819	115.6	41.8	64.1
6/ 8/06	15	708.1	830	117.2	44.1	66.6
6/ 8/06	16	708	830	117.2	45.4	67.8
6/ 8/06	17	707.8	831	117.4	45.4	67.7
6/ 8/06	18	707.8	830	117.3	45.4	67.6
6/ 8/06	19	707.6	830	117.3	45.4	67.8
6/ 8/06	20	708.4	829	117	45.4	67.7
6/ 8/06	21	707.9	828	117	45.4	67.7
6/ 8/06	22	708.7	827	116.7	45.4	67.7
6/ 8/06	23	708.6	827	116.7	45.4	67.6
6/ 8/06	24	709	827	116.6	45.4	67.6
6/ 9/06	1	709	826	116.5	45.4	67.5
6/ 9/06	2	708.8	826	116.5	45.4	67.6
6/ 9/06	3	709.2	826	116.5	45.4	67.6
6/ 9/06	4	709.6	826	116.4	45.4	67.6
6/ 9/06	5	709.9	826	116.4	45.4	67.6
6/ 9/06	6	709.8	825	116.2	45.4	67.6
6/ 9/06	7	709.9	825	116.2	45.4	67.9
6/ 9/06	8	710.1	824	116	45.4	67.8
6/ 9/06	9	709.9	824	116.1	45.4	68
6/ 9/06	10	708.7	825	116.4	45.4	68
6/ 9/06	11	708.8	826	116.5	45.4	68
6/ 9/06	12	708.1	826	116.7	45.4	67.8
6/ 9/06	13	707.3	827	116.9	45.4	67.8
6/ 9/06	14	706.6	828	117.2	45.4	67.8
6/ 9/06	15	707	826	116.8	45.4	67.8
6/ 9/06	16	706.9	826	116.8	45.4	67.7
6/ 9/06	17	706.7	824	116.6	48.7	70.3
6/ 9/06	18	706.3	822	116.4	49.8	71.8
6/ 9/06	19	706.6	821	116.2	49.8	71.6
6/ 9/06	20	706.3	822	116.4	49.8	71.7
6/ 9/06	21	706.4	821	116.2	49.9	71.8
6/ 9/06	22	706.4	821	116.2	49.9	72
6/ 9/06	23	707.3	819	115.8	49.9	71.9
6/ 9/06	24	706.8	820	116	49.9	71.9
6/10/06	1	706.8	819	115.9	49.9	71.6
6/10/06	2	706.5	819	115.9	49.9	71.9
6/10/06	3	705.8	818	115.9	49.9	71.8
6/10/06	4	706	818	115.9	49.9	71.8
6/10/06	5	706.2	818	115.8	49.9	71.8
6/10/06	6	706.6	818	115.8	49.9	71.5
6/10/06	7	706.1	817	115.7	49.9	71.8
6/10/06	8	706.4	818	115.8	49.9	72.1
6/10/06	9	706.9	818	115.7	49.9	71.9
6/10/06	10	706.8	819	115.9	49.9	71.8
6/10/06	11	707.2	820	115.9	49.9	72
6/10/06	12	707.2	821	116.1	49.9	71.8
6/10/06	13	707.4	822	116.2	49.9	71.8
6/10/06	14	707.3	823	116.4	49.9	71.7
6/10/06	15	707.5	823	116.3	49.9	71.9
6/10/06	16	707.2	824	116.5	49.9	72.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/10/06	17	707.5	824	116.5	49.9	71.8
6/10/06	18	707.2	824	116.5	49.9	71.8
6/10/06	19	707.1	824	116.5	49.9	71.8
6/10/06	20	707.1	823	116.4	50	71.9
6/10/06	21	707.6	823	116.3	50	72.1
6/10/06	22	707.6	823	116.3	50	71.9
6/10/06	23	707.6	821	116	50	71.8
6/10/06	24	707.3	821	116.1	50	71.9
6/11/06	1	706.9	819	115.9	50	72
6/11/06	2	706.5	819	115.9	50	72.1
6/11/06	3	706.6	818	115.8	50	71.9
6/11/06	4	706	819	116	50	71.9
6/11/06	5	706.2	818	115.8	50	71.9
6/11/06	6	706.4	818	115.8	50	71.9
6/11/06	7	706	817	115.7	50	71.8
6/11/06	8	706.4	817	115.7	49.9	71.8
6/11/06	9	706.6	817	115.6	49.9	71.9
6/11/06	10	706.5	817	115.6	49.9	71.8
6/11/06	11	706.2	818	115.8	49.9	71.8
6/11/06	12	705.5	818	115.9	49.9	71.8
6/11/06	13	705.6	818	115.9	49.9	71.8
6/11/06	14	705.3	818	116	49.9	71.9
6/11/06	15	705.3	817	115.8	49.9	71.9
6/11/06	16	705.2	817	115.8	49.9	71.8
6/11/06	17	705.2	818	116	49.9	71.9
6/11/06	18	704.2	818	116.2	49.9	71.7
6/11/06	19	704.2	818	116.2	49.9	71.8
6/11/06	20	704.5	817	116	49.9	71.8
6/11/06	21	705.2	816	115.7	49.9	71.8
6/11/06	22	705.7	816	115.6	49.9	71.8
6/11/06	23	705.8	816	115.6	49.9	71.6
6/11/06	24	706.4	815	115.4	49.9	71.5
6/12/06	1	706.5	815	115.4	49.9	71.8
6/12/06	2	706.4	815	115.4	49.9	71.5
6/12/06	3	706.4	814	115.2	49.9	71.5
6/12/06	4	706.8	814	115.2	49.9	71.5
6/12/06	5	706.6	814	115.2	49.9	71.5
6/12/06	6	707.1	813	115	49.9	71.2
6/12/06	7	706.5	814	115.2	49.9	72.2
6/12/06	8	707.3	813	115	49.9	72
6/12/06	9	707	815	115.3	49.9	72
6/12/06	10	706.4	815	115.4	49.9	72
6/12/06	11	705.9	816	115.6	49.9	71.7
6/12/06	12	706	818	115.9	47.1	69.2
6/12/06	13	705.4	820	116.2	46.6	68
6/12/06	14	706	821	116.3	46.6	68.2
6/12/06	15	706.2	821	116.2	46.6	68.2
6/12/06	16	705.6	821	116.4	46.6	68.2
6/12/06	17	705.6	821	116.3	46.6	68
6/12/06	18	705.6	821	116.4	46.6	68.3
6/12/06	19	705.4	822	116.5	46.6	68
6/12/06	20	705.1	822	116.6	46.6	68.2
6/12/06	21	705.9	822	116.4	46.6	68
6/12/06	22	706.1	822	116.4	46.6	68

