DOE–EM/GJ1080–2006

*Office of Environmental Management – Grand Junction*

MOAB UTAH
UMTRA Project

# Moab Initial Action Report
# 2005 Calendar Year

January 2006

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

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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 yards 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 site were transferred to the U.S. Department of Energy (DOE).

Results of a number of investigations, including a recent one completed by DOE (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. This report provides the results of that initial action implementation.

# 2.0 2005 Initial Action Operations

During completion of the site observational work plan (SOWP; 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 2005, small backwater areas developed and the initial action was implemented (Figure 2). A chronology of the initial action is included in Table 1. Photographs of these areas are included in the trip report in Appendix A.

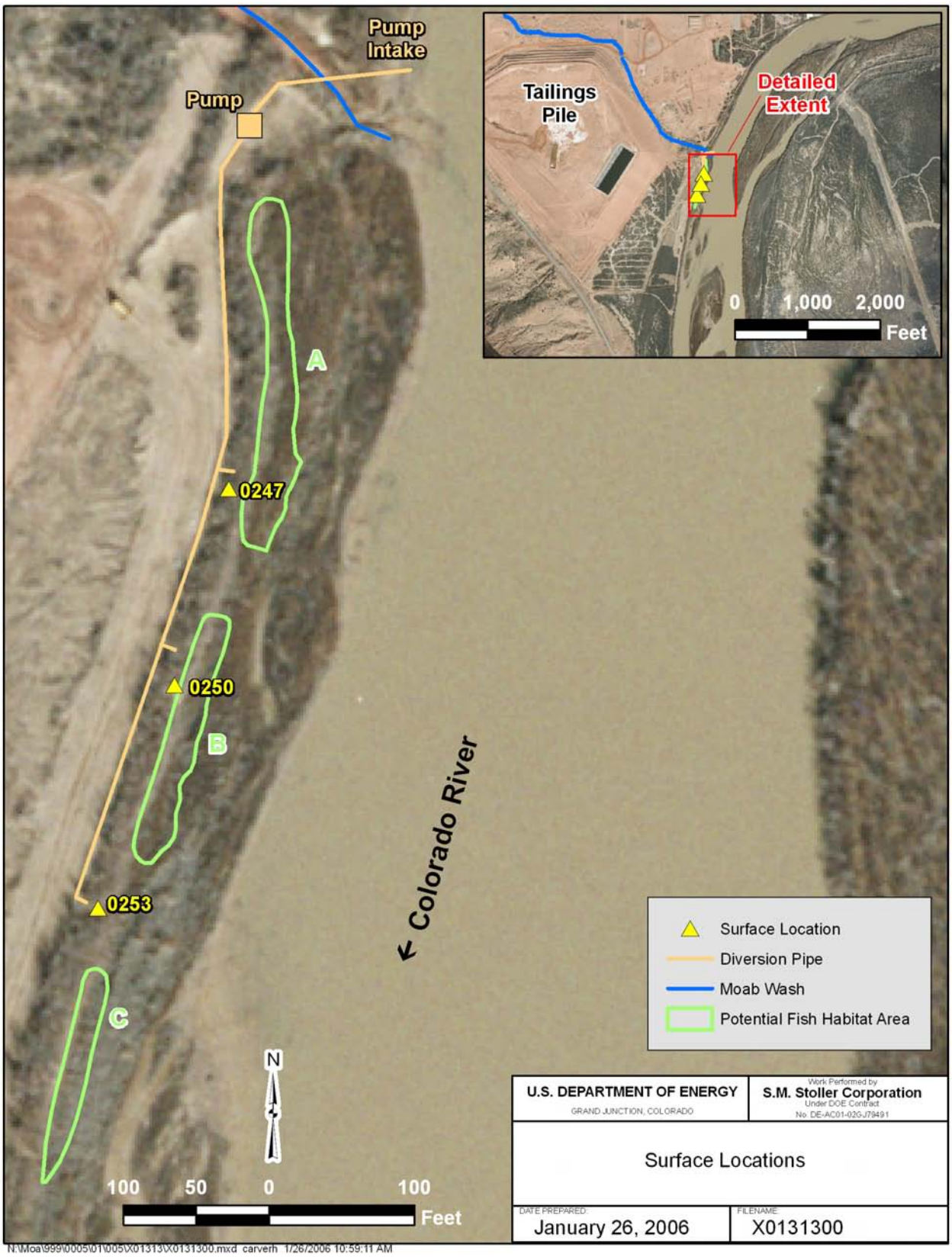


*Figure 1. Surface Locations*

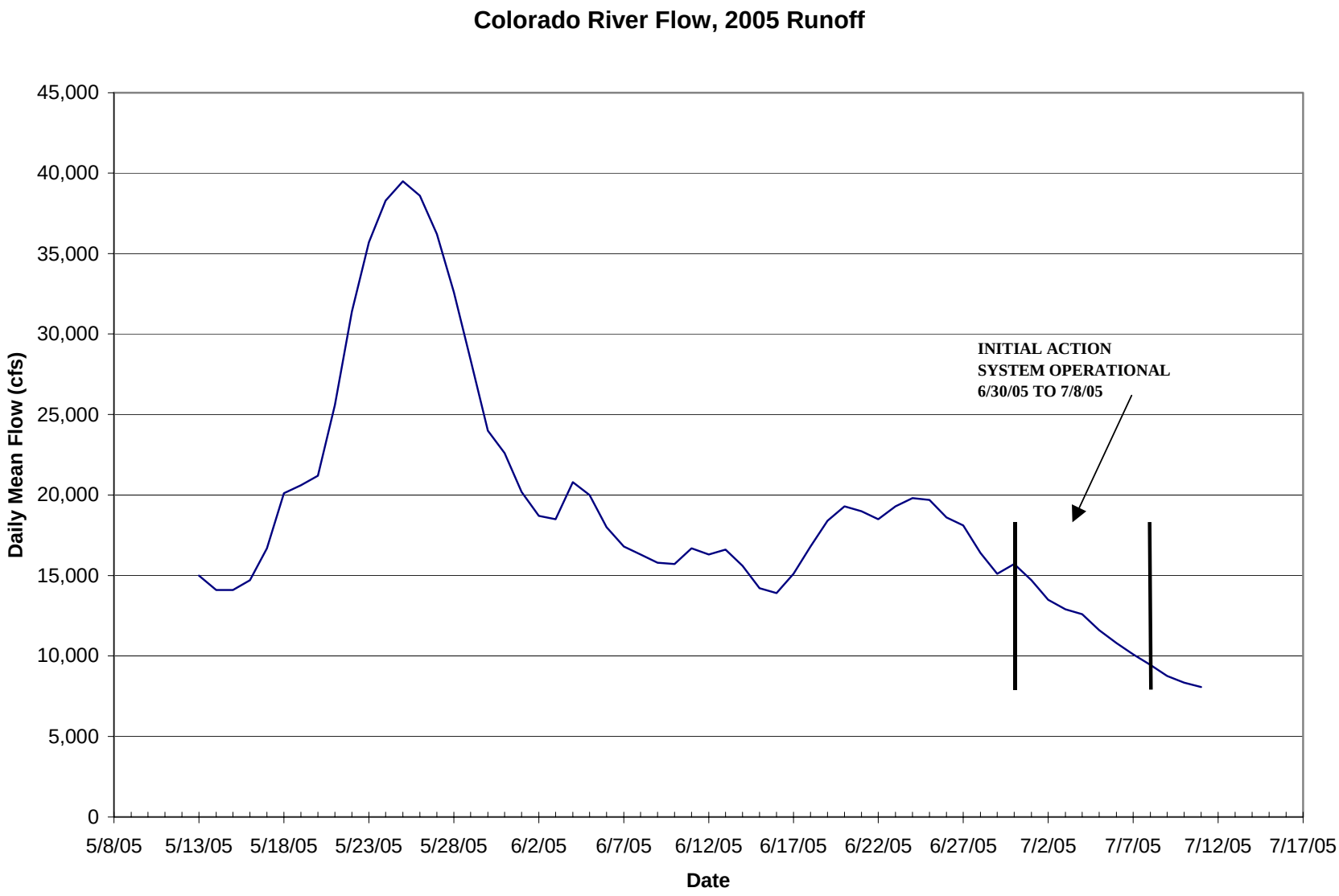


*Figure 2. Colorado River Flow Plots*

*Table 1. Initial Action Chronology for 2005*

| Date | Co River Flow (cfs) | Action |
|---|---|---|
| 6/8/05 | 16,300 | Photos taken at Areas A, B, C, and Moab Wash |
