Navajo Nation – Cove Wash Watershed - Surface Water Quality Assessment Report (Integrated 305(b) Report and 303(d) Listing)

(Photograph of Cove Wash on October 29, 2011)

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March 14, 2014

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B. Laboratory Analytical Data for Site 10COVEWASH09

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1.0 Background and Purpose

The objective of the United States Clean Water Act (USCWA) is to "*restore* and *maintain* the chemical, physical, and biological integrity of the Nation's Waters" (USGPO, 1988). In order to meet this objective, and exert its sovereign authority to protect its water resources, the Navajo Nation codified the Navajo Nation Clean Water Act (NNCWA 1999) in July 1999. The importance of water to the Navajo Nation is clearly demonstrated by the adoption of the NNCWA, with the Navajo Nation being only one of a few tribes or states to adopt a clean water act. The NNCWA provides the legislative authority to allow the Navajo Nation to fulfill the USCWA requirements.

In order to *restore* and *maintain* the chemical, physical, and biological integrity of the Nation's Water, states and federally recognized tribes adopt water quality standards which protect the uses of the Nation's water bodies. Water quality standards are narrative and numeric criteria used as benchmarks to determine if a designated use for a water body is being attained. NNCWA Section 103(a)(2)(A) provides for "the establishment of water quality standards to protect fish and wildlife and the domestic, cultural, agricultural and recreational uses of the waters of the Navajo Nation." This is consistent with the "fishable and swimmable goal" set forth in USCWA Sections 101(a)(2) and 303(c)(2). NNCWA Sections 201(b) and (c) requires that designated uses be established for public water supplies, the protection and propagation of fish and wildlife, recreational purposes, agricultural (including livestock watering), industrial, cultural, and other uses, and to establish criteria to protect the designated uses.

The Navajo Nation first codified the 1999 Navajo Nation Water Quality Standards (1999 NNWQS) in July 1999 (NNEPA 1999). On January 20, 2006 the US Environmental Protection Agency (USEPA) approved the Navajo Nation's application to administer the Water Quality Standards and Certification Programs under the federal Clean Water Act's Sections 303 and 401. On March 26, 2009, the USEPA approved the 2007 Navajo Nation Surface Water Quality Standards (NNSWQS) (NNEPA 2008). The 2013 NNSWQS (NNEPA 2013) are currently awaiting Navajo Nation legislative approval.

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The Navajo Environmental Protection Agency Water Quality / Navajo Nation Pollutant Discharge Elimination System Program (Navajo EPA WQ/NNPDES Program) is responsible for implementing the requirements of the USCWA and the NNCWA within the Navajo Nation.

This report fulfills USCWA Section 305(b) reporting requirements, USCWA Section 303(d) listing requirements, USEPA's USCWA Section 106 Tribal Guidance, Chapter 8 and Appendix A, assessment reporting requirements, and FY 2014 National Water Program Guidance Measures WQ-SP14b.N11. It also fulfills assessment reporting requirements in the "Navajo Nation Environmental Protection Agency Water Quality/Navajo Nation Pollutant Discharge Elimination System Program, Federal Clean Water Act Performance Partnership Grant" Work Plan.

The purpose of this report is to assess Cove Wash surface water quality data obtained by the Navajo EPA WQ/NNPDES Program by:

1. Presenting the surface water quality data;
2. Comparing the surface water quality data to the latest version of the NNSWQS to see if standards are being met;
3. Determine if uses designated for Cove Wash surface waters are being supported using the methods described in the February 20, 2008 NNEPA document entitled: "Guidance for Assessing the Quality of Navajo Nation Surface Waters to Determine Impairment" (Integrated 305(b) Reporting and 303(d) Listing); and
4. Make recommendations for further surface water quality data gathering.

The Navajo Nation Cove Wash Watershed Surface Water Quality Assessment is intended to be a living document, which can be updated to include the latest surface water quality data. The Navajo EPA WQ/NNPDES Program welcomes all comments that will assist in revising this report in the future.

2.0 Cove Wash Watershed

The Cove Wash Watershed (Figure 2.0) is located on approximately 47 square miles within the Middle San Juan River Watershed. The United States Geological Survey (USGS) uses a 12-digit Hydrologic Unit Code (HUC) of 140801050903 (USGS 2013) for the Cove Wash Watershed. Cove Wash is the only named water body within this watershed. For the purposes of this report

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Cove Wash refers to Cove Wash and all tributaries within the Cove Wash Watershed. The combined length of Cove Wash and its tributaries is 52.1 miles (see Table 2.0). The uses that are designated for Cove Wash are Secondary Human Contact (ScHC), Fish Consumption (FC), Aquatic and Wildlife Habitat (A&WHbt), and Livestock Watering (LW) (See Table 2.1).

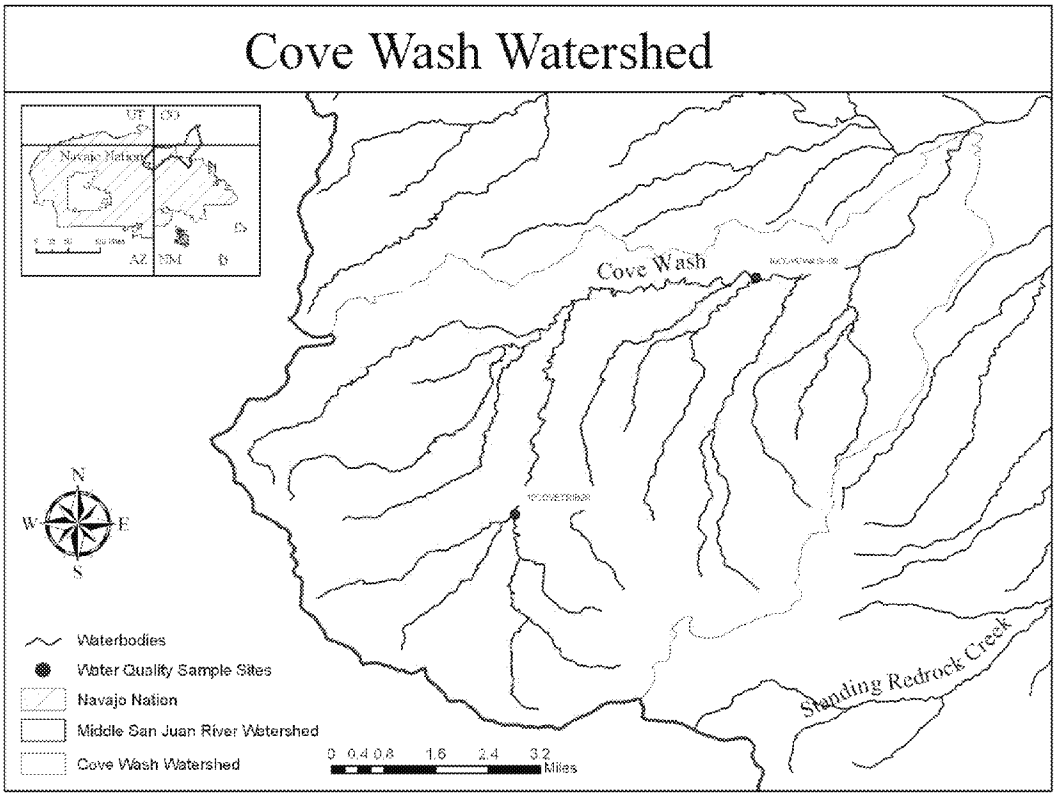

Figure 2.0 –Cove Wash Watershed (Approximately 47 square miles)

Table 2.0 – Cove Wash Watershed Atlas of Surface Water Bodies
(stream segment measurement on Cove, AZ 1:24,000 USGS Topographic Map)

Surface Water Body Name	Length (miles) or Area (acres)
Cove Wash	52.1 miles

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Table 2.1 – Cove Wash Watershed Surface Waters with Designated Uses
(from 2007 Navajo Nation Surface Water Quality Standards, Table 205.1)

Surface Water Body Name	Designated Uses*
Cove Wash	ScHC, FC, A&WHbt, and LW

Footnotes: * = Designated Uses are: ScHC = Secondary Human Contact, FC = Fish Consumption, A&WHbt = Aquatic and Wildlife Habitat, and LW = Livestock Watering.

3.0 Historic Uranium Mining

The Cove Wash Watershed has historically been mined for uranium ore. Figure 3.0 shows the location of these abandoned uranium mines and the location of surface water sampling site 10COVETRIB29. Figure 3.0 also indicates the location of the abandoned uranium mine area known as the Mesa I Mines. A detailed history of uranium mining in these areas will not be provided in this report. For a detailed history please refer to the following documents:

- Abandoned Uranium Mines Project – Arizona, New Mexico, Utah – Navajo Lands – 1994 – 2000 – Project Atlas (December 2000, United States Environmental Protection Agency Region 9 Superfund Records Center and United States Army Corps of Engineers Los Angeles District),
- Preliminary Assessment Report – Mesa I Mines – Apache County, Arizona - EPA ID No. NND983466772 (August 2008, United States Environmental Protection Agency Region 9),
- Amendment to Preliminary Assessment Report – Mesa I Mines – EPA ID No. NND983466772 (August 2008, United States Environmental Protection Agency Region 9); and
- Navajo Abandoned Uranium Mine – Site Screen Report – Cove Wash Area – Navajo AUM Northern Region (May 2010, United States Environmental Protection Agency Region 9).