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/12/06	23	707.2	822	116.2	46.5	68.1
6/12/06	24	707.4	822	116.2	46.5	67.7
6/13/06	1	707.5	821	116	46.5	67.9
6/13/06	2	707.3	821	116.1	46.5	68.3
6/13/06	3	707.2	821	116.1	46.5	68.2
6/13/06	4	707.5	821	116	46.5	68.1
6/13/06	5	706.9	819	115.9	46.5	68.3
6/13/06	6	706.7	820	116	46.5	67.8
6/13/06	7	706.9	819	115.9	46.6	68.1
6/13/06	8	706.4	819	115.9	46.6	68.2
6/13/06	9	706	818	115.9	46.5	68
6/13/06	10	706.6	817	115.6	46.5	68.1
6/13/06	11	707	817	115.6	46.5	67.8
6/13/06	12	706.9	816	115.4	46.5	68
6/13/06	13	706.7	816	115.5	46.5	68
6/13/06	14	706.8	816	115.5	46.5	68.1
6/13/06	15	706.8	815	115.3	46.5	68.1
6/13/06	16	706.5	815	115.4	46.4	67.8
6/13/06	17	706.5	815	115.4	46.4	67.9
6/13/06	18	706.5	815	115.3	46.4	67.7
6/13/06	19	706.8	815	115.3	46.4	68
6/13/06	20	707	815	115.3	46.4	68
6/13/06	21	706.9	814	115.2	46.5	68
6/13/06	22	707.3	813	114.9	46.5	68.1
6/13/06	23	707.2	813	115	46.5	67.8
6/13/06	24	706.9	812	114.9	46.5	68.3
6/14/06	1	705.8	810	114.8	46.4	68.3
6/14/06	2	705.8	811	114.9	46.4	68.2
6/14/06	3	705.5	810	114.8	46.4	68.1
6/14/06	4	705.2	809	114.7	46.4	68.3
6/14/06	5	704.8	808	114.6	46.4	68
6/14/06	6	704.8	808	114.7	46.4	67.6
6/14/06	7	704.9	808	114.6	46.4	68
6/14/06	8	704.8	807	114.5	46.4	68
6/14/06	9	704.8	808	114.6	46.4	67.9
6/14/06	10	704.9	807	114.5	46.4	68
6/14/06	11	705.1	807	114.4	46.6	68
6/14/06	12	705.3	807	114.4	46.6	68
6/14/06	13	705.8	808	114.5	46.6	68
6/14/06	14	705.7	808	114.5	46.6	68
6/14/06	15	706.2	809	114.6	46.6	68.2
6/14/06	16	706.5	808	114.4	46.6	68.2
6/14/06	17	706.6	808	114.3	46.6	68.2
6/14/06	18	706.6	809	114.5	46.6	68.1
6/14/06	19	706.5	809	114.5	46.6	68.1
6/14/06	20	706.2	808	114.4	46.7	68.3
6/14/06	21	705.8	807	114.3	46.7	68.3
6/14/06	22	705.8	807	114.3	46.7	68.3
6/14/06	23	706.1	807	114.3	46.7	68.3
6/14/06	24	706	806	114.2	46.7	68.4
6/15/06	1	706	806	114.2	46.7	68.3
6/15/06	2	705.8	805	114.1	46.7	68.2
6/15/06	3	706.1	805	114	46.7	68.3
6/15/06	4	706.1	805	114	46.7	68.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/15/06	5	706.2	805	114	46.6	68.1
6/15/06	6	706.3	804	113.8	46.6	68.1
6/15/06	7	706.2	805	114	46.6	67.9
6/15/06	8	706.6	804	113.8	46.6	68
6/15/06	9	706.9	804	113.7	46.6	68
6/15/06	10	706.4	805	114	46.6	68.2
6/15/06	11	706.8	794	112.3	46.6	68
6/15/06	13	706.9	779	110.2	41.9	64
6/15/06	14	706.4	781	110.6	40.8	63
6/15/06	15	706.6	782	110.7	40.8	63.1
6/15/06	16	706.3	783	110.9	40.8	63.4
6/15/06	17	705.8	784	111.1	40.8	63.4
6/15/06	18	706	784	111.1	40.8	63.4
6/15/06	19	706.1	785	111.2	40.8	63.2
6/15/06	20	706.4	785	111.1	40.8	63.2
6/15/06	21	706.4	787	111.4	40.8	63.6
6/15/06	22	706.7	787	111.4	40.9	63.7
6/15/06	23	706.9	787	111.3	40.9	63.3
6/15/06	24	706.9	788	111.5	40.9	63.3
6/16/06	1	706.8	788	111.5	40.9	62.7
6/16/06	2	707	789	111.6	40.9	63.3
6/16/06	3	706.9	789	111.6	40.9	63.1
6/16/06	4	707.8	788	111.3	40.9	63.3
6/16/06	5	707.9	789	111.5	40.9	63.6
6/16/06	6	708.4	789	111.4	40.9	63.1
6/16/06	7	708.6	789	111.3	40.9	63.5
6/16/06	8	709.1	790	111.4	40.9	63.1
6/16/06	9	709.1	791	111.6	40.9	63.5
6/16/06	10	708.9	791	111.6	40.9	63.5
6/16/06	11	709.1	793	111.8	40.9	63.4
6/16/06	12	708.3	793	112	40.9	62.8
6/16/06	13	708.4	792	111.8	40.9	63.4
6/16/06	14	707.6	793	112.1	40.9	63.3
6/16/06	15	707.5	793	112.1	40.9	63.3
6/16/06	16	706.7	793	112.2	40.9	63.3
6/16/06	17	706.1	793	112.3	40.9	63.3
6/16/06	18	706.5	793	112.2	40.9	63.3
6/16/06	19	706.8	791	111.9	40.9	63.3
6/16/06	20	707	791	111.9	40.9	63.3
6/16/06	21	707.1	792	112	41	63.4
6/16/06	22	708	793	112	41	63.3
6/16/06	23	707.9	792	111.9	41	63.3
6/16/06	24	708.7	794	112	41	63.7
6/17/06	1	709.2	794	112	40.9	63.4
6/17/06	2	709.3	794	111.9	40.9	63.7
6/17/06	3	709.6	794	111.9	40.9	63.4
6/17/06	4	710.2	795	111.9	40.9	63.2
6/17/06	5	710.7	795	111.9	41	63.5
6/17/06	6	711.4	796	111.9	41	62.4
6/17/06	7	711.9	797	112	41	63.6
6/17/06	8	712.5	799	112.1	41	63.3
6/17/06	9	712.6	799	112.1	41	63.2
6/17/06	10	712.6	799	112.1	41	63.1
6/17/06	11	713	801	112.3	41	63.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/17/06	12	712.4	802	112.6	41	62.5
6/17/06	13	712.4	803	112.7	41	63.1
6/17/06	14	712	803	112.8	41	63
6/17/06	15	711.8	803	112.8	41	62.9
6/17/06	16	711.5	803	112.9	41	63.2
6/17/06	17	711.3	803	112.9	41	63.2
6/17/06	18	710.6	802	112.9	41	63.2
6/17/06	19	711.3	802	112.7	41.1	62.7
6/17/06	20	711.1	802	112.8	41.1	62.6
6/17/06	21	711.4	802	112.7	41.1	62.6
6/17/06	22	712	801	112.5	41.2	62.6
6/17/06	23	711.9	801	112.5	41.2	62.6
6/17/06	24	712	800	112.4	41.2	63.4
6/18/06	1	712.1	800	112.3	41.2	63
6/18/06	2	712.2	798	112.1	41.2	63
6/18/06	3	711.8	798	112.1	41.2	62.8
6/18/06	4	712.4	798	112	41.2	62.8
6/18/06	5	712.8	797	111.8	41.3	63.1
6/18/06	6	712.5	797	111.9	41.3	63.1
6/18/06	7	712.2	796	111.8	41.3	63.5
6/18/06	8	712.9	796	111.7	41.3	63.3
6/18/06	9	711.9	796	111.8	41.3	63.4
6/18/06	10	711.4	797	112	42.6	64.9
6/18/06	11	711.2	811	114	45.3	67.1
6/18/06	12	710.8	807	113.5	48.7	70.1
6/18/06	13	710.4	807	113.6	48.6	69.7
6/18/06	14	709.9	807	113.7	48.5	70.6
6/18/06	15	709.8	806	113.6	48.5	70.5
6/18/06	16	709.5	805	113.5	48.5	70.4
6/18/06	17	709.5	807	113.7	48.6	70
6/18/06	18	708.6	807	113.9	48.6	70.6
6/18/06	19	708.7	806	113.7	48.6	70.6
6/18/06	20	708.9	804	113.4	48.6	70.3
6/18/06	21	709.4	804	113.3	48.6	70.3
6/18/06	22	709.2	803	113.2	48.6	70.4
6/18/06	24	708.4	803	113.4	48.7	69.9
6/19/06	1	708.6	802	113.2	48.7	70.7
6/19/06	2	708.7	802	113.2	48.7	70.7
6/19/06	3	709.1	801	113	48.7	70.7
6/19/06	4	709.3	801	112.9	48.7	71
6/19/06	5	709	801	113	48.7	71.1
6/19/06	6	709.2	801	112.9	48.7	70.9
6/19/06	7	709.6	801	112.9	48.7	70.9
6/19/06	8	709.4	802	113.1	48.7	70.9
6/19/06	9	709.5	802	113	48.7	70.6
6/19/06	10	709.1	803	113.2	49.8	71.6
6/19/06	11	708.9	803	113.3	53.5	75.4
6/19/06	12	708.8	810	114.3	57.8	79.8
6/19/06	13	709.2	810	114.2	57.7	79.5
6/19/06	14	708	811	114.6	57.6	79.5
6/19/06	15	707.7	814	115	58.8	80.6
6/19/06	16	707.9	813	114.9	58.8	80.6
6/19/06	17	708.1	813	114.8	58.8	80.1
6/19/06	18	708.1	812	114.7	58.8	80.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/19/06	19	708.8	811	114.4	58.8	80.5
6/19/06	20	709.8	810	114.1	59.7	81.4
6/19/06	21	710.2	809	113.9	59.7	81.4
6/19/06	22	710.4	809	113.9	59.9	81.5
6/19/06	23	710.8	808	113.7	59.9	81.5
6/19/06	24	711	807	113.5	60.1	82.1
6/20/06	1	711.2	806	113.3	60.1	80.5
6/20/06	2	711.3	806	113.3	60.2	80.3
6/20/06	3	711.6	806	113.3	60.2	80.3
6/20/06	4	711.6	805	113.1	60.2	80.1
6/20/06	5	712	804	112.9	60.2	80.1
6/20/06	6	712.2	803	112.7	60.2	79.5
6/20/06	7	712.6	803	112.7	60.2	80.3
6/20/06	8	713	803	112.6	60.2	79.6
6/20/06	9	713.3	803	112.6	60.2	79.8
6/20/06	11	712.2	805	113	60.2	79.6
6/20/06	12	712.2	806	113.2	60.2	79.7
6/20/06	13	712.1	806	113.2	60.2	79.7
6/20/06	14	711.8	806	113.2	60.2	79.6
6/20/06	15	711.4	807	113.4	60.2	79.7
6/20/06	16	711	808	113.6	60.2	79.7
6/20/06	17	711.6	808	113.5	60.2	79.7
6/20/06	18	711.3	808	113.6	60.2	79.5
6/20/06	19	711.2	808	113.6	60.4	79.8
6/20/06	20	711.4	807	113.4	60.4	79.8
6/20/06	21	712	806	113.2	60.4	79.6
6/20/06	22	712.3	806	113.2	60.4	79.6
6/20/06	23	712.3	805	113	60.4	79.8
6/20/06	24	712.1	805	113	60.4	80
6/21/06	1	712.5	804	112.8	60.4	80.1
6/21/06	2	712.7	803	112.7	60.4	79.7
6/21/06	3	712.8	803	112.6	60.4	79.7
6/21/06	4	713.2	802	112.5	60.2	79.5
6/21/06	5	713	802	112.5	60.2	79.6
6/21/06	6	714.3	802	112.3	60.2	78.4
6/21/06	7	714.3	802	112.3	60.2	80
6/21/06	8	714.7	802	112.2	59	78.3
6/21/06	9	714.3	803	112.4	59	78.4
6/21/06	10	714.1	804	112.6	59.1	79
6/21/06	11	713.8	794	111.2	56	76
6/21/06	12	713.5	796	111.6	54.5	74.6
6/21/06	13	713.3	797	111.7	54.6	75
6/21/06	14	713	798	111.9	54.7	74.7
6/21/06	15	712.6	795	111.6	49.8	70.1
6/21/06	16	712.6	797	111.8	50	70.2
6/21/06	17	712.5	798	112	50	70.1
6/21/06	18	712.2	799	112.2	50	70.3
6/21/06	19	712.5	800	112.3	48.8	70
6/21/06	20	712.1	799	112.2	49.8	70
6/21/06	21	712.9	800	112.2	49.8	70
6/21/06	22	712.7	799	112.1	49.8	69.8
6/21/06	23	713.4	799	112	49.8	69.8
6/21/06	24	713.6	799	112	49.9	70
6/22/06	1	713.5	798	111.8	49.9	70.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/22/06	2	713.5	797	111.7	49.9	69.9
6/22/06	3	713.9	797	111.6	49.9	69.7
6/22/06	4	713.9	796	111.5	49.9	69.8
6/22/06	5	714	795	111.3	49.9	69.8
6/22/06	6	714.4	794	111.1	49.9	68.8
6/22/06	7	714.4	794	111.1	49.9	69.6
6/22/06	8	715.1	794	111	49.8	69.9
6/22/06	9	714.7	798	111.7	45	65
6/22/06	10	714.5	791	110.7	40.7	61
6/22/06	11	714.1	791	110.8	40.2	59.5
6/22/06	12	713.9	795	111.4	40.2	59.5
6/22/06	13	713.6	796	111.5	40.2	59.9
6/22/06	14	713.4	798	111.9	40.2	60
6/22/06	15	713.5	799	112	40.1	60.4
6/22/06	16	713	800	112.2	40.1	60
6/22/06	17	712.9	802	112.5	40.1	59.6
6/22/06	18	712.8	803	112.7	40.1	59.6
6/22/06	19	712.8	805	112.9	40.1	59.8
6/22/06	20	712.5	804	112.9	40.1	60
6/22/06	21	713	805	112.9	40.1	60.1
6/22/06	22	713.3	805	112.9	40.1	60
6/22/06	23	713.4	805	112.8	40.1	59.9
6/22/06	24	713.4	805	112.8	40.1	59.9
6/23/06	1	714.5	805	112.7	40.1	59.9
6/23/06	2	713.8	805	112.8	40.1	60.1
6/23/06	3	713.9	805	112.8	40.1	60.1
6/23/06	4	714	804	112.6	40.1	60.3
6/23/06	5	714.3	804	112.6	40.1	60.4
6/23/06	6	714.6	803	112.4	40.1	60.4
6/23/06	7	715.1	803	112.3	40.1	60.2
6/23/06	8	715.6	803	112.2	40.1	60.8
6/23/06	9	716.3	804	112.2	40.1	60.4
6/23/06	10	715	806	112.7	40.1	60.6
6/23/06	11	715.2	806	112.7	40	60.1
6/23/06	12	715	792	110.8	34.9	54.9
6/23/06	13	715.1	792	110.8	33.6	55.4
6/23/06	14	715.1	793	110.9	33.6	55.2
6/23/06	15	714.7	793	111	33.6	55.2
6/23/06	16	714.6	794	111.1	33.6	55.2
6/23/06	17	714.4	795	111.3	33.6	55
6/23/06	18	713.6	795	111.4	33.6	55.1
6/23/06	19	714.8	796	111.4	33.6	55
6/23/06	20	714	796	111.5	33.6	55
6/23/06	21	714.4	796	111.4	33.6	55.1
6/23/06	22	714.6	795	111.3	33.6	55.1
6/23/06	23	715	796	111.3	33.6	55
6/23/06	24	715.2	796	111.3	33.6	55
6/24/06	1	715.3	795	111.1	33.6	55.2
6/24/06	2	715.6	795	111.1	33.6	55.2
6/24/06	3	715.6	796	111.2	33.6	55.2
6/24/06	4	715.9	797	111.3	33.5	55.2
6/24/06	5	716.1	797	111.3	33.5	54.9
6/24/06	6	716.6	797	111.2	33.5	54.5
6/24/06	7	716.5	797	111.2	33.6	54.6

