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Office of Environmental Management – Grand Junction

UMTRA Project

Moab Initial Action Report
2006 Calendar Year

January 2007

U.S. Department of Energy

Office of Environmental Management

Work Performed Under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Environmental Management.
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Moab Project

Moab Initial Action Report
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Work Performed by S.M. Stoller Corporation under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Environmental Management,
Grand Junction, Colorado

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1.0 Introduction

The Moab UMTRA Project site (Moab site) is a former uranium-ore processing facility located approximately 3 miles northwest of the city of Moab in Grand County, Utah (DOE 2005). The plant was constructed in 1956 by the Uranium Reduction Company, which operated the mill until 1962 when the assets were sold to the Atlas Minerals Corporation (Atlas). Operations continued under Atlas until 1984. When the processing operations ceased in 1984, the mill had accumulated an estimated 16 million tons of uranium mill tailings in an unlined impoundment in the floodplain of the Colorado River. The tailings pile covers approximately 130 acres, is about 0.5 mile in diameter, averages about 94 feet in height above ground surface, and is located about 750 feet west of the Colorado River. Atlas placed an interim cover over the tailings pile as part of decommissioning activities ongoing between 1988 and 1995. In October 2001, the title of the property and responsibility for remediation of the tailings pile and contaminated ground water beneath the Moab site were transferred to the U.S. Department of Energy (DOE).

Results of a number of investigations, including a recent one completed by DOE (2003), indicate that contaminants have leached from the tailings pile into the ground water. Several site-related contaminants have been identified, but the most pervasive and highest concentration constituent is ammonia. DOE's studies have identified two plumes of ammonia associated with the site: a deep plume beneath the tailings pile and a shallower plume emanating from the toe of the tailings pile to the Colorado River. Ground water from the shallow plume has been demonstrated to discharge to the Colorado River and to have a localized impact on surface water quality. DOE and stakeholders have expressed concern about risk to sensitive aquatic species that may inhabit the slow-moving water at the edge of the river where ammonia is discharging.

DOE, in consultation with stakeholders, designed an initial short-term action to reduce the potential for site-contributed ammonia to adversely affect endangered fish species, specifically the Colorado pikeminnow (DOE 2002). This Initial Action consists of introducing clean upstream river water into the mixing zones along the bank of the Colorado River to dilute concentrations of ammonia where suitable habitat may exist. The Initial Action was implemented for the first time during the summer of 2005, and once again during the summer of 2006. This report provides the results of that most recent Initial Action implementation.

2.0 2006 Initial Action Operations

During completion of the site observational work plan (DOE 2003) for the Moab site, the best potentially suitable habitat for endangered fish was identified in the area immediately downgradient of Moab Wash (Areas A, B, and C on Figure 1). These areas are dry in Figure 1 because river flows at the time the photo was taken were below levels required to inundate those areas (between 12,500 and 8,750 cubic feet per second) (DOE 2003). During appropriate river flows, backwaters had the potential to develop in these areas and they were the focus of the Initial Action. During high river stages, these potential habitat areas are part of the main river channel. After peak runoff in 2006, small backwater areas developed, and the Initial Action was implemented. A chronology of the Initial Action is included in Table 1. Photographs of these areas are included in the trip report in Appendix A.