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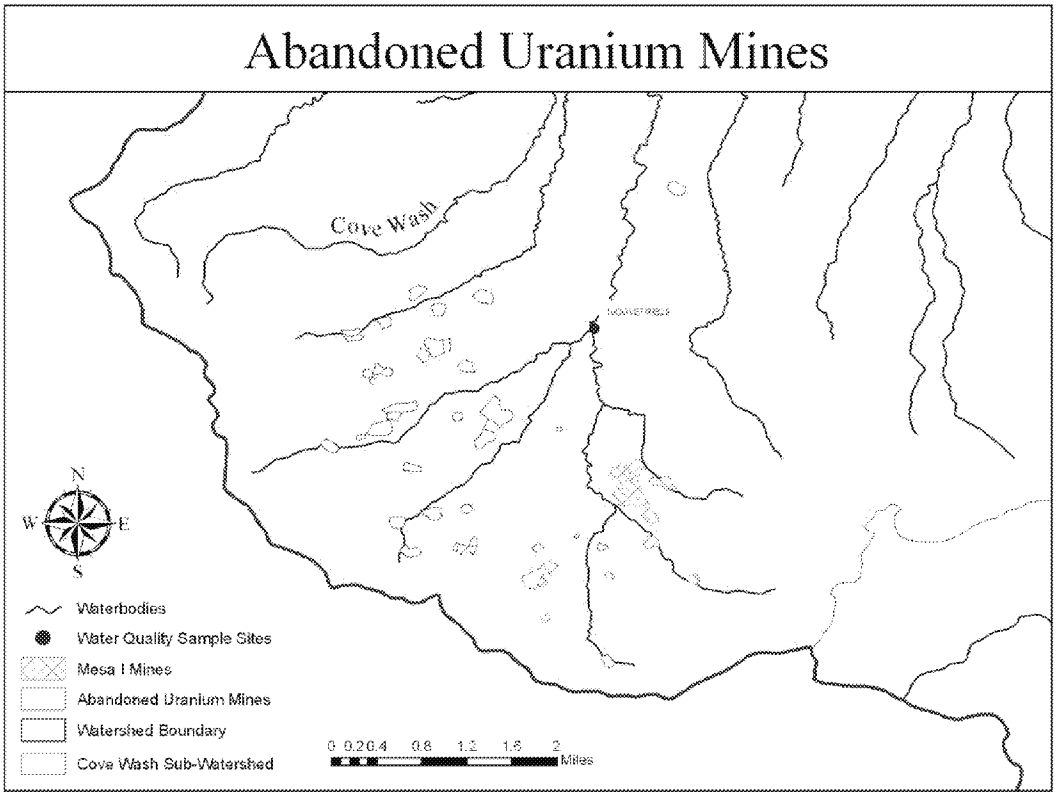

Figure 3.0 – Abandoned Uranium Mines in Cove Wash Watershed

4.0 Cove Wash Surface Water Quality Data Collection Activities

Cove Wash is the only surface water body from which water quality data was obtained. Monitoring and water quality sampling of Cove Wash was conducted at the sites listed in Table 4.0. These activities were undertaken using professional experience and in accordance with the NNEPA WQP June 1, 2012 "Quality Assurance Plan for Surface Water Data Collection" or previous quality assurance plans.

Table 4.0 – Cove Wash Sampling Locations and Dates.

Location	Site Name	Years Sampled
Cove Wash Tributary	10COVETRIB29	2011, 2012
Cove Wash	10COVEWASH09	2001

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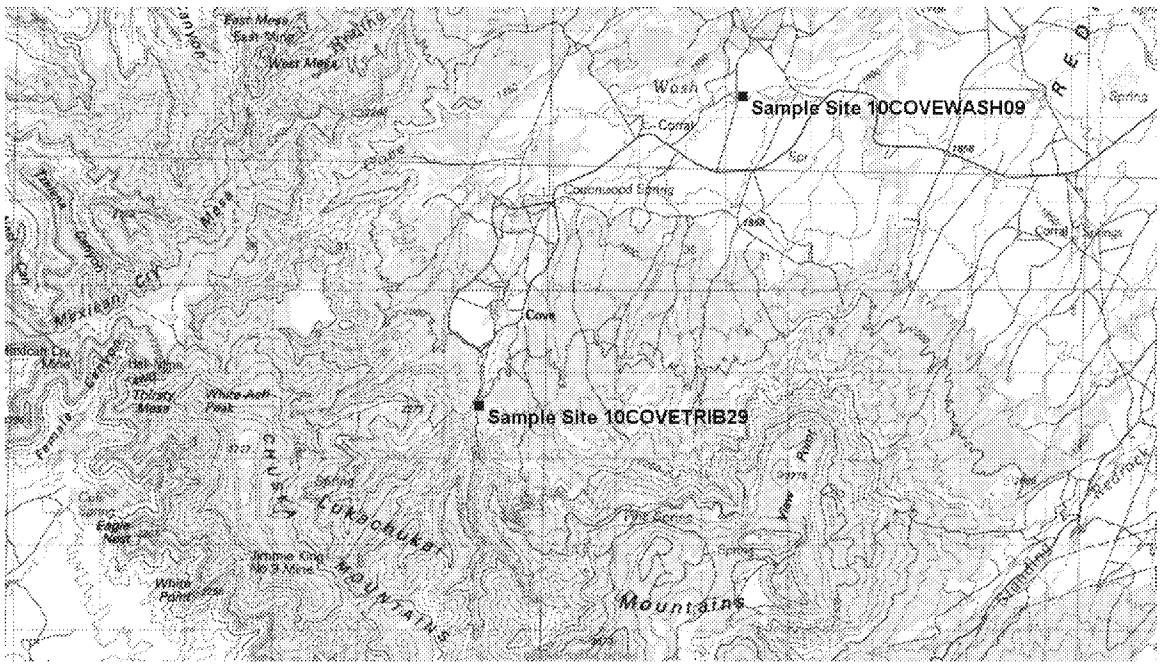
Water quality sampling was conducted in the years listed in Table 4.0. Measurements of physical/ chemical characteristics and stream discharge were made. Samples were obtained and submitted to an analytical laboratory for analyses. Quality Assurance and Quality Control samples were also obtained.

Cove Wash has been sampled at two sites. Sample site 10COVETRIB29 is one of the Cove Wash tributaries located in the watershed head waters. Sample site 10COVEWASH09 is located approximately at a mid-point in the Cove Wash between the head waters and the confluence with Blackhorse Creek. Both sites are located down gradient of the historical uranium mining areas. Cove Wash is intermittent at both sampling locations (Map 4.0). Photographs of surface flow conditions at sites 10COVETRIB29 and 10COVEWASH09 are provided below.



Map 4.0 - Location of Sample Sites 10COVETRIB29 and 10COVEWASH09.

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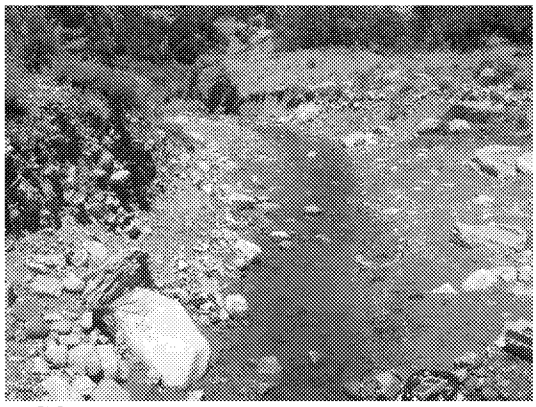
Photographs of Sample Sites:

10COVETRIB29 - May 23, 2011

10COVETRIB29 - August 1, 2012


10COVETRIB29 - June 20, 2011

10COVETRIB29 - August 27, 2012

10COVETRIB29 - July 20, 2011

10COVEWASH09 – March 12, 2001

4.1 Cove Wash Site 10COVETRIB29 Water Quality Data

A summary of all analytical and field data obtained at this site is provided in Table 4.1 and in the analytical laboratory reports in Appendix A. (For an electronic copy of these data, please call 505-368-1037).

