Final Design Report

Stage 1A Element 1 -
Stage 1 Reservoir Drawdown and Scour Mitigation
Milltown Reservoir Sediments Site

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Date:

May 25, 2006

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List of Acronyms

AA	Assessment Area
ARARs	Applicable or Relevant and Appropriate Requirements
BO	Biological Opinion
BFR	Blackfoot River
BMP	Best Management Practice
CD	Consent Decree
CFBLLC	Clark Fork and Blackfoot LLC
CFR	Clark Fork River
DFDR	Draft Final Design Report
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FEWA	Functionally Effective Wetland Area
FSP	Field Sampling Plan
FWP	Montana Department of Fish, Wildlife and Parks
FWS	U.S. Fish and Wildlife Service
mg/L	Milligrams per Liter
MPC	Montana Power Company
MRSOU	Milltown Reservoir Sediments Operable Unit
PDR	Preliminary Design Report
RA	Remedial Action
RAWP	Remedial Action Work Plan
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RDWP	Remedial Design Work Plan
ROD	Record of Decision
SAA	Sediment Accumulation Area
SDs	Settling Defendants
SOW	Statement of Work
State	State of Montana
TSS	Total Suspended Solids
μg/L	Micrograms per Liter
USGS	U.S. Geological Survey

1.0 INTRODUCTION

In 2004 after many years of study, the U.S. Environmental Protection Agency (EPA) released their Record of Decision (ROD) for Cleanup of the Milltown Reservoir Sediments Operable Unit (MRSOU) of the Milltown Reservoir/Clark Fork River (CFR) Superfund Site in Milltown, Montana. Subsequently, in 2006 a Consent Decree (CD) was entered whereby the responsible parties agreed to design and implement the cleanup work required under the ROD in three work stages following the Superfund Remedial Design/Remedial Action (RD/RA) process. This Final Design Report (FDR) presents the RD for Stage 1A Element 1 – Stage 1 Reservoir Drawdown and Scour Mitigation. As described in the "Remedial Design Work Plan (RDWP) for Stages 1, 2 and 3 Drawdowns and Related Construction Activities" (Envirocon, 2006a), subsequent Stage 1 design elements (i.e., Element 2 – Site Infrastructure, and Element 3 – CFR Bypass Channel and Related Structures) will be covered in subsequent FDRs for Stage 1B and Stage 1C activities.

1.1 Purpose and Objectives

The primary objective of each of the FDRs prepared for the MRSOU is to present the technical requirements of the design element(s) covered by the report and identify how they fit into the overall RA, so that these requirements may be reviewed to determine if the final design will be consistent with the CD including the Remedial Design/Remedial Action Statement of Work (SOW) submitted as Appendix C to the CD (Envirocon, 2005a).

The specific purpose of this FDR is to present the design basis for implementing the first phase (i.e., Stage 1A, E1) of reservoir drawdown and associated scour mitigation required for initial remedial action (RA) activities at the MRSOU. This FDR identifies Stage 1A E1 drawdown procedures and sequencing (including reversible modifications to dam operations) as well as Stage 1 drawdown-related scour mitigation measures. This FDR also evaluates other Stage 1A E1 drawdown-related potential impacts. Finally, this FDR presents design objectives, design criteria/basis, supporting data and evaluations and conceptual design summaries for the various components included in the Stage 1A E1 drawdown and scour mitigation design element.

1.2 Site Location and Description

The Milltown Reservoir was created in 1907 by the construction of the Milltown Dam at the confluence of the CFR and the Blackfoot River (BFR). The Milltown Dam is located approximately 5 miles east of Missoula, Montana and is adjacent to the small, unincorporated communities of Milltown and Bonner (Figure 1). The historic mining communities of Butte and Anaconda are upstream. During the past century, mine wastes and natural sediment materials have washed downstream, creating some 7 million cubic yards (mcy) of sediment accumulation behind the Milltown Dam. The submerged environment within which these sediments resided caused an enhanced degree of solubility of arsenic over time resulting in creation of a groundwater arsenic plume. In addition, under certain conditions (i.e., reservoir drawdown, ice flow and some high flow events) net scour of reservoir sediments has resulted in short term increases in downstream copper concentrations at USGS gaging station 12340500 (see Figure 1 for gaging station location).

1.3 Design Activities

Design activities for this design element included collection of specific field and dam operational data and completion of HEC-6 hydraulic scour modeling to predict scour-related impacts due to Stage 1A E1 drawdown. Both these activities have been completed for this design element.

1.3.1 Field and Dam Operational Data Collection

To aid in the development of this FDR, field data and dam operational information were collected to support Stage 1A E1 drawdown design, HEC-6 hydraulic modeling and pore water release evaluation. Section 3.4 provides a summary of supporting data used for the evaluations presented and referenced in this FDR.