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/24/06	8	716.8	797	111.2	33.6	54.5
6/24/06	9	716.6	797	111.2	33.6	54.7
6/24/06	10	716	799	111.6	33.6	54.8
6/24/06	11	715.8	805	112.5	27.4	52.5
6/24/06	12	715.4	796	111.3	21.1	49.6
6/24/06	13	714.9	796	111.3	21.1	49.2
6/24/06	14	714.5	797	111.6	21.1	50
6/24/06	15	714.8	798	111.6	21.1	49.6
6/24/06	16	714.2	798	111.7	21.1	50.2
6/24/06	17	713.8	798	111.8	21.1	50.3
6/24/06	18	713.7	798	111.8	21.1	50
6/24/06	19	713.7	798	111.8	21.1	49.6
6/24/06	20	713.9	798	111.8	21.1	50.1
6/24/06	21	714.2	798	111.7	21.1	50
6/24/06	22	715	798	111.6	21.1	50
6/24/06	23	714.9	797	111.5	21.1	49.7
6/24/06	24	715.1	798	111.6	21.1	49.7
6/25/06	1	715.4	798	111.6	21.1	50.3
6/25/06	2	715.7	797	111.4	21.1	50.5
6/25/06	3	716	797	111.3	21.1	50.5
6/25/06	4	716.3	797	111.3	21.1	50.8
6/25/06	5	716.1	797	111.3	21	50.7
6/25/06	6	716.3	797	111.3	21	50.6
6/25/06	7	716.6	797	111.2	21	50.9
6/25/06	8	716.7	797	111.2	21	50.6
6/25/06	9	716.4	799	111.5	21	50.5
6/25/06	10	715.8	800	111.8	21	50.4
6/25/06	11	715.3	792	110.7	17.3	47.9
6/25/06	18	712.7	786	110.3	13.6	44.9
6/25/06	19	712.4	785	110.2	13.6	44.9
6/25/06	20	712.4	784	110.1	13.6	44.7
6/26/06	11	711.5	789	110.9	11.7	43.1
6/26/06	12	711.1	783	110.1	5.6	37.4
6/29/06	13	709.6	790	111.3	0	30.8
6/29/06	14	710.1	792	111.5	0	30.6
6/29/06	15	710.3	793	111.6	0	30.6
6/29/06	16	711	792	111.4	0	30.8
6/29/06	17	710.8	793	111.6	0	30.7
6/29/06	18	711	793	111.5	0	30.6
6/29/06	19	711.3	792	111.3	0	30.6
6/29/06	20	711.3	791	111.2	0	30.7
6/29/06	21	711.9	790	111	0	30.8
6/29/06	22	712.3	789	110.8	0	30.6
6/29/06	23	712.3	789	110.8	0	30.7
6/29/06	24	712.6	788	110.6	0	30.5
6/30/06	1	712.3	786	110.4	0	30.6
6/30/06	2	712.5	786	110.3	0	30.6
6/30/06	3	712.5	785	110.2	0	30.6
6/30/06	4	712.8	785	110.1	0	30.6
6/30/06	8	713.8	785	110	0	29.9
6/30/06	9	713.6	785	110	0	29.9
6/30/06	10	712.9	786	110.3	0	29.3
6/30/06	11	712.6	787	110.4	0	29.8
6/30/06	12	711.9	788	110.7	0	29.2