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Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
05/23/2011	Alkalinity, bicarbonate as CaCO3	D	260	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, bicarbonate as CaCO3	D	380	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, bicarbonate as CaCO3	D	390	mg/l	6	APHA	2320B
08/27/2012	Alkalinity, bicarbonate as CaCO3	D	380	mg/l	6	APHA	2320B
05/23/2011	Alkalinity, carbonate as CaCO3	D	14	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, carbonate as CaCO3	D	ND	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, carbonate as CaCO3	D	ND	mg/l	6	APHA	2320B
08/27/2012	Alkalinity, carbonate as CaCO3	D	ND	mg/l	6	APHA	2320B
05/23/2011	Alkalinity, hydroxide as CaCO3	D	ND	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, hydroxide as CaCO3	D	ND	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, hydroxide as CaCO3	D	ND	mg/l	6	APHA	2320B
08/27/2012	Alkalinity, hydroxide as CaCO3	D	ND	mg/l	6	APHA	2320B
05/23/2011	Alkalinity, Phenolphthalein	D	6.9	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, Phenolphthalein	D	ND	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, Phenolphthalein	D	ND	mg/l	6	APHA	2320B
08/27/2012	Alkalinity, Phenolphthalein	D	ND	mg/l	6	APHA	2320B
05/23/2011	Alkalinity, total	D	270	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, total	D	380	mg/l	6	APHA	2320B
08/01/2012	Alkalinity, total	D	390	mg/l	6	APHA	2320B
08/27/2012	Alkalinity, total	D	380	mg/l	6	APHA	2320B
05/23/2011	Aluminum	D	ND	mg/L	0.01	USEPA	200.8
05/23/2011	Aluminum	T	0.036	mg/L	0.01	USEPA	200.8
06/20/2011	Aluminum	D	ND	mg/L	0.01	USEPA	200.8
06/20/2011	Aluminum	T	ND	mg/L	0.01	USEPA	200.8
07/20/2011	Aluminum	D	ND	mg/L	0.01	USEPA	200.8
07/20/2011	Aluminum	T	7.2	mg/L	0.1	USEPA	200.8
08/01/2012	Aluminum	D	ND	mg/L	0.01	USEPA	200.8
08/01/2012	Aluminum	T	1.6	mg/L	0.02	USEPA	200.8
08/01/2012	Aluminum	D	ND	mg/L	0.01	USEPA	200.8
08/01/2012	Aluminum	T	1.4	mg/L	0.02	USEPA	200.8
08/27/2012	Aluminum	D	ND	mg/L	0.01	USEPA	200.8
08/27/2012	Aluminum	T	0.68	mg/L	0.01	USEPA	200.8
05/23/2011	Ammonia-nitrogen	T	0.027	mg/L	Field Measurement		
06/20/2011	Ammonia-nitrogen	T	ND	mg/L	Field Measurement		
07/20/2011	Ammonia-nitrogen	T	0.102	mg/L	Field Measurement		
08/01/2012	Ammonia-nitrogen	T	0.238	mg/L	Field Measurement		
08/27/2012	Ammonia-nitrogen	T	0.086	mg/L	Field Measurement		
05/23/2011	Antimony	D	ND	mg/l	0.003	USEPA	200.8
05/23/2011	Antimony	T	ND	mg/l	0.003	USEPA	200.8
06/20/2011	Antimony	D	ND	mg/l	0.003	USEPA	200.8
06/20/2011	Antimony	T	ND	mg/l	0.003	USEPA	200.8

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
07/20/2011	Antimony	D	ND	mg/l	0.003	USEPA	200.8
07/20/2011	Antimony	T	ND	mg/l	0.003	USEPA	200.8
08/01/2012	Antimony	D	ND	mg/l	0.003	USEPA	200.8
08/01/2012	Antimony	T	ND	mg/l	0.003	USEPA	200.8
08/01/2012	Antimony	D	ND	mg/l	0.003	USEPA	200.8
08/01/2012	Antimony	T	ND	mg/l	0.003	USEPA	200.8
08/27/2012	Antimony	D	ND	mg/l	0.003	USEPA	200.8
08/27/2012	Antimony	T	ND	mg/l	0.003	USEPA	200.8
05/23/2011	Arsenic	D	0.005	mg/l	0.001	USEPA	200.8
05/23/2011	Arsenic	T	0.0051	mg/l	0.001	USEPA	200.8
06/20/2011	Arsenic	T	0.0057	mg/l	0.001	USEPA	200.8
06/20/2011	Arsenic	D	0.0059	mg/l	0.001	USEPA	200.8
07/20/2011	Arsenic	D	0.008	mg/l	0.001	USEPA	200.8
07/20/2011	Arsenic	T	0.0086	mg/l	0.001	USEPA	200.8
08/01/2012	Arsenic	D	0.011	mg/l	0.001	USEPA	200.8
08/01/2012	Arsenic	T	0.014	mg/l	0.001	USEPA	200.8
08/01/2012	Arsenic	D	0.011	mg/l	0.001	USEPA	200.8
08/01/2012	Arsenic	T	0.013	mg/l	0.001	USEPA	200.8
08/27/2012	Arsenic	D	0.0056	mg/l	0.001	USEPA	200.8
08/27/2012	Arsenic	T	0.0066	mg/l	0.001	USEPA	200.8
05/23/2011	Barium	T	0.31	mg/l	0.01	USEPA	200.7
06/20/2011	Barium	T	0.29	mg/l	0.01	USEPA	200.7
07/20/2011	Barium	T	0.29	mg/l	0.01	USEPA	200.7
08/01/2012	Barium	T	0.53	mg/l	0.01	USEPA	200.7
08/01/2012	Barium	T	0.53	mg/l	0.01	USEPA	200.7
08/27/2012	Barium	T	0.42	mg/l	0.01	USEPA	200.7
05/23/2011	Beryllium	T	ND	mg/l	0.001	USEPA	200.7
06/20/2011	Beryllium	T	ND	mg/l	0.001	USEPA	200.7
07/20/2011	Beryllium	T	ND	mg/l	0.001	USEPA	200.7
08/01/2012	Beryllium	T	0.0015	mg/l	0.001	USEPA	200.7
08/01/2012	Beryllium	T	ND	mg/l	0.001	USEPA	200.7
08/27/2012	Beryllium	T	ND	mg/l	0.001	USEPA	200.7
05/23/2011	Boron	D	ND	mg/l	0.2	USEPA	200.7
05/23/2011	Boron	T	ND	mg/l	0.2	USEPA	200.7
06/20/2011	Boron	D	ND	mg/l	0.2	USEPA	200.7
06/20/2011	Boron	T	ND	mg/l	0.2	USEPA	200.7
07/20/2011	Boron	D	ND	mg/l	0.2	USEPA	200.7
07/20/2011	Boron	T	ND	mg/l	0.2	USEPA	200.7
08/01/2012	Boron	D	ND	mg/l	0.2	USEPA	200.7
08/01/2012	Boron	T	ND	mg/l	0.2	USEPA	200.7
08/01/2012	Boron	D	ND	mg/l	0.2	USEPA	200.7

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
08/01/2012	Boron	T	ND	mg/l	0.2	USEPA	200.7
08/27/2012	Boron	D	ND	mg/l	0.2	USEPA	200.7
08/27/2012	Boron	T	ND	mg/l	0.2	USEPA	200.7
05/23/2011	Cadmium	D	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Cadmium	T	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Cadmium	D	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Cadmium	T	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Cadmium	D	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Cadmium	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Cadmium	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Cadmium	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Cadmium	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Cadmium	T	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Cadmium	D	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Cadmium	T	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Calcium	D	76	mg/l	2	USEPA	200.7
06/20/2011	Calcium	D	58	mg/l	2	USEPA	200.7
07/20/2011	Calcium	D	72	mg/l	2	USEPA	200.7
08/01/2012	Calcium	D	110	mg/l	2	USEPA	200.7
08/01/2012	Calcium	D	110	mg/l	2	USEPA	200.7
08/27/2012	Calcium	D	95	mg/l	2	USEPA	200.7
05/23/2011	Chloride	D	10	mg/l	2	USEPA	300
08/01/2012	Chloride	D	14	mg/l	2	USEPA	300
08/01/2012	Chloride	D	14	mg/l	2	USEPA	300
08/27/2012	Chloride	D	17	mg/l	2	USEPA	300
05/23/2011	Chromium	D	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Chromium	T	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Chromium	D	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Chromium	T	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Chromium	D	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Chromium	T	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Chromium	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Chromium	T	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Chromium	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Chromium	T	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Chromium	D	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Chromium	T	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Cobalt	D	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Cobalt	D	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Cobalt	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Cobalt	D	ND	mg/l	0.04	USEPA	200.7