1.3.2 HEC-6 Hydraulic Modeling

The U.S. Army Corps of Engineers' computational model "HEC-6, Scour and Deposition in Rivers and Reservoirs" was used to analyze predicted sediment transport and scour resulting from Stage 1A E1 reservoir drawdown. HEC-6 is a one dimensional movable boundary open channel flow numerical model designed to simulate and predict changes in river profiles resulting from scour and/or deposition over moderate time periods" (HEC, 1992). The results of the scour evaluation are presented in the "Final Technical Memorandum Milltown Reservoir Scour During Area I Sediment and Dam Removal Evaluation" (Envirocon, 2004a), "Milltown Reservoir Dry Removal Scour Evaluation Addendum 1 Proposed Plan Updated Scour Evaluation" (Envirocon, 2004b) and "Milltown Reservoir Dry Removal Scour Evaluation Addendum 2 Evaluation of Potential Infrastructure Impacts Associated with Dam-Removal Induced Scour and Effectiveness of Possible Countermeasures" (Envirocon, 2005b). Some additional HEC-6 modeling was completed since the above referenced reports to evaluate predicted sediment transport and scour assuming, as proposed in this FDR, Stage 1A E1 drawdown is initiated in spring 2006 (previously evaluations assumed a fall start of Stage 1A E1 drawdown). The results of the additional modeling are included in Appendix A of this report.

1.4 Report Organization

This FDR is divided into the following sections:

- Section 1 provides an introduction and overview of design activities for this design element;
- Section 2 outlines the description and objectives of this design element and its components;
- Section 3 discusses in detail the RD components, including preliminary construction schedule, design criteria and basis, supporting data, conceptual design summary, contingency plans, site access control plan and action-specific monitoring;
- Section 4 presents the reference list for this FDR;

- Appendix A presenting results of additional HEC-6 scour modeling for a spring 2006 start of Stage 1A E1 drawdown scenario;

- Appendix B presenting Stage 1A E1 drawdown general maintenance, monitoring and operational requirements for Milltown Dam;

- Appendix C presenting the Emergency Action Plan for Milltown Dam and Reservoir; and

- Appendix D presenting the Remedial Action Work Plan for the Stage 1A E1 drawdown.

Note that technical specifications are not required for the Stage 1A E1 drawdown design element.

2.0 REMEDIAL DESIGN ELEMENT DESCRIPTION AND OBJECTIVES

The objectives of the activities included in this RD element are to: 1) use the existing dam structures to lower the water level in the reservoir sufficiently to start Stage 1A E1 dewatering of the Sediment Accumulation Area (SAA) I sediments, facilitate access for constructing site infrastructure, and enable the use of mechanical excavation techniques for bypass channel construction; and 2) minimize the impacts associated with this drawdown. For this initial drawdown step (i.e. Stage 1A E1), the dam's radial gate and panel gate spillway panels will be used to reduce reservoir pool level by approximately 8 to 10 feet during average flow conditions (Figure 2). The intermediate stanchions on the panel gate spillway will not be removed in case panels need to be replaced. To maximize dilution of scoured sediment, the Stage 1A E1 drawdown should optimally start immediately prior to, or during, the seasonal high flow period. Since the schedule proposed in this FDR anticipates that the drawdown will start soon enough to take advantage of the 2006 spring high flow period, the maximum amount of drawdown (i.e., radial gate and spillway both fully open) will be targeted with the understanding that the reservoir water level elevation may need to be increased resulting in a less than maximum drawdown if downstream water quality warning limits are exceeded.

If approval to implement Stage 1A E1 drawdown is not obtained prior to the 2006 seasonal high flow period then Stage 1A E1 drawdown may be initiated later in the year with the understanding that additional controls on the rate, or maximum amount, of drawdown may be required. Under this scenario it is anticipated that the reservoir would be lowered initially a maximum of 8 feet (an amount recently experienced by the reservoir with minimal water quality impacts) thus limiting scour. The timing of the remaining 2 feet of Stage 1A E1 drawdown would be approved by the EPA in consultation with the State of Montana (State).

Stage 1A E1 drawdown will be maintained (with variations associated with natural flow changes or in response to exceedance of downstream water quality warning limits (see Section 3.2.1 for identification of warning limits) or trash management requirements) through completion of Stage 1A E1 construction. This design element addresses this Stage 1A E1 drawdown and its related potential impacts.

Evaluations will be presented in this FDR showing: the predicted effectiveness of the drawdown described above on sediment dewatering; the predicted impact of drawdown on downstream water quality; and the need for, and predicted effectiveness of, best management practices (BMPs) developed to protect biological and surface/groundwater resources from drawdown and/or sediment release impacts. Work items to be completed under this design element include the following:

- Identify and define all modifications to dam operations required to implement Stage 1A E1 drawdown, specify how the modifications will be sequenced and controlled, identify contingency/emergency actions for post-drawdown dam operations during potential floods or ice-floe events, and define coordination efforts with the EPA and the Clark Fork and Blackfoot, LLC (CFBLLC) for establishing and maintaining or modifying reservoir drawdown levels during Stage 1 activities;

- Verify that the proposed dam operation modifications and changes in reservoir water levels will not reduce dam safety and stability operation (Note: this objective is primarily addressed through reference to existing Part 12 Safety Analyses including Addenda previously completed by CFBLLC for the Federal Energy Regulatory Commission [FERC]).