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/30/06	13	711.3	790	111.1	0	29.7
6/30/06	14	711.1	792	111.4	0	29.5
6/30/06	15	711.3	793	111.5	0	30.1
6/30/06	16	710.2	794	111.8	0	30.1
6/30/06	17	709.4	795	112.1	0	29.8
6/30/06	18	709.4	797	112.4	0	29.7
6/30/06	19	709	797	112.4	0	29.8
6/30/06	20	708.6	796	112.3	0	30.2
6/30/06	21	708.7	796	112.3	0	29.6
6/30/06	22	709.2	795	112.1	0	29.7
6/30/06	23	709.5	794	111.9	0	29.7
6/30/06	24	709.6	793	111.7	0	30
7/ 1/06	1	709.9	791	111.4	0	30
7/ 1/06	2	710.2	790	111.2	0	30.3
7/ 1/06	3	709.9	789	111.1	0	30
7/ 1/06	4	709.8	789	111.2	0	29.8
7/ 1/06	5	710.6	788	110.9	0	29.7
7/ 1/06	6	710.9	787	110.7	0	29.7
7/ 1/06	7	710.9	787	110.7	0	29.9
7/ 1/06	8	710.8	787	110.7	0	29.8
7/ 1/06	9	710.2	788	111	0	29.7
7/ 1/06	10	710.2	789	111.1	0	29.7
7/ 1/06	11	710.2	790	111.2	0	29.8
7/ 1/06	12	709.9	792	111.6	0	29.6
7/ 1/06	13	709	794	112	0	29.9
7/ 1/06	14	708.6	796	112.3	0	29.6
7/ 1/06	15	708.3	798	112.7	0	30.2
7/ 1/06	16	707.6	798	112.8	0	29.5
7/ 1/06	18	707.1	799	113	0	30.1
7/ 1/06	19	707	800	113.2	0	30
7/ 1/06	20	706.7	798	112.9	0	29.7
7/ 1/06	21	707.5	797	112.6	0	30.1
7/ 1/06	22	708.1	795	112.3	0	30.1
7/ 1/06	23	708.8	794	112	0	30.7
7/ 1/06	24	708.4	793	111.9	0	30.6
7/ 2/06	1	708.4	792	111.8	0	30.4
7/ 2/06	2	708.8	792	111.7	0	30.4
7/ 2/06	3	709.3	792	111.7	0	30.2
7/ 2/06	4	709.5	792	111.6	0	30.6
7/ 2/06	5	709.7	792	111.6	0	30.1
7/ 2/06	6	710	792	111.5	0	30
7/ 2/06	7	710.1	792	111.5	0	30.6
7/ 2/06	8	709.9	793	111.7	0	30.3
7/ 2/06	9	710	794	111.8	0	29.9
7/ 2/06	10	709.5	794	111.9	0	29.7
7/ 2/06	11	709.6	795	112	0	30.1
7/ 2/06	12	708.8	797	112.4	0	29.7
7/ 2/06	13	708.4	799	112.8	0	29.6
7/ 2/06	14	708.5	800	112.9	0	30.2
7/ 2/06	15	707.9	802	113.3	0	30.1
7/ 2/06	16	707.9	803	113.4	0	30.1
7/ 2/06	17	707.2	803	113.6	0	29.9
7/ 2/06	18	706.5	803	113.7	0	29.8
7/ 2/06	19	706.8	802	113.5	0	29.4

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
7/ 2/06	20	707.4	801	113.2	0	29.2
7/ 2/06	21	707.5	800	113.1	0	29.6
7/ 2/06	22	708.4	799	112.8	0	30.1
7/ 2/06	23	708.5	797	112.5	0	29.8
7/ 2/06	24	709	796	112.3	0	29.8
7/ 3/06	1	709.2	795	112.1	0	29.8
7/ 3/06	2	709.2	794	112	0	29.6
7/ 3/06	3	709.5	793	111.8	0	29.6
7/ 3/06	4	709.9	791	111.4	0	29.9
7/ 3/06	5	710	791	111.4	0	29.6
7/ 3/06	6	710.4	790	111.2	0	29.6
7/ 3/06	7	710.8	789	111	0	29.7
7/ 3/06	8	711.3	789	110.9	0	30.1
7/ 3/06	9	711.1	790	111.1	0	30
7/ 3/06	10	710.3	790	111.2	0	30.9
7/ 3/06	11	710.3	791	111.4	0	30.9
7/ 3/06	12	710	792	111.6	0	31.2
7/ 3/06	13	709.7	794	111.9	0	30.9
7/ 3/06	14	709.4	795	112.1	0	31.2
7/ 3/06	16	709.2	797	112.4	0	31.1
7/ 3/06	17	708.5	798	112.6	0	31
7/ 3/06	18	708.6	798	112.6	0	31.1
7/ 3/06	19	708.5	797	112.5	0	30.9
7/ 3/06	20	708.3	796	112.4	0	31.1
7/ 3/06	21	709.3	795	112.1	0	31
7/ 3/06	22	709	793	111.8	0	30.9
7/ 3/06	23	710	792	111.5	0	30.7
7/ 3/06	24	710.5	791	111.3	0	30.9
7/ 4/06	1	710.7	789	111	0	30.9
7/ 4/06	2	710.6	788	110.9	0	31
7/ 4/06	3	710	786	110.7	0	31
7/ 4/06	4	710.4	785	110.5	0	31.1
7/ 4/06	5	710.8	784	110.3	0	31.1
7/ 4/06	6	710	783	110.3	0	30.8
7/ 4/06	9	710.1	782	110.1	0	30.7
7/ 4/06	10	710.3	782	110.1	0	31
7/ 4/06	11	709.8	782	110.2	0	31
7/ 4/06	12	709.1	783	110.4	0	31.1
7/ 4/06	13	708.5	784	110.7	0	31.1
7/ 4/06	14	708.3	785	110.8	0	31
7/ 4/06	15	706.7	786	111.2	0	30.9
7/ 4/06	16	707.1	786	111.2	0	30.8
7/ 4/06	17	706.4	787	111.4	0	30.9
7/ 4/06	18	706.1	786	111.3	0	30.8
7/ 4/06	19	705.8	786	111.4	0	30.9
7/ 4/06	20	705.2	786	111.5	0	31
7/ 4/06	21	705.6	785	111.2	0	30.8
7/ 4/06	22	706.1	784	111	0	30.8
7/ 4/06	23	706.9	782	110.6	0	30.7
7/ 4/06	24	708.4	781	110.3	0	30.7
7/ 5/06	1	707.3	779	110.1	0	30.7
7/ 5/06	14	706.1	777	110	0	30.9
7/ 5/06	15	705.6	778	110.3	0	31
7/ 5/06	16	705.1	779	110.5	0	30.7