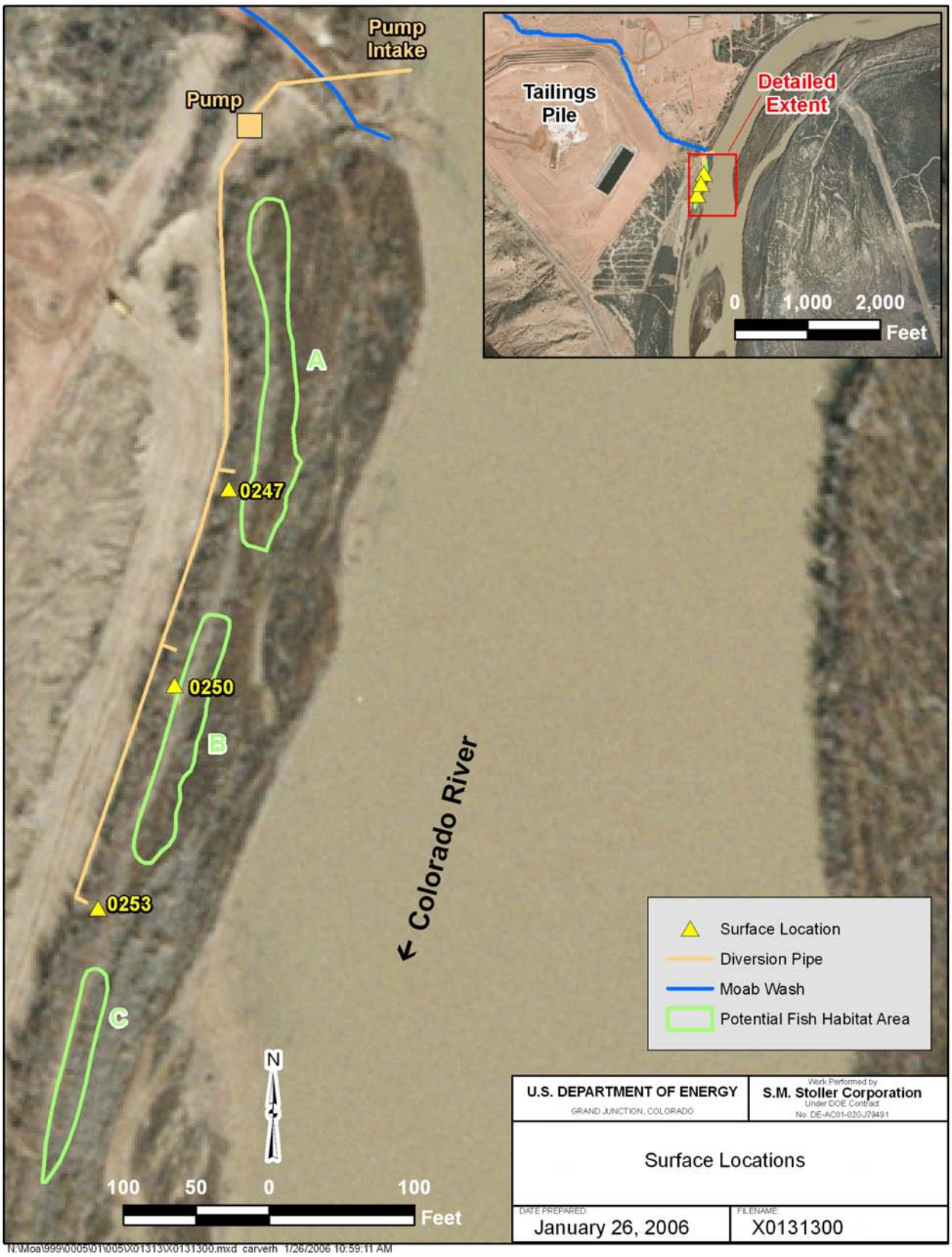

Figure 1. Surface Locations

Table 1. Initial Action Chronology for 2006

Date	Mean Daily Flow (cfs)	Comments
4/27/06	10,400	Water moving into Area C; A and B dry
5/3/06	10,300	Photos taken; A, B, and C dry
5/5/06	11,500	Photos taken; water in Area C, A and B dry
5/9/06	10,300	Photos taken; minimal water in Area C only; A and B dry
5/10 to 5/14/06	9,960 to 10,100	Flows below 10,000; A, B, and C dry
5/15/06	11,200	Photos taken; minimal water in Area C; A and B dry
5/19/06	14,700	Photos taken; water in Areas B and C, hitting south end of A
5/23/06	18,700	Photos taken; Areas A, B, and C flooded
5/24/06	21,400	Peak Flow for 2006 runoff (max 22,400 at 16:30)
5/25/06	19,600	Photos taken; Areas A, B, and C flooded
5/30/06	14,000	Photos taken; isolated pools in Area A; minimal flow in B; Area C flooded; *collected baseline samples 0247 (Area A), 0250 (Area B), and 0253 (Area C)*
5/31/06	11,800	**System started,** water diverted mostly into Area A. Photos taken; Area A has water flowing due to pumping; Areas B and C have ponded water
6/1/06	10,600	Photos taken; pumping between 700 and 900 gpm, mostly into Area A; smaller volume into Area B; water still backing into Area C; minimal flow in B; Area C flooded; *collected samples 0247 (Area A), 0250 (Area B), and 0253 (Area C)*
6/5/06	11,900	Started applying water into Area C for the first time; *collected samples 0247 (Area A), 0250 (Area B), and 0253 (Area C)*
6/6/06	12,300	Photos taken; minimal water in Areas A and B from pumping; Area C flooded
6/12/06	12,500	Photos taken; pumping between 700 and 900 gpm, mostly into Area C; smaller volume into Areas A and B; *collected samples 0247 (Area A), 0250 (Area B), and 0253 (Area C)*
6/15/06	10,100	Photos taken; still pumping between 700 and 900 gpm, mostly into Area C; smaller volume into Areas A and B; *collected samples 0247 (Area A), 0250 (Area B), and 0253 (Area C)*
6/17/06	9,140	**System shut down;** flows below 10,000 cfs

Baseline samples were collected at locations 0247, 0250, and 0253 prior to system startup (Figure 2). The system was operated as described in Table 1 and depicted in the photographs in the trip report (Appendix A).

3.0 Monitoring Results

Baseline sampling results are presented in Table 2 along with corresponding ambient water quality criteria (AWQC) for ammonia. The AWQC are pH and/or temperature dependent, so they vary with conditions at each location. Table 3 presents results of sampling conducted during operation of the Initial Action.