- Summarize hydraulic and sediment transport data analyses and modeling used to validate predicted surface water flow, scour and sediment transport effects of Stage 1A E1 drawdown including identifying: 1) key drawdown elevations and/or flow conditions when constituent concentrations and rate of scour may change; and 2) how those changes could affect downstream water quality (Note: this objective is primarily addressed through reference to scour evaluations for the overall project completed under separate covers);

- Identify and develop sediment release mitigation BMPs, evaluate their anticipated effectiveness and define the basis for their use as part of a contingency plan (issued under separate cover) for exceedance of downstream surface water quality standards/warning limits;

- Identify and develop contingency actions for addressing possible Stage 1A E1 drawdown-related sedimentation impacts to downstream irrigation intakes on the CFR to the Bitterroot River confluence;

- Determine methods for meeting, during reservoir drawdown and subsequent Stage 1B and 1C construction activities, the applicable Terms and Conditions contained in the Incidental Take Statement of the U.S. Fish and Wildlife Service's (FWS) Biological Opinion (BO) (FWS, 2004) that are the responsibility of the Settling Defendants (SDs) as detailed in Section 3.2.5 of the SOW;

- Present predicted SAA I sediment dewatering rates and volumes of water released due to sediment consolidation/draining under Stage 1A E1 drawdown and the predicted fate and environmental impact, if any, of the released water (Note: this objective is primarily addressed through reference to pore water release evaluations completed for the overall project under separate cover);

- Evaluate predicted water level impacts on domestic wells in the local aquifer due to Stage 1A E1 drawdown.; The Missoula City-County Health Department plans to complete an updated inventory of domestic wells in the vicinity of the Milltown Reservoir, and provide a ranking of high and medium hazard wells to EPA by June 1, 2006. This work is described in more detail in the February, 2006 Scope of Work, Missoula City-County Health Department Domestic Well Inventory and Assessment of Potential Drawdown Impacts.

- Determine predicted water quality impacts, if any, to local community/private drinking water supply or early warning wells that are currently in use due to Stage 1A E1 drawdown and identify in a contingency plan (issued under separate cover) for contamination of drinking water supply or early warning monitoring wells the mitigative measures to be implemented by the SDs should RA activities cause arsenic concentrations to increase above 10 μg/L in drinking water wells or above statistically-determined trigger levels in early warning wells;

- Summarize predicted Stage 1A E1 drawdown impacts, if any, to road, rail, and bridge infrastructure located on the BFR or the CFR upstream, or the CFR downstream, of Milltown Dam and identify mitigative measure, if any, to be used to address predicted impacts (Note: the impact evaluation of this objective is primarily addressed through reference to scour evaluations for the overall project completed under separate cover. Mitigation to abate any water level/availability impacts to existing water supply wells, bridges, and roads related to a change in aquifer water levels is not part of the SDs obligations under the CD and SOW and instead will be addressed by EPA);

- Summarize Stage 1A E1 drawdown impacts, if any, to wetlands in the MRSOU project area (Note: this objective is primarily addressed through reference to the Wetlands Mitigation Process, Step 3 – Detailed Analysis of Impacts report provided under separate cover) ; and

- Identify element-specific requirements for monitoring Stage 1A E1 drawdown performance and impacts (i.e., beyond the general RA monitoring requirements identified in the Remedial Action Monitoring Plan [RAMP Envirocon, 2006b]).

3.0 REMEDIAL DESIGN COMPONENTS

This section of the report provides an overview and discusses the design criteria, predicted impacts, supporting data and conceptual design summary of the RD components of this design element. This FDR contains only one general design component covering all aspects of Stage 1A E1 reservoir drawdown and scour mitigation.