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
7/ 5/06	17	704.6	779	110.6	0	30.5
7/ 5/06	18	705.1	779	110.5	0	30.6
7/ 5/06	19	704.5	779	110.6	0	30.6
7/ 5/06	20	705.3	778	110.3	0	30.8
7/ 9/06	16	705.1	777	110.2	0	25.1
7/ 9/06	17	704	778	110.5	0	25
7/ 9/06	18	703.3	778	110.6	0	25
7/ 9/06	19	703.3	778	110.6	0	25.2
7/ 9/06	20	702.8	778	110.7	0	25.1
7/ 9/06	21	703.8	777	110.4	0	24.9
7/ 9/06	22	703.2	777	110.5	0	25.4
7/ 9/06	23	703	777	110.5	0	25.1
7/ 9/06	24	703.7	775	110.1	0	25.6
7/10/06	1	703	774	110.1	0	25
7/10/06	17	702.1	773	110.1	0	25.5
7/10/06	18	702.1	772	110	0	25.9
7/10/06	19	702.1	772	110	0	25.8
6/30/06	17	709.4	795	112.1	0	29.8
6/30/06	18	709.4	797	112.4	0	29.7
6/30/06	19	709	797	112.4	0	29.8
6/30/06	20	708.6	796	112.3	0	30.2
6/30/06	21	708.7	796	112.3	0	29.6
6/30/06	22	709.2	795	112.1	0	29.7
6/30/06	23	709.5	794	111.9	0	29.7
6/30/06	24	709.6	793	111.7	0	30
7/ 1/06	1	709.9	791	111.4	0	30
7/ 1/06	2	710.2	790	111.2	0	30.3
7/ 1/06	3	709.9	789	111.1	0	30
7/ 1/06	4	709.8	789	111.2	0	29.8
7/ 1/06	5	710.6	788	110.9	0	29.7
7/ 1/06	6	710.9	787	110.7	0	29.7
7/ 1/06	7	710.9	787	110.7	0	29.9
7/ 1/06	8	710.8	787	110.7	0	29.8
7/ 1/06	9	710.2	788	111	0	29.7
7/ 1/06	10	710.2	789	111.1	0	29.7
7/ 1/06	11	710.2	790	111.2	0	29.8
7/ 1/06	12	709.9	792	111.6	0	29.6
7/ 1/06	13	709	794	112	0	29.9
7/ 1/06	14	708.6	796	112.3	0	29.6
7/ 1/06	15	708.3	798	112.7	0	30.2
7/ 1/06	16	707.6	798	112.8	0	29.5
7/ 1/06	18	707.1	799	113	0	30.1
7/ 1/06	19	707	800	113.2	0	30
7/ 1/06	20	706.7	798	112.9	0	29.7
7/ 1/06	21	707.5	797	112.6	0	30.1
7/ 1/06	22	708.1	795	112.3	0	30.1
7/ 1/06	23	708.8	794	112	0	30.7
7/ 1/06	24	708.4	793	111.9	0	30.6
7/ 2/06	1	708.4	792	111.8	0	30.4
7/ 2/06	2	708.8	792	111.7	0	30.4
7/ 2/06	3	709.3	792	111.7	0	30.2
7/ 2/06	4	709.5	792	111.6	0	30.6
7/ 2/06	5	709.7	792	111.6	0	30.1
7/ 2/06	6	710	792	111.5	0	30

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
7/ 2/06	7	710.1	792	111.5	0	30.6
7/ 2/06	8	709.9	793	111.7	0	30.3
7/ 2/06	9	710	794	111.8	0	29.9
7/ 2/06	10	709.5	794	111.9	0	29.7
7/ 2/06	11	709.6	795	112	0	30.1
7/ 2/06	12	708.8	797	112.4	0	29.7
7/ 2/06	13	708.4	799	112.8	0	29.6
7/ 2/06	14	708.5	800	112.9	0	30.2
7/ 2/06	15	707.9	802	113.3	0	30.1
7/ 2/06	16	707.9	803	113.4	0	30.1
7/ 2/06	17	707.2	803	113.6	0	29.9
7/ 2/06	18	706.5	803	113.7	0	29.8
7/ 2/06	19	706.8	802	113.5	0	29.4
7/ 2/06	20	707.4	801	113.2	0	29.2
7/ 2/06	21	707.5	800	113.1	0	29.6
7/ 2/06	22	708.4	799	112.8	0	30.1
7/ 2/06	23	708.5	797	112.5	0	29.8
7/ 2/06	24	709	796	112.3	0	29.8
7/ 3/06	1	709.2	795	112.1	0	29.8
7/ 3/06	2	709.2	794	112	0	29.6
7/ 3/06	3	709.5	793	111.8	0	29.6
7/ 3/06	4	709.9	791	111.4	0	29.9
7/ 3/06	5	710	791	111.4	0	29.6
7/ 3/06	6	710.4	790	111.2	0	29.6
7/ 3/06	7	710.8	789	111	0	29.7
7/ 3/06	8	711.3	789	110.9	0	30.1
7/ 3/06	9	711.1	790	111.1	0	30
7/ 3/06	10	710.3	790	111.2	0	30.9
7/ 3/06	11	710.3	791	111.4	0	30.9
7/ 3/06	12	710	792	111.6	0	31.2
7/ 3/06	13	709.7	794	111.9	0	30.9
7/ 3/06	14	709.4	795	112.1	0	31.2
7/ 3/06	16	709.2	797	112.4	0	31.1
7/ 3/06	17	708.5	798	112.6	0	31
7/ 3/06	18	708.6	798	112.6	0	31.1
7/ 3/06	19	708.5	797	112.5	0	30.9
7/ 3/06	20	708.3	796	112.4	0	31.1
7/ 3/06	21	709.3	795	112.1	0	31
7/ 3/06	22	709	793	111.8	0	30.9
7/ 3/06	23	710	792	111.5	0	30.7
7/ 3/06	24	710.5	791	111.3	0	30.9
7/ 4/06	1	710.7	789	111	0	30.9
7/ 4/06	2	710.6	788	110.9	0	31
7/ 4/06	3	710	786	110.7	0	31
7/ 4/06	4	710.4	785	110.5	0	31.1
7/ 4/06	5	710.8	784	110.3	0	31.1
7/ 4/06	6	710	783	110.3	0	30.8
7/ 4/06	9	710.1	782	110.1	0	30.7
7/ 4/06	10	710.3	782	110.1	0	31
7/ 4/06	11	709.8	782	110.2	0	31
7/ 4/06	12	709.1	783	110.4	0	31.1
7/ 4/06	13	708.5	784	110.7	0	31.1
7/ 4/06	14	708.3	785	110.8	0	31
7/ 4/06	15	706.7	786	111.2	0	30.9

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
7/ 4/06	16	707.1	786	111.2	0	30.8
7/ 4/06	17	706.4	787	111.4	0	30.9
7/ 4/06	18	706.1	786	111.3	0	30.8
7/ 4/06	19	705.8	786	111.4	0	30.9
7/ 4/06	20	705.2	786	111.5	0	31
7/ 4/06	21	705.6	785	111.2	0	30.8
7/ 4/06	22	706.1	784	111	0	30.8
7/ 4/06	23	706.9	782	110.6	0	30.7
7/ 4/06	24	708.4	781	110.3	0	30.7
7/ 5/06	1	707.3	779	110.1	0	30.7
7/ 5/06	14	706.1	777	110	0	30.9
7/ 5/06	15	705.6	778	110.3	0	31
7/ 5/06	16	705.1	779	110.5	0	30.7
7/ 5/06	17	704.6	779	110.6	0	30.5
7/ 5/06	18	705.1	779	110.5	0	30.6
7/ 5/06	19	704.5	779	110.6	0	30.6
7/ 5/06	20	705.3	778	110.3	0	30.8
7/ 9/06	16	705.1	777	110.2	0	25.1
7/ 9/06	17	704	778	110.5	0	25
7/ 9/06	18	703.3	778	110.6	0	25
7/ 9/06	19	703.3	778	110.6	0	25.2
7/ 9/06	20	702.8	778	110.7	0	25.1
7/ 9/06	21	703.8	777	110.4	0	24.9
7/ 9/06	22	703.2	777	110.5	0	25.4
7/ 9/06	23	703	777	110.5	0	25.1
7/ 9/06	24	703.7	775	110.1	0	25.6
7/10/06	1	703	774	110.1	0	25
7/10/06	17	702.1	773	110.1	0	25.5
7/10/06	18	702.1	772	110	0	25.9
7/10/06	19	702.1	772	110	0	25.8

Table C-9. Albeni Falls tailwater TDG percent saturation greater than or equal to 110%, barometric and total gas pressure collected in 2007.