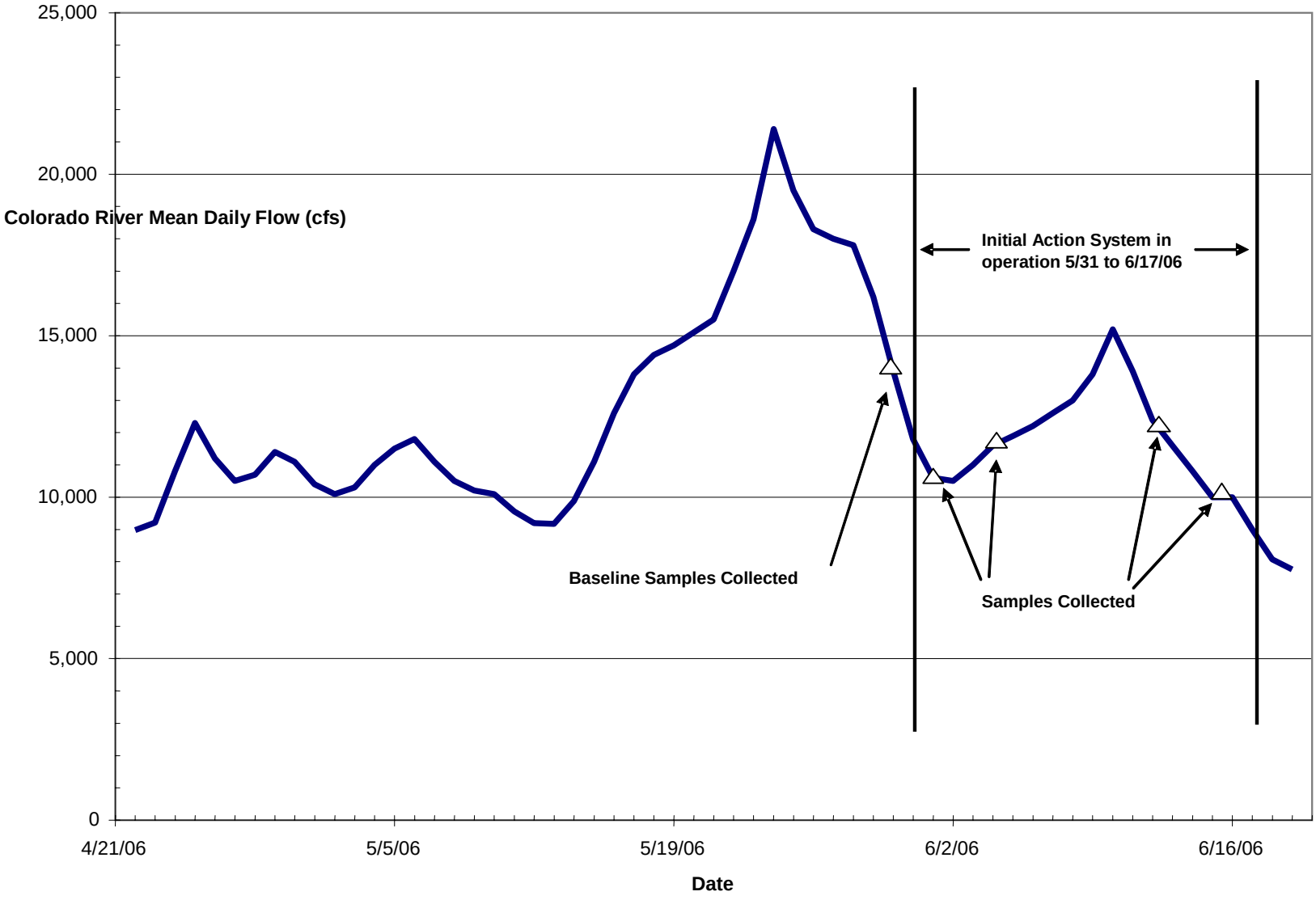

Figure 2. Colorado River Flow Plots

Table 2. Initial Action Baseline Monitoring Results for Ammonia (May 30, 2006)

Location	Ammonia, Total as N (mg/L)	Federal/State Chronic Standard (mg/L as N)	Federal/State Acute Standard (mg/L as N)
0247	3.7	5.3	28.9
0250	<0.1	3.6	14.7
0253	0.15	2.3	8.3

Table 3. Initial Action Operation Monitoring Results for Ammonia

Location	Area represented	Date sampled	Ammonia, Total as N (mg/L)
0247	A	6/01/2006	<0.1
		6/05/2006	<0.1
		6/12/2006	<0.1
		6/15/2006	<0.1
0250	B	6/01/2006	<0.1
		6/05/2006	<0.1
		6/12/2006	0.13
		6/15/2006	<0.1
0253	C	6/01/2006	<0.1
		6/05/2006	<0.1
		6/12/2006	<0.1
		6/15/2006	<0.1

4.0 Conclusions and Recommendations

Prior to system startup, ammonia was detected at surface locations 0247 and 0253. As shown in Table 2, baseline concentrations were below both chronic and acute ammonia AWQC at all locations. Therefore, discharge of ground water did not result in unacceptable ammonia concentrations before startup of Initial Action operation. Subsequent sampling did, however, indicate a significant decrease in ammonia concentration at location 0247 to levels at or below the detection limit (Table 3). During Initial Action operation, ammonia was detected at only one location (0250) at a level very near the detection limit.

Biomonitoring conducted during the summer of 2006 gave no indication that discharge of ground water from the site was having any adverse impact on fish habitat along the riverbank (DOE 2007). Baseline sampling in the Initial Action area for both 2005 (DOE 2006) and 2006 indicate that no unacceptable ammonia concentrations were present in that area. It may be that the ground water interim actions are serving their intended purpose of preventing degradation of river water quality. If adjustments to the Initial Action protocols are required or other adjustments to the Initial Action system deemed necessary, this will be done by DOE in consultation with the U.S. Fish and Wildlife Service and submitted as part of the Water Quality Study Plan required by the final Biological Opinion for the site (DOE 2005).

5.0 References

DOE (U.S. Department of Energy) 2002. *Work Plan for the Implementation of the Initial Action in the Sandbar Area Adjacent to the Moab Project Site*, GJO-2002-299-TAR, March.

DOE (U.S. Department of Energy) 2003. *Site Observational Work Plan for the Moab, Utah, Site*, GJO-2003-424-TAC, December.

DOE (U.S. Department of Energy) 2005. *Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement*, DOE/EIS-0355, July.

DOE (U.S. Department of Energy) 2006. *Moab Initial Action Report, 2005 Calendar Year*, DOE-EM/GJ1080-2006, January.