| 6/14/05 | 15,600 | Photos taken at Areas A, B, C, and Moab Wash |
| 6/17/05 | 15,100 | Pump onsite |
| 6/30/05 | 15,700 | Set up Area A diffuser, started up system in Area A only at 350−400 gallons per minute (gpm). Collected background sample 247. Not necessary to install equipment in Areas B and C yet. Photos taken. |
| 7/1/05 | 14,700 | Shut down system in the afternoon for the long weekend. |
| 7/5/05 | 11,600 | Installed diffusers in Areas B and C. Collected background samples 250 (Area B) and 253 (Area C). Discharging ~ 350 to 400 gpm into each area. Photos taken. |
| 7/7/05 | 10,100 | Discharging only ~550 to 600 gpm total for system (as opposed to 1,100 to 1,200 gpm). Suspect we have blockage at the intake that is reducing flows. Early in day discharging ~ 700 gpm (declining as system is running). Area A discharging ~ 200 gpm, Area B ~ 275 gpm, and Area C ~ 250 to 300 gpm. Plan to clean out intake on 7/8/05, and collect samples from all three areas on 7/12/05. |
| 7/8/05 | 9,450 | Could not restart pump after cleaning out intake line. Decision late in the afternoon was made to shut down system for the year based on the flows in the habitat areas. As a result, Area A ran for ~5 days, Areas B and C ran for only ~3 days. Due to unexpected system shutdown, no samples collected beyond background samples for this year. |