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
4/ 7/07	16	699.8	771	110.2	12.5	34
5/ 2/07	19	700.6	772	110.2	13.2	41.1
5/ 2/07	20	701	774	110.4	13.2	41
5/ 2/07	21	701	774	110.4	13.2	40.8
5/ 2/07	22	701.5	775	110.5	13.2	40.8
5/ 2/07	24	701.2	772	110.1	13.1	41.9
5/ 3/07	1	701.7	772	110	13.1	41.7
5/ 3/07	2	701.8	772	110	13.2	41.2
5/ 3/07	16	702.5	780	111	14.2	42.3
5/ 3/07	17	702.7	779	110.9	18.7	45.7
5/ 8/07	19	698.9	772	110.5	13.4	39.9
5/ 8/07	20	698.8	772	110.5	13.4	40
5/ 8/07	21	699	771	110.3	13.4	40
5/ 8/07	22	699.8	771	110.2	13.4	40
5/ 8/07	23	700.3	772	110.2	13.5	40.2

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/ 8/07	24	701.1	772	110.1	13.5	40.2
5/ 9/07	1	701.9	772	110	13.5	40.3
5/ 9/07	2	702.8	773	110	13.5	39.9
5/ 9/07	4	703.8	774	110	13.5	40.2
5/ 9/07	10	706.5	777	110	13.5	40.5
5/ 9/07	11	706.4	777	110	13.5	40.5
5/ 9/07	12	706.5	779	110.3	13.5	40
5/ 9/07	13	705.8	781	110.7	13.5	40.1
5/ 9/07	14	705.8	781	110.7	13.5	39.7
5/ 9/07	15	705.8	782	110.8	13.5	39.8
5/ 9/07	16	705.4	783	111	13.5	39.8
5/ 9/07	17	705.7	782	110.8	13.5	39.9
5/ 9/07	18	705.1	782	110.9	13.5	39.8
5/ 9/07	19	704.5	781	110.9	13.5	40.1
5/ 9/07	20	704.9	779	110.5	13.5	39.8
5/ 9/07	21	705.3	778	110.3	13.5	40.1
5/ 9/07	22	706.7	777	110	13.5	40
5/10/07	10	706.9	778	110.1	13.6	40.2
5/10/07	11	707.1	779	110.2	13.6	40.5
5/10/07	12	706.6	781	110.5	13.6	40.4
5/10/07	13	706.3	782	110.7	13.6	40.3
5/10/07	14	705.5	783	111	13.6	40.5
5/10/07	15	705.3	784	111.2	13.6	40.3
5/10/07	16	704.9	785	111.4	13.6	40.5
5/10/07	17	705	784	111.2	13.6	40.3
5/10/07	18	704.7	784	111.3	13.6	40.1
5/10/07	19	704.9	783	111.1	13.6	40.1
5/10/07	20	705.2	782	110.9	13.6	40
5/10/07	21	705.6	781	110.7	13.6	40
5/10/07	22	706.5	780	110.4	13.6	39.8
5/10/07	23	706.9	780	110.3	13.7	40
5/10/07	24	706.9	778	110.1	13.7	40
5/11/07	10	709.6	781	110.1	13.7	40.1
5/11/07	11	708.7	783	110.5	13.7	40.2
5/11/07	12	707.7	784	110.8	13.7	40.2
5/11/07	13	707	786	111.2	13.7	40.3
5/11/07	14	706.6	787	111.4	13.7	40.2
5/11/07	15	706.1	787	111.5	13.7	40.1
5/11/07	16	705.8	787	111.5	13.7	39.9
5/11/07	17	705.4	787	111.6	13.7	39.9
5/11/07	18	704.7	787	111.7	13.7	39.9
5/11/07	19	704.2	786	111.6	13.7	39.9
5/11/07	20	704	785	111.5	13.7	40.1
5/11/07	21	704.4	784	111.3	13.7	39.9
5/11/07	22	704.6	783	111.1	13.7	39.9
5/11/07	23	704.6	782	111	13.7	39.7
5/11/07	24	704.9	781	110.8	13.7	39.9
5/12/07	1	704.5	780	110.7	13.8	40
5/12/07	2	703.8	780	110.8	13.8	40
5/12/07	3	704.1	780	110.8	13.8	40.1
5/12/07	4	704.2	779	110.6	13.8	40.2
5/12/07	5	704.3	780	110.7	13.8	40.2
5/12/07	6	704.3	779	110.6	13.8	40
5/12/07	7	704.9	781	110.8	13.8	39.8

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/12/07	8	704.4	780	110.7	13.8	40.2
5/12/07	9	704.6	781	110.8	13.8	40.3
5/12/07	10	703.8	782	111.1	13.8	40.1
5/12/07	11	703.2	784	111.5	13.8	40.1
5/12/07	12	702.3	785	111.8	13.8	39.8
5/12/07	13	701.7	787	112.2	13.8	39.8
5/12/07	14	701.1	789	112.5	13.8	39.7
5/12/07	15	700.7	789	112.6	13.8	39.7
5/12/07	16	700.5	790	112.8	13.8	39.9
5/12/07	17	700.2	789	112.7	13.8	39.8
5/12/07	18	700.4	790	112.8	13.8	39.7
5/12/07	19	700.3	789	112.7	13.8	39.8
5/12/07	20	700.6	788	112.5	13.8	39.9
5/12/07	21	701.4	787	112.2	13.8	40.1
5/12/07	22	703.3	787	111.9	13.8	39.9
5/12/07	23	704.3	785	111.5	13.8	39.9
5/12/07	24	704.8	785	111.4	13.8	39.9
5/13/07	1	705	785	111.3	13.9	39.9
5/13/07	2	705.6	784	111.1	13.9	40.2
5/13/07	3	706.7	784	110.9	13.9	40
5/13/07	4	707.3	785	111	13.9	40.2
5/13/07	5	707.9	786	111	13.9	40.1
5/13/07	6	709.4	785	110.7	13.9	39.9
5/13/07	7	709	785	110.7	13.9	40.2
5/13/07	8	709.9	785	110.6	13.9	40
5/13/07	9	710.3	785	110.5	13.9	40
5/13/07	10	710.2	787	110.8	13.9	40.3
5/13/07	11	710.4	787	110.8	13.9	40.1
5/13/07	13	710.5	788	110.9	13.9	39.9
5/13/07	14	710.9	788	110.9	13.9	40.1
5/13/07	15	711.3	788	110.8	13.9	40.3
5/13/07	16	711.6	788	110.7	13.9	40.2
5/13/07	17	711.2	788	110.8	13.9	40
5/13/07	18	711.1	788	110.8	14	40.1
5/13/07	19	711.2	788	110.8	14	40
5/13/07	20	711.4	788	110.8	14	40.5
5/13/07	21	712	787	110.5	14	40.3
5/13/07	22	711.9	787	110.5	14	40.1
5/13/07	23	712.2	787	110.5	14	40
5/13/07	24	712.2	787	110.5	14	40
5/14/07	1	712.5	785	110.2	14	40
5/14/07	2	712.9	785	110.1	14	40.2
5/14/07	3	713	784	110	14	40.3
5/14/07	11	714.8	788	110.2	13.9	44.7
5/14/07	12	714.7	787	110.1	13.9	45
5/14/07	13	714.7	787	110.1	13.9	45
5/14/07	14	713.5	788	110.4	13.9	44.9
5/14/07	15	712.9	788	110.5	13.9	45
5/14/07	16	712.2	788	110.6	13.9	45
5/14/07	17	712.1	788	110.7	13.9	44.8
5/14/07	18	712	787	110.5	13.9	45
5/14/07	19	711.7	785	110.3	13.9	44.9
5/14/07	20	711.7	783	110	13.9	44.9
5/16/07	14	703.3	774	110.1	19.3	50.2