3.1 Reservoir Drawdown and Scour Mitigation Design Element Overview and Preliminary Construction Schedule

The primary objectives of this design element are outlined in Section 2.0 above. This section describes how this design element fits into the overall project design and schedule. As mentioned in Section 2.0, Stage 1A E1 drawdown is the initial RA activity planned for the site. Figure 2 provides a timeline of the anticipated Stage 1A E1 reservoir drawdown and how it relates to the second and third drawdown stages along with the estimated water level surface at the dam under average flow conditions. The approximate timing of RA construction activities relative to these drawdown stages are also shown on Figure 2. The current timeline assumes Stage 1A E1 drawdown begins in the spring of 2006, Stage 2 (i.e., powerhouse inlet conversion) drawdown begins in the fall of 2007 and Stage 3 (post-dam removal) drawdown begins in the spring of 2008 but the final dates depend upon the timing of:

- Trash passage during 2006 spring high flow (e.g., delaying initiation of Stage 1A E1 drawdown until after the primary period of trash passage which typically occurs during the rising limb of the spring hydrograph can simplify trash management at the dam);

- Completion of related work undertaken by the EPA (i.e., installation of replacement wells in the Milltown area, mitigation of possible drawdown impacts to BFR bridge infrastructure, etc.);

- Mitigation of possible drawdown impacts on Stimson Lumber's cooling ponds (EPA, in consultation with the State, is evaluating whether any necessary cooling pond mitigation would affect the schedule);

- Agency approval of designs and monitoring plans; and

- Construction durations.

Hydraulic modeling was used to estimate surface water levels in the existing reservoir channels and in the bypass channel during the three stages of drawdown at various cross-section locations and under various flow events. The results of the initial modeling were provided to EPA in "Hydraulic Modeling of Predicted Water Surface Elevations During Construction", EMC^2 2005. However, this initial water level modeling assumed the intermediate stanchions on the spillway were removed as part of Stage 1A E1 drawdown. It is now anticipated that spillway intermediate stanchions will be left in during Stage 1A E1 drawdown which will increase spillway roughness and head loss resulting in higher upstream water levels when flows are routed over the spillway.

Therefore, the initial hydraulic modeling was revised to reflect leaving stanchions in place and the updated results are provided in EMC^2 calculation 1089-C50 (available upon request).

3.2 Design Criteria and Basis

This section describes the design criteria and constraints, the key design parameters and design concepts for all activities and work items of this design element. The purpose of this section is to ensure that the design meets: a) the technical requirements of the CD and SOW (including compliance with Applicable or Relevant and Appropriate Requirements [ARARs], acceptance of environmental protection measures and technologies, and feasibility of components of the selected remedy); and b) standard professional engineering practices. Those items that are to be considered in (or become the foundation of) the design of this element are specified in this section. This section provides a reference to, or summary of, the performance standards and ARARs that are directly applicable to the Stage 1A E1 drawdown. How the design achieves compliance with these applicable and other performance standards identified in Attachment 1 of the SOW is summarized in Table 1.

The design basis for this design element includes the following:

- Downstream surface water quality criteria during construction (i.e., Temporary Surface Water Quality Standards presented in Attachment 1 of the SOW and warning limits presented in the RAMP) along with general sediment management strategies identified in OSWER Directive 9285.6-08 "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites" (EPA, 2002a) to determine appropriate BMPs;

- Alluvial aquifer drinking water and other water quality standards contained in Attachment 1 to the SOW along with warning limits and trigger levels presented in the RAMP;

- Protection of biological resources requirements identified in Section 3.2.5 of the SOW and FWS's BO;

- Current reservoir drawdown operating plan (updated) including the Emergency Action Plan for Milltown Development FERC Project No. 2543, January 2005 document [*Note to reviewers: CFBLLC is currently updating the January 2005 document's Emergency Notification Flowchart to reflect RA personnel contact information*]; and

- Substantive requirements of 18 CFR Part 12 – Safety of Water Power Projects and Project Works – As applicable considering Milltown Dam will be a non-power generating facility that will only remain in use temporarily.

3.2.1 Downstream Surface Water Quality Criteria

Downstream surface water quality will be monitored during the RA and will be used as a design basis for implementing and maintaining BMPs to mitigate reservoir sediment scour. Temporary surface water quality standards have been identified as an ARAR during Stage 1A E1 drawdown. The temporary standards are specified in Attachment 1 to the SOW. To provide additional conservativeness warning limits set at 80% of the temporary standard levels were developed in the RAMP for triggering additional monitoring and/or BMP implementation before standards are reached or exceeded. The RAMP also established a warning limit for downstream turbidity. If in-stream warning limits are exceeded, a contingency plan will be followed to consider additional BMPs to prevent excessive sediment from scouring downstream and exceeding water quality standards. Section 3.6.2 presents an overview of the contingency plan for additional BMPs if water quality warning limits are exceeded. To further protect downstream water quality and aquatic resources, the use of BMPs will also consider OSWER Directive 9285.6-08, "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites".

3.2.2 Groundwater Quality Criteria

The quality of the groundwater within the alluvial aquifer underneath and adjacent to the reservoir is not expected to degrade during Stage 1A E1 drawdown. See Section 3.3.3 for a discussion on anticipated changes to groundwater quality. Groundwater will be monitored during Stage 1A E1 drawdown according to the specifics contained in the RAMP.