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
08/01/2012	Cobalt	D	ND	mg/l	0.04	USEPA	200.7
08/27/2012	Cobalt	D	ND	mg/l	0.04	USEPA	200.7
05/23/2011	Copper	D	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Copper	T	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Copper	D	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Copper	T	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Copper	D	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Copper	T	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Copper	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Copper	T	0.01	mg/l	0.01	USEPA	200.7
08/01/2012	Copper	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Copper	T	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Copper	D	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Copper	T	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Cyanide	T	ND	mg/l	0.005	APHA	4500-CN(E)
06/20/2011	Cyanide	T	ND	mg/l	0.005	APHA	4500-CN(E)
07/20/2011	Cyanide	T	ND	mg/l	0.005	APHA	4500-CN(E)
08/01/2012	Cyanide	T	ND	mg/L	0.005	APHA	4500-CN(E)
08/01/2012	Cyanide	T	ND	mg/L	0.005	APHA	4500-CN(E)
08/27/2012	Cyanide	T	ND	mg/L	0.005	APHA	4500-CN (G)
05/23/2011	Dissolved oxygen (DO)		6.62	mg/L	Field Measurement		
06/20/2011	Dissolved oxygen (DO)		6.82	mg/L	Field Measurement		
07/20/2011	Dissolved oxygen (DO)		6.99	mg/L	Field Measurement		
08/01/2012	Dissolved oxygen (DO)		6.5	mg/L	Field Measurement		
08/27/2012	Dissolved oxygen (DO)		1.77	mg/L	Field Measurement		
05/23/2011	Dissolved oxygen saturation		73.9	%	Field Measurement		
06/20/2011	Dissolved oxygen saturation		79.8	%	Field Measurement		
07/20/2011	Dissolved oxygen saturation		78.4	%	Field Measurement		
08/01/2012	Dissolved oxygen saturation		82.2	%	Field Measurement		
08/27/2012	Dissolved oxygen saturation		20.1	%	Field Measurement		
05/23/2011	Flow		0.19	cfs	Field Measurement		
06/20/2011	Flow		0.02	cfs	Field Measurement		
07/20/2011	Flow		0.05	cfs	Field Measurement		
08/01/2012	Flow		~0.0003	cfs	Field Measurement		
08/27/2012	Flow		~0.0003	cfs	Field Measurement		
05/23/2011	Fluoride	T	ND	mg/l	0.4	USEPA	300
06/20/2011	Fluoride	T	ND	mg/l	0.4	USEPA	300
07/20/2011	Fluoride	T	ND	mg/l	0.4	USEPA	300
08/01/2012	Fluoride	T	ND	mg/l	0.4	USEPA	300
08/01/2012	Fluoride	T	ND	mg/l	0.4	USEPA	300
08/27/2012	Fluoride	T	ND	mg/l	0.4	USEPA	300

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
05/23/2011	Gross alpha radioactivity, (Americium-241 ref std)	T	50.3 ± 4.4	pCi/L		USEPA	00-02
06/20/2011	Gross alpha radioactivity, (Americium-241 ref std)	T	44 ± 4	pCi/L		USEPA	00-02
07/20/2011	Gross alpha radioactivity, (Americium-241 ref std)	T	43 ± 4	pCi/L		USEPA	00-02
08/01/2012	Gross alpha radioactivity, (Americium-241 ref std)	T	67 ± 6	pCi/L		USEPA	00-02
08/01/2012	Gross alpha radioactivity, (Americium-241 ref std)	T	63 ± 5	pCi/L		USEPA	00-02
08/27/2012	Gross alpha radioactivity, (Americium-241 ref std)	T	40 ± 3	pCi/L		USEPA	00-02
05/23/2011	Hardness, Calcium and Magnesium, caculated	D	260	mg/l	6	APHA	2340B
06/20/2011	Hardness, Calcium and Magnesium, caculated	D	210	mg/l	6	APHA	2340B
07/20/2011	Hardness, Calcium and Magnesium, caculated	D	240	mg/l	6	APHA	2340B
08/01/2012	Hardness, Calcium and Magnesium, caculated	D	370	mg/l	13	APHA	2340B
08/01/2012	Hardness, Calcium and Magnesium, caculated	D	380	mg/l	13	APHA	2340B
08/27/2012	Hardness, Calcium and Magnesium, caculated	D	350	mg/l	13	APHA	2340B
05/23/2011	Kjeldahl nitrogen	T	ND	mg/l	1	APHA	4500-NH3(D)
06/20/2011	Kjeldahl nitrogen	T	ND	mg/l	1	APHA	4500-NH3(D)
07/20/2011	Kjeldahl nitrogen	T	ND	mg/l	1	APHA	4500-NH3(D)
08/01/2012	Kjeldahl nitrogen	T	0.772	mg/L	0.1	APHA	4500-NH3(B)
08/01/2012	Kjeldahl nitrogen	T	0.915	mg/L	0.1	APHA	4500-NH3(B)
08/27/2012	Kjeldahl nitrogen	T	0.56	mg/L	0.1	USEPA	351.2
05/23/2011	Lead	D	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Lead	T	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Lead	D	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Lead	T	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Lead	D	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Lead	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Lead	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Lead	T	0.0013	mg/l	0.001	USEPA	200.8
08/01/2012	Lead	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Lead	T	0.001	mg/l	0.001	USEPA	200.8
08/27/2012	Lead	D	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Lead	T	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Magnesium	D	16	mg/l	0.25	USEPA	200.7
06/20/2011	Magnesium	D	16	mg/l	0.25	USEPA	200.7
07/20/2011	Magnesium	D	14	mg/l	0.25	USEPA	200.7
08/01/2012	Magnesium	D	24	mg/l	2	USEPA	200.7
08/01/2012	Magnesium	D	25	mg/l	2	USEPA	200.7
08/27/2012	Magnesium	D	26	mg/l	2	USEPA	200.7
05/23/2011	Mercury	T	0.92	ng/L	0.5	USEPA	1631E
06/20/2011	Mercury	T	0.32	ng/L	0.5	USEPA	1631E
07/20/2011	Mercury	T	2.6	ng/L	0.5	USEPA	1631E
08/01/2012	Mercury	T	0.004	ug/L	0.0005	USEPA	1631E
08/01/2012	Mercury	T	0.0052	ug/L	0.0005	USEPA	1631E

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
08/27/2012	Mercury	T	0.0009	ug/L	0.0005	USEPA	1631E
05/23/2011	Molybdenum	D	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Molybdenum	D	0.011	mg/l	0.01	USEPA	200.7
07/20/2011	Molybdenum	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Molybdenum	D	0.012	mg/l	0.01	USEPA	200.7
08/01/2012	Molybdenum	D	0.012	mg/l	0.01	USEPA	200.7
08/27/2012	Molybdenum	D	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Nickel	D	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Nickel	T	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Nickel	D	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Nickel	T	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Nickel	D	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Nickel	T	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Nickel	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Nickel	T	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Nickel	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Nickel	T	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Nickel	D	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Nickel	T	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Nitrogen, Nitrate (NO3) as N	T	ND	mg/L	Field Measurement		
06/20/2011	Nitrogen, Nitrate (NO3) as N	T	ND	mg/L	Field Measurement		
07/20/2011	Nitrogen, Nitrate (NO3) as N	T	ND	mg/L	Field Measurement		
08/01/2012	Nitrogen, Nitrate (NO3) as N	T	0.217	mg/L	Field Measurement		
08/27/2012	Nitrogen, Nitrate (NO3) as N	T	ND	mg/L	Field Measurement		
05/23/2011	Nitrogen, Nitrite (NO2) as N	T	0.001	mg/L	Field Measurement		
06/20/2011	Nitrogen, Nitrite (NO2) as N	T	ND	mg/L	Field Measurement		
07/20/2011	Nitrogen, Nitrite (NO2) as N	T	0.001	mg/L	Field Measurement		
08/01/2012	Nitrogen, Nitrite (NO2) as N	T	0.046	mg/L	Field Measurement		
08/27/2012	Nitrogen, Nitrite (NO2) as N	T	ND	mg/L	Field Measurement		
05/23/2011	pH	T	8.38	None	Field Measurement		
06/20/2011	pH	T	8.41	None	Field Measurement		
07/20/2011	pH	T	8.35	None	Field Measurement		
08/01/2012	pH	T	7.47	None	Field Measurement		
08/27/2012	pH	T	6.94	None	Field Measurement		
05/23/2011	Phosphorus	T	0.825	mg/L	Field Measurement		
06/20/2011	Phosphorus	T	0.444	mg/L	Field Measurement		
07/20/2011	Phosphorus	T	0.546	mg/L	Field Measurement		
08/01/2012	Phosphorus	T	0.661	mg/L	Field Measurement		
08/27/2012	Phosphorus	T	0.556	mg/L	Field Measurement		
05/23/2011	Potassium	D	3.3	mg/l	2	USEPA	200.7
08/01/2012	Potassium	D	5.3	mg/l	2	USEPA	200.7