DOE (U.S. Department of Energy) 2007. *Biota Monitoring Final Report at the Moab, Utah, Project Site*, DOE-EM/GJ1384-2007, January.

Appendix A

Trip Report for Initial Action 2006 Sampling Event
May 30-June 15

Stoller

established 1959

DATE: July 27, 2006

TO: John Ford

FROM: E. M. Glowiak

SUBJECT: Trip Report

Site: Moab – Initial Action Surface Water Sampling

Date of Sampling Event: May 30–June 15, 2006

Team Members: Elizabeth Glowiak, Steve Back

RIN Number Assigned: The samples from May 30, June 1, and June 5, 2006, were assigned to RIN 06050389. The samples from June 12 and June 15, 2006, were assigned to RIN 06060404.

Sampling Event Background: As the Colorado River levels peak with the spring snowmelt runoff, the backwater areas along the riverbank become inundated with water. After the river retreats, these backwater habitat areas become isolated from the main channel**.** The Initial Action was initiated on June 1, 2006, as the Colorado River level began to recede. Fresh river water was diverted into three backwater habitat regions (Areas A, B, and C) in order to keep water readily flowing through. Parameters and ammonia samples were collected from each of the three areas from May 30 to June 15, 2006.

Field Variance: Photographs of the Initial Action were not obtained June 12, 2006.

Sample Shipment: The samples were shipped in two separate shipments from Moab, Utah. The first shipment (RIN 06050389) was shipped in one cooler overnight (Airbill No. 8553 8751 8964), and the second shipment (RIN 06060404) was also shipped in one cooler overnight (Airbill No. 8553 8751 8975).

Location-Specific Information: The surface water was collected using stainless-steel weighted polytubing and a peristaltic pump. Area A was assigned the number 0247, Area B was assigned the number 0250, and Area C was assigned the number 0253.

Site No.	Date	Time	Approx Water Depth	Field Parameters				
				Temp (°C)	Spec Cond (µS/cm)	D.O. (mg/L)	pH	ORP
0247	05/30/2006	08:10	3”	13.05	1,693	6.19	7.22	-3.9
0250	05/30/2006	08:20	4”	12.34	619	9.03	7.69	15.0
0253	05/30/2006	08:35	5”	13.81	448	12.04	8.01	32.2
0247	06/01/2006	08:55	1”	16.45	526	7.50	7.50	143.5
0250	06/01/2006	09:25	3”	16.87	526	9.47	7.90	128.1
0253	06/01/2006	09:35	4”	19.06	520	9.08	7.96	116.3
0247	06/05/2006	08:25	2”	18.95	541	7.68	7.37	119.0
0250	06/05/2006	08:08	3”	19.41	548	7.41	6.98	132.9
0253	06/05/2006	08:43	2”	19.39	543	6.58	7.34	113.0
0247	06/12/2006	08:12	3”	18.30	523	8.65	7.78	155.3
0250	06/12/2006	08:30	1”	18.32	523	9.31	8.03	140.3
0253	06/12/2006	08:48	2”	18.65	482	6.39	7.63	146.5
0247	06/15/2006	08:00	6”	18.60	519	8.67	7.85	152.0
0250	06/15/2006	08:18	4”	18.73	517	8.45	8.06	125.0
0253	06/15/2006	08:42	3”	19.83	517	7.10	8.00	125.2

Area A on May 30, 2006, Prior to Launch of the Initial Action

Area B on May 30, 2006

Area C on May 30, 2006

Area A on June 1, 2006

Area B on June 1, 2006

Area C on June 1, 2006

Area A on June 5, 2006

Area B on June 5, 2006

Area C on June 5, 2006

Area A on June 15, 2006

Area B on June 15, 2006

Area C on June 15, 2006

Site Issues: According to the USGS Cisco Gaging Station (Station No. 09180500), the mean daily Colorado River flows during this sampling event are provided below.

Date	Daily Mean Flow (cfs)
05/30/2006	14,000
06/01/2006	10,600
06/12/2006	12,500
06/15/2006	10,100

Equipment Issues: None.

Corrective Action Required/Taken: None.

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