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
5/16/07	15	702.6	775	110.3	19.3	50.2
5/16/07	16	702.4	775	110.3	19.3	50.2
5/16/07	17	702.5	773	110	19.3	50.1
5/17/07	14	703.3	774	110.1	19.3	50.2
5/17/07	15	703.2	775	110.2	19.3	50.2
5/17/07	16	702.9	775	110.3	19.3	50.2
5/17/07	17	702.9	775	110.3	19.4	50.2
5/17/07	18	702.4	774	110.2	19.4	50.2
5/17/07	19	702.2	774	110.2	19.4	50.2
5/18/07	13	705.6	778	110.3	19.5	50.3
5/18/07	14	705.1	779	110.5	19.5	50.4
5/18/07	15	704.5	780	110.7	19.5	50.4
5/18/07	16	704	779	110.7	19.5	50.4
5/18/07	17	704	778	110.5	19.5	50.4
5/18/07	18	703.3	778	110.6	19.5	50.5
5/18/07	19	703.2	776	110.3	19.5	50.4
5/18/07	20	703.4	774	110	19.5	50.5
5/24/07	12	704.3	782	111	17.6	48.6
6/ 1/07	13	703.6	775	110.1	3.1	34.1
6/ 1/07	14	703	775	110.2	3.1	34.3
6/ 1/07	15	703	776	110.4	3.1	34.2
6/ 1/07	17	702.1	777	110.7	3.1	34.1
6/ 1/07	18	701.6	778	110.9	3.1	34
6/ 1/07	19	701.7	777	110.7	3.1	33.8
6/ 1/07	20	702.1	777	110.7	3.1	34
6/ 1/07	21	702	776	110.5	3.1	34
6/ 1/07	22	703	775	110.2	3.1	34
6/ 1/07	23	703.3	774	110.1	3.1	33.8
6/ 1/07	24	703.7	774	110	3.1	33.4
6/ 2/07	14	703.8	775	110.1	3.1	34
6/ 2/07	15	703	777	110.5	3.1	33.9
6/ 2/07	16	702.6	777	110.6	3.1	33.9
6/ 2/07	17	702	778	110.8	3.1	33.8
6/ 2/07	18	702	778	110.8	3.1	34.1
6/ 2/07	19	702.2	779	110.9	3.1	34.2
6/ 2/07	20	702.4	777	110.6	3.1	34.4
6/ 2/07	21	703	777	110.5	3.1	34.4
6/ 2/07	22	703.5	776	110.3	3.1	34.1
6/ 2/07	24	703.9	774	110	3.1	33.8
6/ 3/07	12	703.9	776	110.2	3.1	34.2
6/ 3/07	13	703.3	776	110.3	3.1	34.2
6/ 3/07	14	702.8	777	110.6	3.1	34.1
6/ 3/07	15	702.5	778	110.8	3.1	34.2
6/ 3/07	16	701.7	779	111	3.1	34.2
6/ 3/07	17	701.8	779	111	3.1	33.1
6/ 3/07	18	701.5	781	111.3	3.1	34.1
6/ 3/07	19	701.5	780	111.2	3.1	34.1
6/ 3/07	21	702.2	779	110.9	3.1	34.1
6/ 3/07	22	703	778	110.7	3.1	34.2
6/ 3/07	23	703.4	777	110.5	3.1	34.1
6/ 3/07	24	703.7	777	110.4	3.1	34
6/ 4/07	1	703.7	776	110.3	3.1	34.1
6/ 4/07	2	704	776	110.2	3.1	34.3
6/ 4/07	3	704.4	776	110.2	3.1	34.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/ 4/07	5	704.4	775	110	3.1	34.1
6/ 4/07	6	704.1	775	110.1	3.1	34.1
6/ 4/07	7	704.7	775	110	3.1	34
6/ 4/07	8	704.5	775	110	3.1	34.1
6/ 4/07	9	703.6	775	110.1	3.1	34.2
6/ 4/07	10	703	776	110.4	3.1	34.1
6/ 4/07	11	702.3	776	110.5	3.1	34.1
6/ 4/07	12	702.5	774	110.2	6.3	37.2
6/ 4/07	13	702.4	774	110.2	6.3	37.3
6/ 4/07	14	701.9	778	110.8	6.3	37.2
6/ 4/07	15	702.2	781	111.2	6.3	37.2
6/ 4/07	16	701	791	112.8	7.8	38.5
6/ 4/07	17	700.4	801	114.4	12.3	42.8
6/ 4/07	18	700	802	114.6	12.3	42.8
6/ 4/07	19	700.3	803	114.7	12.4	43
6/ 4/07	20	699.8	803	114.7	12.4	42
6/ 4/07	21	699.9	802	114.6	12.4	42.2
6/ 4/07	22	699.6	801	114.5	12.4	42
6/ 4/07	23	700.8	801	114.3	12.4	41.6
6/ 4/07	24	700.5	801	114.3	12.4	41.7
6/ 5/07	1	700.2	800	114.3	12.4	42.1
6/ 5/07	2	700	799	114.1	12.4	42
6/ 5/07	3	699.9	798	114	12.4	42.1
6/ 5/07	4	699.5	798	114.1	12.4	42.1
6/ 5/07	5	699.1	796	113.9	12.4	42.3
6/ 5/07	6	698.5	798	114.2	12.4	42.1
6/ 5/07	7	697.8	798	114.4	12.4	42.3
6/ 5/07	8	697.4	796	114.1	12.4	41.8
6/ 5/07	9	696.4	797	114.4	12.4	42.1
6/ 5/07	10	697.2	797	114.3	12.4	42
6/ 5/07	11	697.3	795	114	12.4	42.2
6/ 5/07	12	697.5	794	113.8	12.4	42
6/ 5/07	13	697.4	794	113.9	15.3	45.1
6/ 5/07	14	697.5	800	114.7	18.3	47.5
6/ 5/07	15	698.1	799	114.5	18.3	47.7
6/ 5/07	16	697.6	798	114.4	18.3	47.3
6/ 5/07	17	698.3	797	114.1	18.3	47.9
6/ 5/07	18	698.3	797	114.1	18.3	47.7
6/ 5/07	19	698.4	796	114	18.3	47.6
6/ 5/07	20	699	795	113.7	18.3	48.3
6/ 5/07	21	697.9	796	114.1	18.3	46.4
6/ 5/07	22	698.1	797	114.2	18.4	46.5
6/ 5/07	23	698	795	113.9	18.4	46.4
6/ 5/07	24	697.9	794	113.8	18.3	47.1
6/ 6/07	1	697.6	793	113.7	18.4	47.2
6/ 6/07	2	697.6	790	113.2	18.4	47
6/ 6/07	3	697.8	790	113.2	18.3	46.9
6/ 6/07	4	698	788	112.9	18.3	47
6/ 6/07	5	698	788	112.9	18.3	46.9
6/ 6/07	6	698.6	786	112.5	18.3	47
6/ 6/07	7	698.3	785	112.4	18.3	47.1
6/ 6/07	8	698.8	784	112.2	19.8	50.6
6/ 6/07	9	698.6	791	113.2	21.2	52.2
6/ 6/07	10	699.5	787	112.5	21.2	52.3