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
08/01/2012	Potassium	D	5.4	mg/l	2	USEPA	200.7
08/27/2012	Potassium	D	3.6	mg/l	2	USEPA	200.7
05/23/2011	Radium-226	T	1.6 ± 0.2	pCi/L		USEPA	903.1
06/20/2011	Radium-226	T	1.7 ± 0.2	pCi/L		USEPA	903.1
07/20/2011	Radium-226	T	2.4 ± 0.3	pCi/L		USEPA	903.1
08/01/2012	Radium-226	T	1.9 ± 0.2	pCi/L		USEPA	903.1
08/01/2012	Radium-226	T	1.3 ± 0.1	pCi/L		USEPA	903.1
08/27/2012	Radium-226	T	3.2 ± 0.3	pCi/L		USEPA	903.1
05/23/2011	Radium-228	T	ND	pCi/L	0.3	USEPA	904
06/20/2011	Radium-228	T	ND	pCi/L	0.4	USEPA	904
07/20/2011	Radium-228	T	ND	pCi/L	0.5	USEPA	904
08/01/2012	Radium-228	T	1.2 ± 0.3	pCi/L		USEPA	904
08/01/2012	Radium-228	T	ND	pCi/L		USEPA	904
08/27/2012	Radium-228	T	ND	pCi/L		USEPA	904
05/23/2011	Salinity		0.26	0/00	Field Measurement		
06/20/2011	Salinity		0.23	0/00	Field Measurement		
07/20/2011	Salinity		0.26	0/00	Field Measurement		
08/01/2012	Salinity		0.43	0/00	Field Measurement		
08/27/2012	Salinity		0.36	0/00	Field Measurement		
05/23/2011	Selenium	T	0.002	mg/l	0.002	USEPA	200.8
06/20/2011	Selenium	T	ND	mg/l	0.002	USEPA	200.8
07/20/2011	Selenium	T	ND	mg/l	0.002	USEPA	200.8
08/01/2012	Selenium	T	ND	mg/l	0.002	USEPA	200.8
08/01/2012	Selenium	T	ND	mg/l	0.002	USEPA	200.8
08/27/2012	Selenium	T	ND	mg/l	0.002	USEPA	200.8
05/23/2011	Silver	D	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Silver	T	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Silver	D	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Silver	T	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Silver	D	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Silver	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Silver	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Silver	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Silver	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Silver	T	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Silver	D	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Silver	T	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Sodium	D	27	mg/l	2	USEPA	200.7
08/01/2012	Sodium	D	29	mg/l	2	USEPA	200.7
08/01/2012	Sodium	D	30	mg/l	2	USEPA	200.7
08/27/2012	Sodium	D	37	mg/l	2	USEPA	200.7

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
05/23/2011	Specific conductance		533	uS/cm	Field Measurement		
06/20/2011	Specific conductance		488	uS/cm	Field Measurement		
07/20/2011	Specific conductance		532	uS/cm	Field Measurement		
08/01/2012	Specific conductance		872	uS/cm	Field Measurement		
08/27/2012	Specific conductance		741	uS/cm	Field Measurement		
05/23/2011	Sulfate	D	28	mg/l	2	USEPA	300
08/01/2012	Sulfate	D	42	mg/l	2	USEPA	300
08/01/2012	Sulfate	D	42	mg/l	2	USEPA	300
08/27/2012	Sulfate	D	18	mg/l	2	USEPA	300
05/23/2011	Temperature, water		20.64	deg C	Field Measurement		
06/20/2011	Temperature, water		23.09	deg C	Field Measurement		
07/20/2011	Temperature, water		20.85	deg C	Field Measurement		
08/01/2012	Temperature, water		27.61	deg C	Field Measurement		
08/27/2012	Temperature, water		21.64	deg C	Field Measurement		
05/23/2011	Thallium	D	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Thallium	T	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Thallium	D	ND	mg/l	0.001	USEPA	200.8
06/20/2011	Thallium	T	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Thallium	D	ND	mg/l	0.001	USEPA	200.8
07/20/2011	Thallium	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Thallium	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Thallium	T	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Thallium	D	ND	mg/l	0.001	USEPA	200.8
08/01/2012	Thallium	T	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Thallium	D	ND	mg/l	0.001	USEPA	200.8
08/27/2012	Thallium	T	ND	mg/l	0.001	USEPA	200.8
05/23/2011	Total dissolved solids		352	mg/L	Field Measurement		
06/20/2011	Total dissolved solids		322	mg/L	Field Measurement		
07/20/2011	Total dissolved solids		351	mg/L	Field Measurement		
08/01/2012	Total dissolved solids		576	mg/L	Field Measurement		
08/27/2012	Total dissolved solids		489	mg/L	Field Measurement		
05/23/2011	Total suspended solids	T	3	mg/l	1	USEPA	2540D
06/20/2011	Total suspended solids	T	1	mg/l	1	USEPA	2540D
07/20/2011	Total suspended solids	T	39	mg/l	3.3	USEPA	2540D
08/01/2012	Total suspended solids	T	110	mg/l	5	USEPA	2540D
08/01/2012	Total suspended solids	T	110	mg/l	5	USEPA	2540D
08/27/2012	Total suspended solids	T	15	mg/l	1	USEPA	2540D
05/23/2011	Turbidity		1.91	NTU	Field Measurement		
06/20/2011	Turbidity		0.98	NTU	Field Measurement		
07/20/2011	Turbidity		58.9	NTU	Field Measurement		
08/01/2012	Turbidity		21.9	NTU	Field Measurement		

Table 4.1 - Summary of Analytical and Field Data for Site 10COVETRIB29 (continued)

08/27/2012	Turbidity		17.7	NTU	Field Measurement		
05/23/2011	Uranium	T	0.1	mg/l	0.001	USEPA	200.8
06/20/2011	Uranium	T	0.08	mg/l	0.001	USEPA	200.8
07/20/2011	Uranium	T	0.073	mg/l	0.001	USEPA	200.8
08/01/2012	Uranium	T	0.11	mg/l	0.001	USEPA	200.8
08/01/2012	Uranium	T	0.095	mg/l	0.001	USEPA	200.8
08/27/2012	Uranium	T	0.049	mg/l	0.001	USEPA	200.8
05/23/2011	Vanadium	D	ND	mg/l	0.01	USEPA	200.7
06/20/2011	Vanadium	D	ND	mg/l	0.01	USEPA	200.7
07/20/2011	Vanadium	D	0.012	mg/l	0.01	USEPA	200.7
08/01/2012	Vanadium	D	ND	mg/l	0.01	USEPA	200.7
08/01/2012	Vanadium	D	ND	mg/l	0.01	USEPA	200.7
08/27/2012	Vanadium	D	ND	mg/l	0.01	USEPA	200.7
05/23/2011	Zinc	D	ND	mg/l	0.05	USEPA	200.7
05/23/2011	Zinc	T	ND	mg/l	0.05	USEPA	200.7
06/20/2011	Zinc	D	ND	mg/l	0.05	USEPA	200.7
06/20/2011	Zinc	T	ND	mg/l	0.05	USEPA	200.7
07/20/2011	Zinc	D	ND	mg/l	0.05	USEPA	200.7
07/20/2011	Zinc	T	ND	mg/l	0.05	USEPA	200.7
08/01/2012	Zinc	D	0.09	mg/l	0.05	USEPA	200.7
08/01/2012	Zinc	T	0.7	mg/l	0.05	USEPA	200.7
08/01/2012	Zinc	D	0.092	mg/l	0.05	USEPA	200.7
08/01/2012	Zinc	T	0.7	mg/l	0.05	USEPA	200.7
08/27/2012	Zinc	D	ND	mg/l	0.05	USEPA	200.7
08/27/2012	Zinc	T	ND	mg/l	0.05	USEPA	200.7

KEY: mg/L = milligrams per Liter, ng/L = nanograms per Liter, ug/L = micrograms per Liter, pCi/L = picocuries per Liter, CFS = Cubic Feet per Second. uS/cm = microSiemens per centimeter, MPN = Most Probable Number, deg C = degrees Celsius, NTU = Nephelometric Turbidity Units USEPA = United States Environmental Protection Agency, SM = State Method (Arizona), APHA = American Public Health Association, ND = Non Detect, T = Total (not filtered), D = Dissolved (filtered with 0.45 um filter), col = coliform, CFU = Coliform Forming Units, MRL = Method Reporting Limit

4.1.1 Non-Attainment of NNSWQS for Site 10COVETRIB29

A list of parameters which did not attain the corresponding 2013 NNSWQS numeric standards for Cove Wash designated uses is provided in Table 4.1.1. Table 4.1.1 provides the sample date, parameter name, the analytical result, and the numeric NNSWQS for the corresponding designated use.

Aluminum (7.2 milligrams per liter) did not attain the chronic numeric standard of 4.55 milligrams per liter for the aquatic and wildlife designated use given a calcium and magnesium hardness of 240 milligrams per liter. Dissolved Oxygen (1.77 milligrams per liter) did not attain the warm water numeric standard of 6.0 milligrams per liter for the aquatic and wildlife designated use. Gross Alpha Radioactivity (40 ± 3to 67 ± 6 picocuries per liter) did not attain the numeric standard of 15 picocuries per liter for the livestock watering designated use. Selenium (0.002 milligrams per liter) did not attain the chronic numeric standard of 0.002 milligrams per liter for the aquatic and wildlife designated use.