Baseline samples were collected at locations 247, 250, and 253 prior to system startup (Figure 1). The system was operated as described in Table 1. Unexpected problems required system shutdown. Decreasing river flows during the same period (Figure 2) essentially caused the habitat to "dry up" and the initial action was shut down because of lack of water before any performance sampling could be conducted.

# 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 and so vary with conditions at each location.

*Table 2. Initial Action Baseline Monitoring Results for Ammonia*

| Location | Ammonia, Total as N (mg/L) | Federal/State Chronic Standard (mg/L as N) | Federal/State Acute Standard (mg/L as N) |
|---|---|---|---|
| 247 | 0.14 | 1.4 | 9.9 |
| 250 | 0.11 | 1.1 | 13.5 |
| 253 | 0.37 | 1.0 | 18.1 |

# 4.0 Conclusions/Recommendations

As can be seen in Table 2, prior to implementation of the initial action, sampling locations were below AWQC for both chronic and acute ammonia concentrations. Therefore, discharge of ground water did not result in unacceptable ammonia concentrations before startup of initial action operation. Subsequent sampling could not be performed to determine what effects, if any, the initial action had on the habitat areas. However, given that initial ammonia concentrations were approximately one order of magnitude below the AWQC, subsequent sampling would have had little value.

During recent sampling along the riverbank it was noted that significant sediment deposition had occurred in previously identified habitat areas A, B, and C, and that perhaps more suitable habitat now exists further downstream. During the recent routine sampling round (November 2005) an attempt was made to collect surface water samples from areas most likely to provide potential shelter for young-of-year fish and determine actual effects of ground water discharge in these areas. Depending on results of this sampling and on results of biota monitoring planned for the 2006 field season (DOE 2006), it may be appropriate to revise the approach for the initial action in the coming year. Any revisions will be done 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 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 2003. *Site Observational Work Plan for the Moab, Utah, Site*, GJO-2003-424-TAC, December.

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

DOE 2006. *Biota Monitoring Plan, Moab Site, Utah*, DOE-EM/GJ1031-2005, January.

Appendix A—Initial Action Baseline Sampling Trip Report

# Appendix A

# Trip Report for June 30 and July 5, 2005 Sampling Event

Stoller

established 1959

DATE: September 28, 2005

TO: Ken Karp

FROM: K. G. Pill

SUBJECT: Trip Report

**Site:** Moab – Initial Action Baseline Sampling Event

**Date of Sampling Event:** June 30 and July 5, 2005.

**Team Members:** Ken Pill and Don Gaurmer

**Number of Locations Sampled:** 3 surface water locations (0247, 0250, and 0253).

**Locations Not Sampled/Reason:** None.

**Field Variance:** None.

**Quality Control Sample Cross Reference:** Quality control samples were not collected.

**RIN Number Assigned:** All samples were assigned to RIN **05060203**.

**Sample Shipment:** All samples were shipped in 1 cooler overnight FEDEX to Paragon Analytics, Inc. from Grand Junction, Colorado, July 14, 2005 (Airbill No. 8473 2967 6535).

**Location Specific Information:** These samples were collected as part of the initial action baseline sampling effort. Each sample was collected prior to starting the system within each habitat area (photos attached). The table below provides the date and time each location was sampled, plus the associated habitat area.

| Location No. | Date | Time | Habitat Area |
|---|---|---|---|
| 0247 | 6/30/05 | 11:20 | A |
| 0250 | 7/5/05 | 13:15 | B |
| 0253 | 7/5/05 | 14:25 | C |

**Equipment:** No problems to report.

**Site Issues:** According to the USGS Cisco Gaging Station (Station No. 09180500), the mean daily Colorado River Flows during the time period of this sampling event were:

| Date | Daily Mean Flow (cfs) |
|---|---|
| 06/29/2005 | 15,100 |
| 06/30/2005 | 15,700 |
| 07/01/2005 | 14,500 |
| 07/02/2005 | 13,200 |
| 07/03/2005 | 12,600 |
| 07/04/2005 | 12,300 |
| 07/05/2005 | 11,300 |
| 07/06/2005 | 10,500 |

**Corrective Action Required/Taken**: None.

(KGP/lcg)

cc: J. D. Berwick, DOE-EM (e)
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Surface Water Location 0247

Surface Water Location 0250

Surface Water Location 0253