3.2.3 Biological Resource Protection Requirements

The design basis for protecting biological resources during Stage 1A E1 drawdown will include the requirements outlined in the SOW and supported by the Milltown Biological Opinion (BO) and Biological Assessment (BA) reports. Although the BO addresses impacts with the entire RA, this section only focuses on the impacts to bull trout and bald eagles associated with Stage 1A E1 drawdown activities.

Stage 1A E1 drawdown activities will have the following possible effects on bull trout and on proposed designated critical habitat for bull trout:

- Increased turbidity;
- Increased TSS and metal concentrations downstream of the dam;
- Loss of current fish trap and hauling program being operated at the dam; and
- Downstream habitat degradation.

Stage 1A E1 drawdown is anticipated to impact the interim upstream fish passage (i.e., trap and haul) program at the dam currently conducted by CFBLLC in accordance with their FERC license. Limited upstream fish passage at Milltown Dam has been provided using the radial gate raceway as a fish trapping facility. In 1998, Montana Power Company (MPC), in cooperation with Montana Department of Fish, Wildlife and Parks (FWP) initiated intermittent operation of a trap and haul operation using the radial gate raceway to collect upstream migrating fish. This system is operated annually between March and early November, with trapping subject to river flow conditions. Fish passage during Stage 1A E1 may not be achievable. Routing flow through the open radial gate prevents the use of the downstream discharge pool (the normal fish trapping location) as a safe and viable trapping site. The resulting potential worst-case effect is that none, rather than about 12 percent (i.e., the estimated present passage rate), of the trout congregating at the dam base would be able to pass upstream during the Stage 1A E1 drawdown period (anticipated to last approximately 1 to 1.5 years). The resultant adverse effect from the interruption of upstream passage is that the 2006 and 2007 year classes would be reduced. These adverse effects will be short term in nature and eliminated once Milltown dam is removed. Downstream fish passage is not anticipated to be a concern during Stage 1A E1 RA activities.

The BO outlines the potential effects of Stage 1A E1 drawdown on bald eagles and bald eagle designated critical habitat as:

- The retreating reservoir would result in concentrating reservoir fish into smaller, shallower pool areas. This would result in increased foraging efficiency for the bald eagle; and

- Increased TSS downstream of the dam would influence sight recognition of aquatic prey. This would reduce the opportunity for bald eagles to capture fish from the river.

Section 3.5.3 identifies the mitigation measures outlined in the BO that will be integrated into the design.

3.2.4 Current Reservoir Drawdown Operating Plan

In general, the design basis for operating the Stage 1A E1 drawdown will be the Milltown Dam reservoir drawdown operating plan specified in Article 402 of the FERC license modified for specific requirements related to Stage 1A E1 drawdown. Section 3.5.2 of this report describes the operation plan and procedures that will be followed for Stage 1A E1 drawdown.

3.2.5 Dam Safety Monitoring and Maintenance Requirements

Milltown Dam's FERC license will be ended upon the Effective Date of the CD but the substantive provisions of the license related to ongoing dam safety monitoring and maintenance requirements that are applicable to a non-power generating facility that will only remain in use temporarily will be considered a design basis for the Stage 1A E1 drawdown. These provisions are discussed generally in 18 CFR Part 12 with the specific provisions considered applicable for Milltown Dam during the Stage 1A E1 drawdown period listed in Appendix B.

3.3 Predicted Impacts Due to Stage 1A E1 Drawdown

The predicted impacts of the Stage 1A E1 drawdown on the following features are provided in this section:

- Downstream water quality;

- Water levels in drinking water wells;

- Drinking water quality;

- Infrastructure;

- Wetlands;
- SAA I sediments; and
- Dam safety.

3.3.1 Predicted Impacts on Downstream Water Quality Due to Stage 1A E1 Drawdown

A hydraulic modeling evaluation was performed to evaluate the impact of reservoir drawdown prior to (i.e., Stages 1 and 2) and after (i.e., Stage 3) dam removal on predicted scour and transport of reservoir sediments (see "Milltown Reservoir Dry Removal Scour Evaluation Addendum 1", Envirocon 2004b). HEC-6, the U.S. Army Corp of Engineers one-dimensional sediment transport modeling program, was used to predict sediment discharge at the dam and amount of scour and bed change at specific cross-section locations for various reservoir drawdown scenarios. As discussed in the "Final Technical Memorandum, Milltown Reservoir Scour During Area I Sediment and Dam Removal Scour Evaluation", the HEC-6 model is considered a good method for evaluating sediment scour and transport due to removal of Milltown Dam. However, it should be noted that the model has some inherent weaknesses particularly for predicting short-term spikes of sediment releases associated with scour. These limitations include its one-dimensional nature and its inability to consider more than one sediment size gradation at a given cross-section. In addition, some assumptions in the modeling, such as originally including a channel bed grade control at the I-90 bridges as well as the modifications in drawdown timing, have changed as the project has evolved. These factors produce some uncertainty in predicting the potential impacts of Stage 1A E1 drawdown on downstream water quality that should be considered when reviewing model results.