4.1.2 Parameter of Interest at Site 10COVETRIB29

In addition to the parameters not attaining the numeric standards, another parameter is of interest in assessing Cove Wash surface water quality at this site and is listed in Table 4.1.2.

Uranium was present at concentrations ranging from 0.049 to 0.11 milligrams per liter. There is no uranium numeric standard for uses designated for Cove Wash. However, the NNSWQS does have a uranium numeric standard of 0.03 milligrams per liter for the Domestic Water Supply designated use. Domestic Water Supply is currently not an assigned designated use for Cove Wash but it may have been an historic use or possibly a current use by local residents. Uranium concentrations at Cove Wash did not attain the uranium numeric standard of 0.03 milligrams per liter for the Domestic Water Supply designated use.

ED_004888_00003280-00020

Table 4.1.1 - Non-Attainment of 2013 NNSWQS for Site 10COVETRIB29

Sample Date	Parameter	Fraction	Result	Units	Designated Use	NNSWQS
07/20/2011	Aluminum (Ca and Mg Hardness = 240 mg/L)	T	7.2	mg/L	A&WHbt Chronic	4.55
08/27/2012	Dissolved Oxygen		1.77	mg/L	A&WHbt WW	6
05/23/2011	Gross Alpha Radioactivity	T	50.3 ± 4.4	pCi/L	LW	15
06/20/2011	Gross Alpha Radioactivity	T	44 ± 4	pCi/L	LW	15
07/20/2011	Gross Alpha Radioactivity	T	43 ± 4	pCi/L	LW	15
08/01/2012	Gross Alpha Radioactivity	T	67 ± 6	pCi/L	LW	15
08/01/2012	Gross Alpha Radioactivity	T	63 ± 5	pCi/L	LW	15
08/27/2012	Gross Alpha Radioactivity	T	40 ± 3	pCi/L	LW	15
05/23/2011	Selenium	T	0.002	mg/l	A&WHbt Chronic	0.002

KEY: mg/L = milligrams per Liter, pCi/L = picocuries per Liter, T = Total (not filtered), Ca = Calcium, Mg = Magnesium, NNSWQS = Navajo Nation Surface Water Quality Standards, A&WHbt = Aquatic and Wildlife Habitat Designated Use, WW = Warm Water (greater than 20 °C), LW = Livestock Watering Designated Use

Table 4.1.2 - Parameter of Interest for Site 10COVETRIB29

Sample Date	Parameter	Fraction	Result	Units	MRL	Method
05/23/2011	Uranium	T	0.1	mg/l	0.001	USEPA 200.8
06/20/2011	Uranium	T	0.08	mg/l	0.001	USEPA 200.8
07/20/2011	Uranium	T	0.073	mg/l	0.001	USEPA 200.8
08/01/2012	Uranium	T	0.11	mg/l	0.001	USEPA 200.8
08/01/2012	Uranium	T	0.095	mg/l	0.001	USEPA 200.8
08/27/2012	Uranium	T	0.049	mg/l	0.001	USEPA 200.8

KEY: mg/L = milligrams per Liter, USEPA = United States Environmental Protection Agency, T = Total (not filtered), MRL = Method Reporting Limit

4.1.3 Parameters Showing No Degradation of Water Quality at Site 10COVETRIB29

Measure Code WQ-SP14b.N11 of the Fiscal Year 2014 USEPA National Water Program Guidance requests that tribes identify monitoring stations on tribal lands that are showing no degradation in water quality (meaning the waters are meeting uses). Based on water quality data obtained from 2011 to 2012 at site 10COVETRIB29, there are 28 parameters, which when compared to the 2013 NNSWQS, show no degradation of water quality for the ScHC, FC, A&WHbt, and LW designated uses. A listing of these parameters may be found in Table 4.1.3.

Table 4.1.3 - Parameters Showing No Degradation of Water Quality at Site 10COVETRIB29.
Ammonia-nitrogen
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Chromium
Cobalt
Copper
Cyanide
Fluoride
Lead
Mercury
Molybdenum
Nickel
Nitrogen, Nitrate (NO3) as N
pH
Radium-226 and 228 Combined
Salinity
Silver
Temperature, water
Thallium
Total Suspended Solids
Turbidity
Uranium
Vanadium
Zinc

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4.1.4 Designated Use Support Determination at Site 10COVETRIB29

For those parameters not attaining the numeric standards (see Table 4.1.1) a determination if the designated use for that standard is supported is made using the "Summary of Data Required to Determine Designated Use Support" found in Table 1 of the NNEPA Integrated 305(b) Reporting and 303(d) Listing guidance (NNEPA 2008). Table 1 provides the minimum number of values and the number or percent non-attainment of the water quality standard required to determine designated use support for each parameter. The minimum number of values required to determine support of the designated uses for those parameters and designated uses in Table 4.1.1 is five values for inorganics and radiologicals, and 10 values for dissolved oxygen. If the water quality standard is not attained one or less times the designated use is supported. If the water quality standard is not attained two or more times the designated use is not supported for that parameter. For dissolved oxygen, if the water quality standard is not attained less than 15 percent of the time the designated use is supported. If the water quality standard is not attained greater or equal to 15 percent of the time the designated use is not supported.

From Table 4.1.1 the aluminum result on July 20, 2011 was the only one of the six results which did not attain the chronic numeric standard for the aquatic and wildlife habitat designated use. ***Since this is one or less non attainment of the five values obtained, the aquatic and wildlife designated use for the chronic aluminum standard is supported.***

From Table 4.1.1 the dissolved oxygen result on August 27, 2012 was the only one of five results which did not attain the warm water numeric standard for the aquatic and wildlife designated use. Since a minimum of ten values was not obtained a determination of designated use support cannot be made.

From Table 4.1.1 the gross alpha radioactivity did not attain the livestock watering numeric standard six times in six samples. ***Since this is two or more non attainments of the six values obtained, the livestock watering designated use for the gross alpha standard is not supported.***

From Table 4.1.1 the selenium result on May 23, 2011 was the only one of the six results which did not attain the chronic numeric standard for the aquatic and wildlife habitat designated use. ***Since this is one or less non attainment of the five values obtained, the aquatic and wildlife designated use for the chronic selenium standard is supported.***

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4.1.5 Impairment Determination at Site 10COVETRIB29

Once a determination of designated use support is made for a given surface water body using Table 1 NNEPA Integrated 305(b) Reporting and 303(d) Listing guidance, surface water body segments are assigned one of five-categories based on their designated use support status to determine if the surface water should be listed as ***impaired.*** These five categories may be found in Section 3.2 of NNEPA Integrated 305(b) Reporting and 303(d) Listing guidance. Only surface water reaches falling into Category 5 will be considered *impaired* and will be requested to be listed on the federal Clean Water Act Section 303(d) list.

For the livestock watering numeric standard for gross alpha radioactivity the most appropriate category at this point is Category 5c. Category 5c states that "at least one designated use is not supported and additional data is needed before a TMDL is scheduled." Due to the extensive historical uranium mining in the Cove Wash Watershed, the non-attainment of the livestock watering numeric standard for gross alpha radioactivity may be attributable to discharge from these mines. ***The Navajo Nation will request that USEPA list Cove Wash under Section 303(d) of the federal Clean Water Act as impaired by gross alpha radiation for the use of the water for livestock watering.***

4.2 Cove Wash Site 10COVEWASH09 Water Quality Data

A summary of all analytical and field data obtained at this site is provided in Table 4.2 and in the analytical laboratory reports in Appendix B. (For an electronic copy of these data, please call 505-368-1037).

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Table 4.2 - Summary of Analytical and Field Data for Site 10COVEWASH09