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/ 6/07	11	699.2	785	112.3	22.6	53.4
6/ 6/07	12	699.2	781	111.7	26.5	57.5
6/ 6/07	13	699.9	790	112.9	26.5	57.5
6/ 6/07	14	699.7	777	111	26.5	57.3
6/ 6/07	15	700.2	776	110.8	26.5	57.3
6/ 6/07	16	701.4	776	110.6	26.5	57.3
6/ 6/07	17	700.2	776	110.8	26.6	57.6
6/ 6/07	18	701.4	775	110.5	26.6	57.4
6/ 6/07	19	701.7	775	110.4	26.6	57.3
6/ 6/07	20	702.5	774	110.2	26.6	57.3
6/ 6/07	21	702.5	773	110	26.6	57.3
6/ 6/07	22	702.7	773	110	26.6	57.1
6/23/07	13	705.8	784	111.1	6.4	32.9
6/23/07	14	705.1	788	111.8	6.4	32.8
6/23/07	15	704.9	789	111.9	6.4	33.2
6/23/07	16	704.4	788	111.9	6.4	33.4
6/23/07	17	704.2	787	111.8	6.4	33.3
6/23/07	18	703.9	786	111.7	6.4	33.2
6/23/07	19	703.6	786	111.7	6.4	33.5
6/23/07	20	703.8	785	111.5	6.4	33.3
6/23/07	21	702.9	783	111.4	6.4	33.7
6/23/07	22	703.5	783	111.3	6.4	33.5
6/23/07	23	703.5	782	111.2	6.4	33.6
6/23/07	24	703.6	781	111	6.4	33.7
6/24/07	1	703.7	780	110.8	6.4	33.9
6/24/07	2	704	781	110.9	6.4	33.1
6/24/07	3	704.2	780	110.8	6.4	33
6/24/07	4	704.6	780	110.7	6.4	33
6/24/07	5	704.9	780	110.7	6.4	33.2
6/24/07	6	705.1	780	110.6	6.4	33.9
6/24/07	7	705.3	780	110.6	6.4	33.2
6/24/07	8	705.5	781	110.7	6.4	33.5
6/24/07	9	705.3	781	110.7	6.4	33.3
6/24/07	10	705.3	781	110.7	6.4	33.4
6/24/07	11	704.8	783	111.1	6.4	33.3
6/24/07	12	704.6	783	111.1	6.4	33.3
6/24/07	13	704.4	783	111.2	6.4	33.4
6/24/07	14	704.3	783	111.2	6.4	33.2
6/24/07	15	704.1	783	111.2	6.4	33.4
6/24/07	16	703.4	784	111.5	6.4	33.3
6/24/07	17	703.9	783	111.2	6.4	33.3
6/24/07	18	703.9	783	111.2	6.4	33.3
6/24/07	19	704.1	782	111.1	6.4	33.2
6/24/07	20	704.1	782	111.1	6.4	33.4
6/24/07	21	704.9	781	110.8	6.4	33.2
6/24/07	22	704.9	781	110.8	6.4	33.1
6/24/07	23	705	781	110.8	6.4	32.9
6/24/07	24	705.1	780	110.6	6.4	32.7
6/25/07	1	705	780	110.6	6.4	33.3
6/25/07	2	706.1	780	110.5	6.4	33.4
6/25/07	3	706.8	780	110.4	6.4	32.8
6/25/07	4	707.5	779	110.1	6.4	33.1
6/25/07	5	708.3	779	110	6.4	32.9
6/25/07	6	708.7	780	110.1	6.4	33.1

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/25/07	7	709.7	781	110.1	6.4	33
6/29/07	19	706.9	778	110.1	2.2	6.5
6/29/07	20	707.4	783	110.7	6.1	22.9
6/29/07	21	708.1	783	110.6	7.5	22.6
6/29/07	22	708.8	785	110.8	7.6	22.6
6/29/07	23	708.3	785	110.8	7.6	24.3
6/29/07	24	708.3	786	111	7.6	24.8
6/30/07	1	708.9	785	110.7	7.6	25.1
6/30/07	2	709	785	110.7	7.6	25.3
6/30/07	3	709	785	110.7	7.6	25.4
6/30/07	4	709.3	785	110.7	7.6	25.5
6/30/07	5	709.5	786	110.8	7.6	25.6
6/30/07	6	709.8	786	110.7	7.6	25.6
6/30/07	7	710.5	786	110.6	7.6	25.6
6/30/07	8	710.4	787	110.8	7.6	25
6/30/07	9	710.5	788	110.9	7.5	24.9
6/30/07	10	710.1	789	111.1	7.5	25.2
6/30/07	11	710.2	789	111.1	7.5	25
6/30/07	12	709.8	790	111.3	7.5	25.2
6/30/07	13	709.6	790	111.3	7.5	25.2
6/30/07	14	709.4	790	111.4	6.5	24.2
6/30/07	15	709.2	790	111.4	6.5	23.9
6/30/07	16	708.7	790	111.5	6	25.6
6/23/07	20	703.8	785	111.5	6.4	33.3
6/23/07	21	702.9	783	111.4	6.4	33.7
6/23/07	22	703.5	783	111.3	6.4	33.5
6/23/07	23	703.5	782	111.2	6.4	33.6
6/23/07	24	703.6	781	111	6.4	33.7
6/24/07	1	703.7	780	110.8	6.4	33.9
6/24/07	2	704	781	110.9	6.4	33.1
6/24/07	3	704.2	780	110.8	6.4	33
6/24/07	4	704.6	780	110.7	6.4	33
6/24/07	5	704.9	780	110.7	6.4	33.2
6/24/07	6	705.1	780	110.6	6.4	33.9
6/24/07	7	705.3	780	110.6	6.4	33.2
6/24/07	8	705.5	781	110.7	6.4	33.5
6/24/07	9	705.3	781	110.7	6.4	33.3
6/24/07	10	705.3	781	110.7	6.4	33.4
6/24/07	11	704.8	783	111.1	6.4	33.3
6/24/07	12	704.6	783	111.1	6.4	33.3
6/24/07	13	704.4	783	111.2	6.4	33.4
6/24/07	14	704.3	783	111.2	6.4	33.2
6/24/07	15	704.1	783	111.2	6.4	33.4
6/24/07	16	703.4	784	111.5	6.4	33.3
6/24/07	17	703.9	783	111.2	6.4	33.3
6/24/07	18	703.9	783	111.2	6.4	33.3
6/24/07	19	704.1	782	111.1	6.4	33.2
6/24/07	20	704.1	782	111.1	6.4	33.4
6/24/07	21	704.9	781	110.8	6.4	33.2
6/24/07	22	704.9	781	110.8	6.4	33.1
6/24/07	23	705	781	110.8	6.4	32.9
6/24/07	24	705.1	780	110.6	6.4	32.7
6/25/07	1	705	780	110.6	6.4	33.3
6/25/07	2	706.1	780	110.5	6.4	33.4

Date	Hour	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG%	Spill (kcfs)	Total Flow (kcfs)
6/25/07	3	706.8	780	110.4	6.4	32.8
6/25/07	4	707.5	779	110.1	6.4	33.1
6/25/07	5	708.3	779	110	6.4	32.9
6/25/07	6	708.7	780	110.1	6.4	33.1
6/25/07	7	709.7	781	110.1	6.4	33
6/29/07	19	706.9	778	110.1	2.2	6.5
6/29/07	20	707.4	783	110.7	6.1	22.9
6/29/07	21	708.1	783	110.6	7.5	22.6
6/29/07	22	708.8	785	110.8	7.6	22.6
6/29/07	23	708.3	785	110.8	7.6	24.3
6/29/07	24	708.3	786	111	7.6	24.8
6/30/07	1	708.9	785	110.7	7.6	25.1
6/30/07	2	709	785	110.7	7.6	25.3
6/30/07	3	709	785	110.7	7.6	25.4
6/30/07	4	709.3	785	110.7	7.6	25.5
6/30/07	5	709.5	786	110.8	7.6	25.6
6/30/07	6	709.8	786	110.7	7.6	25.6
6/30/07	7	710.5	786	110.6	7.6	25.6
6/30/07	8	710.4	787	110.8	7.6	25
6/30/07	9	710.5	788	110.9	7.5	24.9
6/30/07	10	710.1	789	111.1	7.5	25.2
6/30/07	11	710.2	789	111.1	7.5	25
6/30/07	12	709.8	790	111.3	7.5	25.2
6/30/07	13	709.6	790	111.3	7.5	25.2
6/30/07	14	709.4	790	111.4	6.5	24.2
6/30/07	15	709.2	790	111.4	6.5	23.9
6/30/07	16	708.7	790	111.5	6	25.6

Appendix D. Distribution List

During the development of this document copies of the draft were made available through the Pend Oreille River watershed advisory group (WAG) webpage and the Idaho DEQ Coeur d'Alene Regional Office. Copies of the final document will be provided to the Pend Oreille River WAG members and to the general public upon request.

Pend Oreille River WAG webpage:
http://www.deq.idaho.gov/about/regions/pend_oreille_river_tribs_wag/index.cfm

Pend Oreille River WAG Members	Affiliation

Appendix E. Public Comments