The HEC-6 modeling, using conservative input parameters, predicted that 300,000 to 600,000 tons of sediment would scour from the reservoir during the 4 or 5 year RA drawdown construction period. Most of the sediment scour predicted under these simulations occurs during the time shortly after each of the 3 stages of drawdown are implemented with the majority (i.e., about 53%) of the scour occurring after Stage 3 (dam removal) drawdown. Under the fall start of Stage 1A E1 drawdown schedule assumed in this initial modeling about 37% of the total predicted scour was estimated to occur during Stage 1A E1 drawdown. For comparison, about 592,000 tons of sediment currently moves through the reservoir during an average 4 year period, while 442,000 tons moved through the reservoir during a 10-year high-flow event which occurred in 1997. Most of the material predicted to scour will be uncontaminated sediments from the BFR channel bottom with the remainder from the CFR arm of the reservoir that exhibit metals concentrations similar to upstream CFR channel sediments.

Based on the results of the scour evaluation presented in Envirocon, 2004b and in prior reports (see "Revised Draft Technical Memorandum Milltown Reservoir Scour During Area I Sediment and Dam Removal Evaluation" [Envirocon, 2003] and "Final Technical Memorandum Milltown Reservoir Scour During Area I Sediment and Dam Removal Evaluation" [Envirocon, 2004a]), under a staged-reservoir-drawdown-approach to dam removal, the increase in downstream TSS and metals concentrations from breaching the dam are significantly dampened by a prior period of reservoir drawdown. In addition, the predicted period of higher TSS and metals concentrations can be reduced by sequencing the drawdown/dam breach steps to take advantage of the dilution capacity provided by high flows that typically occur on the CFR and BFR in May and June. Similarly, by gradually lowering reservoir water levels (as is currently required under the dam standard operation procedures), the peak predicted TSS and metals concentrations are predicted to be further reduced. Taking advantage of this sequencing, modeling predicts peak dissolved metals concentrations due to scour of reservoir sediments during any of the drawdown stages, to be less than the temporary construction related dissolved metals standards established by EPA and the State. Peak TSS concentrations were predicted (under some modeled flow scenarios) to potentially exceed the daily maximum TSS standard (550 mg/L) briefly after some drawdown steps including Stage 1A E1 drawdown. However, it is predicted that this TSS standard will be met for over 99% of the construction period. [Note that actual water quality data collected downstream of the dam during recent radial gate reservoir drawdowns did not show TSS concentrations above 550 mg/L in any samples suggesting model-predicted peak TSS concentrations may be conservative at least for Stage 1A E1 drawdown conditions.]

Both the HEC-6 modeling results and water quality and turbidity monitoring during previous drawdowns in the summer or fall of 2002, 2003, 2004 and 2005 show that reservoir drawdowns of less than 6 to 8 feet have minimal impact on downstream water quality. It is recognized that there are some significant differences in this Stage 1A E1 RA drawdown as compared to previous drawdowns. This would be initiated in June, during higher flow conditions than previous drawdowns. It will extend for a period of approximately 16 months, a longer period of time than previous drawdowns. It will extend through the winter, which has not occurred in the past and may present unique challenges associated with ice scour, and the reservoir may be substantially refilled again in spring 2007, followed by another drop in surface water elevations. Nonetheless, the combination of the modeling results and previous drawdown data provides some confidence that sediment scour rates and potential for downstream water quality impacts are likely to increase as reservoir drawdown extends beyond 6 to 8 feet particularly if the additional drawdown is implemented quickly rather than incrementally. In addition, FWP reported in “Effects of the Milltown Dam Removal Actions on Fish in the Clark Fork River, Montana” (FWP, 2004) that insitu bioassays performed during the 2002 10-foot drawdown showed significantly higher mortality of caged fish downstream then upstream of Milltown Dam. Given this understanding, particular caution will be taken when lowering reservoir levels beyond 6 to 8 feet. Depending on monitoring results this caution could include limiting the Stage 1A E1 drawdown to a maximum of 8 feet during the summer/fall user season unless the Stage 1A E1 drawdown can start prior to, or during, high flow conditions.

Supplemental HEC-6 modeling was also done to evaluate a spring start of Stage 1A E1 drawdown timing. Results of this supplemental modeling, included in Appendix A, predict that assuming an average flow year the Stage 1A E1 drawdown would need to be initiated on, or near, the occurrence of peak flow (which typically occurs in early June) to gain the benefits of allowing the majority of the predicted Stage 1A E1 scour to occur during the higher-than-average flow conditions period which typically extend into approximately mid-July. Facilitating scour during this high flow period provides greater confidence that water quality standards/warning limits wouldn’t be exceeded and therefore maximum Stage 1A E1 drawdown levels could be maintained during the following summer/fall user season. However, even with an assumed June 1st drawdown start date the supplemental modeling results provided in Appendix A predict the potential for TSS concentrations from reservoir scour to periodically exceed 70 mg/L (which in the 2002 drawdown data set corresponded to the 12 NTU turbidity user season warning limit) particularly when lower flows resulted in drawdowns over 10 feet under the radial gate full open modeled scenario.