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
03/12/2001	Alkalinity, bicarbonate as CaCO3		300	mg/L	2	APHA	2320B
08/06/2001	Alkalinity, bicarbonate as CaCO3		430	mg/L	2	APHA	2320B
03/12/2001	Alkalinity, carbonate as CaCO3		28	mg/L	2	APHA	2320B
08/06/2001	Alkalinity, carbonate as CaCO3		72	mg/L	2	APHA	2320B
03/12/2001	Alkalinity, hydroxide as CaCO3		ND	mg/L	2	APHA	2320B
08/06/2001	Alkalinity, hydroxide as CaCO3		ND	mg/L	2	APHA	2320B
03/12/2001	Alkalinity, total		330	mg/L	6	APHA	2320B
08/06/2001	Alkalinity, total		500	mg/L	6	APHA	2320B
03/12/2001	Aluminum	D	0.01	mg/L	0.1	USEPA	200.7
08/06/2001	Aluminum	D	0.06	mg/L	0.1	USEPA	200.7
03/12/2001	Ammonia-nitrogen	T	ND	mg/L	0.5	USEPA	350.3
08/06/2001	Ammonia-nitrogen	T	ND	mg/L	0.5	USEPA	350.3
03/12/2001	Anion/cation ratio	T	1		0	ASTM	D-596
08/06/2001	Anion/cation ratio	T	0.973		0	ASTM	D-596
03/12/2001	Antimony	D	ND	mg/L	0.003	USEPA	200.9
08/06/2001	Antimony	D	ND	mg/L	0.003	USEPA	200.9
03/12/2001	Arsenic	D	0.0079	mg/L	0.005	USEPA	200.9
08/06/2001	Arsenic	D	0.021	mg/L	0.005	USEPA	200.9
03/12/2001	Barium	D	0.14	mg/L	0.01	USEPA	200.7
08/06/2001	Barium	D	0.19	mg/L	0.01	USEPA	200.7
03/12/2001	Beryllium	D	ND	mg/L	0.001	USEPA	200.7
08/06/2001	Beryllium	D	ND	mg/L	0.001	USEPA	200.7
03/12/2001	Boron	D	0.19	mg/L	0.05	USEPA	200.7
08/06/2001	Boron	D	0.39	mg/L	0.05	USEPA	200.7
03/12/2001	Bromide		ND	mg/L	0.5	USEPA	300
08/06/2001	Bromide		ND	mg/L	0.5	USEPA	300
03/12/2001	Cadmium	D	ND	mg/L	0.001	USEPA	200.7
08/06/2001	Cadmium	D	ND	mg/L	0.001	USEPA	200.7
03/12/2001	Calcium	T	150	mg/L	2	USEPA	200.7
08/06/2001	Calcium	T	28	mg/L	2	USEPA	200.7
03/12/2001	Chloride	T	15	mg/L	2	USEPA	300
08/06/2001	Chloride	T	33	mg/L	2	USEPA	300
03/12/2001	Chlorine		0.083	mg/L	0.05	HACH	8167
08/06/2001	Chlorine		ND	mg/L	0.05	HACH	8167
03/12/2001	Chromium	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Chromium	D	ND	mg/L	0.01	USEPA	200.7
03/12/2001	Chromium(III)	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Chromium(III)	D	ND	mg/L	0.01	USEPA	200.7

Table 4.2 - Summary of Analytical and Field Data for Site 10COVEWASH09 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
03/12/2001	Chromium(VI)	D	ND	mg/L	0.01	APHA	3500-CR(D)
08/06/2001	Chromium(VI)	D	ND	mg/L	0.01	APHA	3500-CR(D)
03/12/2001	Cobalt	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Cobalt	D	ND	mg/L	0.01	USEPA	200.7
03/12/2001	Copper	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Copper	D	ND	mg/L	0.01	USEPA	200.7
03/12/2001	Cyanide	T	ND	mg/L	0.02	APHA	4500-CN(E)
08/06/2001	Cyanide	T	ND	mg/L	0.02	APHA	4500-CN(E)
03/12/2001	Dissolved oxygen (DO)		8.74	mg/L	Field Measurement		
08/06/2001	Dissolved oxygen (DO)		6.46	mg/L	Field Measurement		
08/06/2001	Dissolved oxygen saturation		109.8	%	Field Measurement		
03/12/2001	Flow		< 1	cfs	Field Measurement		
08/06/2001	Flow		< 1	cfs	Field Measurement		
03/12/2001	Fluoride	T	ND	mg/L	0.4	USEPA	300
08/06/2001	Fluoride	T	0.41	mg/L	0.4	USEPA	300
03/12/2001	Gross alpha radioactivity, (Americium-241 ref std)	T	26.8 ± 2.9	pCi/L	3	USEPA	00-02
08/06/2001	Gross alpha radioactivity, (Americium-241 ref std)	T	40.0 ± 4.0	pCi/L	3	USEPA	00-02
03/12/2001	Hardness, Ca		380	mg/L	5	USEPA	200.7
08/06/2001	Hardness, Ca, Mg		110	mg/L	13	USEPA	200.7
03/12/2001	Lead	D	ND	mg/L	0.002	USEPA	200.9
08/06/2001	Lead	D	ND	mg/L	0.002	USEPA	200.9
03/12/2001	Magnesium	T	41	mg/L	2	USEPA	200.7
08/06/2001	Magnesium	T	8.9	mg/L	2	USEPA	200.7
03/12/2001	Mercury	D	ND	mg/L	0.0002	USEPA	245.1
03/12/2001	Mercury	T	ND	mg/L	0.0002	USEPA	245.1
08/06/2001	Mercury	D	ND	mg/L	0.0002	USEPA	245.1
08/06/2001	Mercury	T	ND	mg/L	0.0002	USEPA	245.1
03/12/2001	Molybdenum	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Molybdenum	D	ND	mg/L	0.01	USEPA	200.7
03/12/2001	Nickel	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Nickel	D	ND	mg/L	0.01	USEPA	200.7
03/12/2001	Nitrogen, Nitrate (NO3) as N	T	0.62	mg/L	0.2	USEPA	300
08/06/2001	Nitrogen, Nitrate (NO3) as N	T	ND	mg/L	0.2	USEPA	300
03/12/2001	Orthophosphate		ND	mg/L	0.1	USEPA	365.3
08/06/2001	Orthophosphate		0.16	mg/L	0.1	APHA	4500-P-E
03/12/2001	pH	T	8.95	None	Field Measurement		
03/12/2001	pH	T	8.7	None	2	USEPA	150.1
08/06/2001	pH	T	8.73	None	Field Measurement		

Table 4.2 - Summary of Analytical and Field Data for Site 10COVEWASH09 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
08/06/2001	pH	T	9.01	None	2	USEPA	150.1
03/12/2001	Phosphorus		2.2	mg/L	0.4	USEPA	365.3
08/06/2001	Phosphorus		ND	mg/L	0.2	APHA	4500-P-B
03/12/2001	Potassium	T	21	mg/L	2	USEPA	200.7
08/06/2001	Potassium	T	5.9	mg/L	2	USEPA	200.7
03/12/2001	Radium-226	T	ND	pCi/L	0.2	USEPA	903.1
08/06/2001	Radium-226	T	0.5 ± 0.1	pCi/L	0.2	USEPA	903.1
03/12/2001	Radium-228	T	ND	pCi/L	0.4	USEPA	904
08/06/2001	Radium-228	T	ND	pCi/L	0.4	USEPA	904
03/12/2001	Salinity		0.10	0/00	Field Measurement		
08/06/2001	Salinity		0.30	0/00	Field Measurement		
03/12/2001	Selenium	T	0.004	mg/L	0.002	USEPA	200.9
03/12/2001	Selenium	D	ND	mg/L	0.001	USEPA	200.9
08/06/2001	Selenium	T	0.001	mg/L	0.001	USEPA	200.9
08/06/2001	Selenium	D	ND	mg/L	0.001	USEPA	200.9
03/12/2001	Silica	T	200	mg/L	0.21	USEPA	200.7
08/06/2001	Silica	T	34	mg/L	0.21	USEPA	200.7
03/12/2001	Silver	D	ND	mg/L	0.01	USEPA	200.7
08/06/2001	Silver	D	ND	mg/L	0.01	USEPA	200.7
03/12/2001	Sodium	T	150	mg/L	20	USEPA	200.7
08/06/2001	Sodium	T	230	mg/L	10	USEPA	200.7
03/12/2001	Specific conductance		752	uS/cm	Field Measurement		
08/06/2001	Specific conductance		1080	uS/cm	Field Measurement		
03/12/2001	Sulfate	T	48	mg/L	40	USEPA	300
08/06/2001	Sulfate	T	53	mg/L	4	USEPA	300
03/12/2001	Sulfide		ND	mg/L	0.05	APHA	4500-S-C,D
08/06/2001	Sulfide		ND	mg/L	0.05	APHA	4500-S-C,D
03/12/2001	Temperature, water		12.6	deg C	Field Measurement		
08/06/2001	Temperature, water		31.5	deg C	Field Measurement		
03/12/2001	Thallium	D	ND	mg/L	0.001	USEPA	200.9
08/06/2001	Thallium	D	ND	mg/L	0.001	USEPA	200.9
03/12/2001	Total dissolved solids		496	mg/L	Field Measurement		
03/12/2001	Total dissolved solids		490	mg/L	10	APHA	2540C
08/06/2001	Total dissolved solids		713	mg/L	Field Measurement		
08/06/2001	Total dissolved solids		880	mg/L	10	APHA	2540C
03/12/2001	Total suspended solids	T	4100	mg/L	100	USEPA	160.2
08/06/2001	Total suspended solids	T	26	mg/L	10	USEPA	160.2
03/12/2001	Tritium		ND	pCi/L	361	USEPA	906

Table 4.2 - Summary of Analytical and Field Data for Site 10COVEWASH09 (continued)