If at all possible, operation of all drawdowns (including the Stage 1A E1 drawdown) will be performed in a manner to avoid exceedance of all the temporary construction-related water quality standards and/or warning limits,. If monitoring demonstrates exceedances, appropriate additional sediment control BMPs and treatment, if necessary, as specified in the contingency plan outlined in Section 3.6.2 will be evaluated and implemented as directed by EPA, in consultation with the State. For example, should monitoring verify modeling predictions of the potential for exceedance of the turbidity warning limits in late summer/early fall the radial gate could be partially closed to maintain drawdown at a level that reduces the rate of scour to meet the downstream turbidity warning limit.

3.3.2 Predicted Impacts on Local Hydrogeology/Well Water Levels Due to Stage 1A E1 Drawdown

A report entitled "Preliminary Groundwater Modeling To Estimate Effects of Dam and Sediment Removal on the Alluvial Aquifer in Milltown, Montana" (Clark Fork Coalition, 2003) presents results of groundwater modeling of the alluvial aquifer in the Milltown area in predicting how dam and sediment removal would affect groundwater flow. The stated objectives of the model were to: 1) predict changes in groundwater flow direction, 2) estimate the magnitude of water level decline in the aquifer, 3) estimate changes in groundwater flux, and 4) investigate changes in groundwater-river interaction. According to the report, the groundwater model predicts minor change in flow direction, mainly shifting from north to northwest within the reservoir area, and shifting slightly south in the area north of the dam. The groundwater model further predicts that both the CFR and BFR would remain losing streams throughout the reservoir area after dam removal with the CFR at Duck Bridge perched above the aquifer by about 7-8 feet. In addition, the model predicts that a flux from the reservoir to the aquifer would decrease from 1.4 million cubic feet per day to 49,000 cubic feet per day after the dam is removed, and total flux of groundwater through the reservoir area would decrease from 2.3 million cubic feet per day with the dam in place to 1.55 million cubic feet per day with the dam removed.

Specific to alluvial aquifer water table elevations the model predicts they would fall by about 10-15 feet within the current reservoir area and by about 7 feet at the location of Interstate 90 immediately north of the reservoir. There are no current, or reasonably anticipated, water supply wells in these areas. Beneath Milltown itself, alluvial aquifer water level decline is expected to be about 6 feet. Currently wells in the area beneath and immediately downgradient of Milltown are not being used for water supply due to the presence of the arsenic plume. In the area adjacent to Milltown where groundwater wells are currently used for drinking water supply the post-dam-removal decline in alluvial aquifer water level is predicted to be less than 6 feet. The model is based on post-dam-removal (i.e., Stage 3 drawdown) conditions and Stage 1A E1 drawdown makes up only about one third of the total post-dam-removal predicted water level drop (i.e., a 10-ft Stage 1A E1 drawdown drop versus a 30-ft post dam removal total drop as measured immediately upstream of the Dam - see Figure 2). However, because the Stage 1A E1 drawdown effects extend further upstream, they likely represent more than one third of the total predicted post-dam- removal alluvial aquifer water table drop in the area proximal to the upstream channels. Also because the model was run at a relatively high river flow rate of 5,000 cfs, it may underestimate the water table drop during lower river flows and hence surface water levels typical during the August through March period.

The Clark Fork Coalition modeling effort was thorough and made the best predictions possible with the data available. However, it should be recognized that the model limitations identified above create some uncertainty in predicting reservoir drawdown effects on local groundwater levels. As discussed below, monitoring of actual well water levels during the 2005 drawdown found that the model under-predicted the impacts of surface water drawdown on groundwater levels. Therefore the model will be updated by the University of Montana and re-calibrated in the future to incorporate new data before the Stages 2 and 3 drawdowns.

Monitoring of actual well water levels beneath the I-90 and Milltown at the end of the fall 2005 8-foot reservoir drawdown showed alluvial aquifer water levels declined by about 5 to 10 feet and some well users reportedly experienced a reduction in water availability. EPA is in the process of developing a plan to replace the wells where water availability was impacted by the 2005 drawdown and/or that they believe have the potential to be impacted by the Stage 1A E1 drawdown. Given the time delay after start of drawdown when impacts were first reported in 2005 (i.e., about one month after the 8-feet of drawdown level was reached), replacement of the identified wells would need to be completed by about mid-August 2006 assuming drawdown is initiated in early June 2006 and dropping river flow rates result in reaching 8 feet of drawdown by about mid-July. In addition, EPA is responsible for developing, implementing and funding a contingency plan as necessary for replacement of other domestic water wells if any additional wells are found to be made unusable by lowering of groundwater levels due to Stage 1A E1 drawdown.