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement	
08/06/2001	Tritium		ND	pCi/L	348	USEPA	906
03/12/2001	Turbidity		>999	NTU	Field Measurement		
08/06/2001	Turbidity		50.3	NTU	Field Measurement		
03/12/2001	Uranium	T	0.01	mg/L	0.0001	USEPA	200.8
08/06/2001	Uranium	T	0.056	mg/L	0.0001	USEPA	200.8
03/12/2001	Vanadium	D	0.074	mg/L	0.01	USEPA	200.7
08/06/2001	Vanadium	D	0.046	mg/L	0.01	USEPA	200.7
03/12/2001	Zinc	D	ND	mg/L	0.05	USEPA	200.7
08/06/2001	Zinc	D	ND	mg/L	0.05	USEPA	200.7

KEY: mg/L = milligrams per Liter, ng/L = nanograms per Liter, ug/L = micrograms per Liter, pCi = picocuries per Liter, CFS = Cubic Feet per Second. uS/cm = microSiemens per centimeter, MPN = Most Probable Number, deg C = degrees Celsius, NTU = Nephelometric Turbidity Units USEPA = United States Environmental Protection Agency, SM = State Method (Arizona), APHA = American Public Health Association, ND = Non Detect, T = Total (not filtered), D = Dissolved (filtered with 0.45 um filter), col = coliform, CFU = Coliform Forming Units, MRL = Method Reporting Limit

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4.2.1 Non-Attainment of NNSWQS for Site 10COVEWASH09

A list of parameters which did not attain the corresponding 2013 NNSWQS numeric standards for Cove Wash designated uses is provided in Table 4.2.1. Table 4.2.1 provides the sample date, parameter name, the analytical result, and the numeric NNSWQS for the corresponding designated use.

Gross Alpha Radioactivity (26.8 ± 2.9 and 40.0 ± 4.0 picocuries per liter) did not attain the numeric standard of 15 picocuries per liter for the livestock watering designated use. Chlorine (0.083 milligrams per liter) did not attain the acute numeric standard of 0.019 milligrams per liter for the aquatic and wildlife designated use, the chronic numeric standard of 0.011 milligrams per liter for the aquatic and wildlife designated, and the numeric standard of 0.011 milligrams per liter for the livestock watering designated use. Selenium (0.004 milligrams per liter) did not attain the chronic numeric standard of 0.002 milligrams per liter for the aquatic and wildlife designated use.

4.2.2 Parameters of Interest at Site 10COVEWASH09

In addition to the parameters not attaining the numeric standards, parameters of interest in assessing Cove Wash surface water quality at this site are listed in Table 4.2.2.

Dissolved arsenic was present at a concentration of 0.021 milligrams per liter. Domestic Water Supply is currently not an assigned designated use for Cove Wash but it may have been an historic use or possibly a current use by local residents. However, if it were, the concentration of 0.021 would have not attained the Domestic Water Supply numeric standard for arsenic of 0.01 milligrams per liter. Uranium was present at concentrations of 0.01 and 0.056 milligrams per liter. There is no uranium numeric standard for uses designated for Cove Wash. However, the NNSWQS does have a uranium numeric standard of 0.03 milligrams per liter for the Domestic Water Supply designated use. The uranium concentrations of 0.056 milligrams per liter did not attain this standard.

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Table 4.2.1 - Non-Attainment of 2013 NNSWQS for Site 10COVEWASH09

Sample Date	Parameter	Fraction	Result	Units	Designated Use	NNSWQS
03/12/2001	Gross alpha radioactivity	T	26.8 ± 2.9	pCi/L	LW	15
08/06/2001	Gross alpha radioactivity	T	40.0 ± 4.0	pCi/L	LW	15
03/12/2001	Chlorine		0.083	mg/L	A&WHbt Acute, Chronic, and LW	0.019, 0.011, and 0.011
03/12/2001	Selenium	T	0.004	mg/L	A&WHbt Chronic	0.002

KEY: mg/L = milligrams per Liter, pCi = picocuries per Liter, T = Total (not filtered), NNSWQS = Navajo Nation Surface Water Quality Standards, A&WHbt = Aquatic and Wildlife Habitat Designated Use, LW = Livestock Watering Designated Use

Table 4.2.2 - Parameters of Interest for Site 10COVEWASH09

Sample Date	Parameter	Fraction	Result	Units	MRL	Method or Measurement
08/06/2001	Arsenic	D	0.021	mg/L	0.005	USEPA 200.9
03/12/2001	Uranium	T	0.01	mg/L	0.0001	USEPA 200.8
08/06/2001	Uranium	T	0.056	mg/L	0.0001	USEPA 200.8

KEY: mg/L = milligrams per Liter, USEPA = United States Environmental Protection Agency, T = Total (not filtered), D = Dissolved (filtered with 0.45 um filter), MRL = Method Reporting Limit

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4.2.3 Parameters Showing No Degradation of Water Quality at Site 10COVEWASH09

Measure Code WQ-SP14b.N11 of the Fiscal Year 2014 USEPA National Water Program Guidance requests that tribes identify monitoring stations on tribal lands that are showing no degradation in water quality (meaning the waters are meeting uses). Based on water quality data obtained in 2001 at site 10COVEWASH09, there are 32 parameters, which when compared to the 2013 NNSWQS, show no degradation of water quality for the ScHC, FC, A&WHbt, and LW designated uses. A listing of these parameters may be found in Table 4.2.3.

Table 4.2.3 - Parameters Showing No Degradation of Water Quality at Site 10COVEWASH09
Aluminum
Ammonia-nitrogen
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Chromium
Chromium(III)
Chromium(VI)
Cobalt
Copper
Cyanide
Fluoride
Lead
Mercury
Molybdenum
Nickel
Nitrogen, Nitrate (NO3) as N
pH
Radium-226 and 228 Combined
Salinity
Silver
Temperature, water
Thallium
Total suspended solids
Tritium
Turbidity
Uranium
Vanadium
Zinc

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4.2.4 Designated Use Support Determination at Site 10COVEWASH09

For those parameters not attaining the numeric standards (see Table 4.2.1) a determination if the designated use for that standard is supported is made using the "Summary of Data Required to Determine Designated Use Support" found in Table 1 of the NNEPA Integrated 305(b) Reporting and 303(d) Listing guidance (NNEPA 2008). Table 1 provides the minimum number of values and the number or percent non-attainment of the water quality standard required to determine designated use support for each parameter. The minimum number of values required to determine support of the designated uses for those parameters and designated uses in Table 4.2.1 is five values. If the water quality standard is not attained one or less times the designated use is supported. If the water quality standard is not attained two or more times the designated use is not supported for that parameter. The minimum requirement of five values was not obtained for the gross alpha radioactivity, chlorine, and selenium values listed in Table 4.2.1. Therefore a determination of designated use support cannot be made.

4.2.5 Impairment Determination at Site 10COVEWASH09

Once a determination of designated use support is made for a given surface water body as described in Section 4.2.4, surface water body segments are assigned one of five-categories based on their designated use support status to determine if the surface water should be listed as ***impaired.*** These five categories may be found in Section 3.2 of NNEPA Integrated 305(b) Reporting and 303(d) Listing guidance. Only surface water reaches falling into Category 5 will be considered *impaired* and will be requested to be listed on the federal Clean Water Act Section 303(d) list.

Since the minimum number of values were not obtained to determine designated use support, a determination of water body impairment at site 10COVEWASH09 cannot be made.

5.0 Conclusions and Recommendations

- There are 52.1 miles of intermittent surface water flows in Cove Wash and its tributaries.
- Uses designated for Cove Wash and its tributaries are secondary human contact, fish consumption, aquatic and wildlife habitat, and livestock watering.

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- Surface water quality in the Cove Wash Watershed was assessed as per USCWA Section 305(b) requirements at two sites: 10COVETRIB29 and 10COVEWASH09.
- Determinations of designated use support and water body impairment were conducted at both sites consistent with USCWA Sections 305(b) and 303(d).
- Aluminum, dissolved oxygen, gross alpha radioactivity, and selenium did not attain 2013 NNSWQS numeric standards at site 10COVETRIB29.
- Gross alpha radioactivity, chlorine and selenium did not attain 2013 NNSWQS numeric standards at site 10COVEWASH09.
- Uranium was a parameter of interest at both sites, while arsenic was a parameter of interest only at site 10COVEWASH09
- For the uses designated for Cove Wash there were 28 parameters which showed no degradation of water quality at site 10COVETRIB29, and 32 parameters showed no degradation of water quality at site 10COVEWASH09.
- At site 10COVETRIB29; the aquatic and wildlife designated use for the chronic aluminum standard is supported, the livestock watering designated use for the gross alpha standard is not supported, and the aquatic and wildlife designated use for the chronic selenium standards is supported.
- At site 10COVEWASH09 insufficient data was collected to determine designated use support and water body impairment.
- Cove Wash is assigned a 5 category of designated use support based on non-attainment of the gross alpha radioactivity numeric standard for the livestock watering designated use .
- Cove Wash is to be listed as a USCWA Section 303(d) impaired water body and a Total Maximum Daily Load for gross alpha radioactivity is to be developed in order to determine sources.

6.0 References

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