3.3.3 Predicted Impacts on Local Community and Private Drinking Water Supply Water Quality (i.e. Arsenic concentrations) Due to Stage 1A E1 Drawdown

Stage 1A E1 drawdown will result in lowering water levels in the specific reservoir sediments identified as the source of arsenic to the alluvial aquifer by up to approximately 10 feet. After the affected sediments have fully dewatered [Note: evaluation of the transient impact of sediment pore water release due to consolidation/draining that would occur immediately after the drawdown is implemented is discussed in Section 3.3.6] this lowering of the sediment water table is expected to reduce arsenic loading to the alluvial aquifer compared to current full pool conditions through two mechanisms:

1. Because the water level drop in the sediments is expected to be larger than in the underlying alluvial aquifer, the downward hydraulic gradient currently causing sediment

pore water to flow into the underlying alluvial aquifer will be reduced, decreasing the quantity of pore water flow from the source sediment area into the aquifer; and

2. The uppermost sediments will become unsaturated while oxidizing conditions will extend further downward into the sediments which should geochemically reduce arsenic mobility in much of the sediment mass and thereby likely reduce arsenic concentrations in the sediment pore water quantity that does reach the underlying surface.

Given the post-dewatering arsenic flux from the sediments to the alluvial aquifer should be reduced by decreases in both pore water flow and its arsenic concentrations, expansion of the current local arsenic plume extent or concentrations would not be expected due to Stage 1A E1 drawdown. Similarly, because dissolved arsenic concentrations in downstream CFR surface water are not expected to exceed the 10 μg /L standard or even the lower 8 μg /L warning limit for any length of time during reservoir drawdown (see Section 3.3.1), arsenic concentrations in drinking water supply wells located near loosing reaches of the downstream CFR would also not be expected to increase to above the standard. Although arsenic concentrations over the standard in currently unimpacted local or downstream drinking water wells are not expected, a contingency plan for replacing a current drinking water supply which exceeds 10 μg/L arsenic concentration (or alternate concentration level if one is established in the RAMP) due to Stage 1A E1 drawdown or other RA activity is provided in Section 3.6.4. Similarly, as described in the RAMP, if the arsenic concentrations in other non-drinking water Early Warning wells were to increase above the trigger levels identified in the RAMP as a result of scour related to Stage 1A E1 drawdown then the contingency plan may require modifications to the drawdown rate or amount and/or implementation of additional monitoring of surface and groundwater quality.

3.3.4 Predicted Impacts on Road, Rail and Bridge Infrastructure Along the Clark Fork and Blackfoot Rivers Due to Stage 1A E1 Drawdown

Detailed evaluation of predicted river bed scour/sedimentation effects from RA reservoir drawdown and dam removal activities on the road, rail and bridge infrastructure along the CFR and BFR immediately upstream and downstream of Milltown Dam is presented in "Milltown Reservoir Scour Evaluation Addendum 2 – Evaluation of Potential Infrastructure Impacts Associated with Dam-Removal-Induced Scour and Effectiveness of Possible Countermeasures" (Envirocon, 2005b). This evaluation analyzed potential impacts to:

- I-90 eastbound bridge across the BFR located approximately 0.3 miles upstream of Milltown Dam;
- I-90 westbound bridge across the BFR located approximately 0.3 miles upstream of Milltown Dam;
- Rail bridge across the BFR located approximately 0.4 miles upstream of Milltown Dam;
- Highway (Hwy) 200 bridge across the BFR located approximately 0.5 miles upstream of Milltown Dam;

- Pedestrian bridge across the BFR located approximately 0.5 miles upstream of Milltown Dam;

- Gabion bank stabilization structures and other Montana Department of Transportation (MDT) areas of potential bank stability concern along Hwy 200 where it runs beside the BFR channel upstream of Stimson Dam;

- I-90 eastbound and westbound bridges across the CFR located approximately 1 mile downstream of Milltown Dam at Bandmann Flats (and by inference other downstream infrastructure including the rail bridge located approximately 0.2 miles downstream of Milltown Dam and various other bridges located within the city of Missoula);

- I-90 Embankment where it runs beside the CFR channel upstream of Milltown Dam (i.e., immediately upstream of the Sheriff Posse grounds); and

- Turah Bridge across the CFR located approximately 5 miles upstream of Milltown Dam.

The evaluation determined that the predicted upstream extent of dam-removal-induced channel bed scour did not reach the Hwy 200 gabion structures along the BFR, the CFR channel where it ran alongside the I-90 embankment immediately upstream of the Sheriff Posse grounds, or Turah Bridge. It also predicted little or no channel bed scour (i.e., less than 2 feet) at all the MDT areas of potential bank stability concern where the BFR runs alongside Hwy 200. Some short term deposition of sediment was predicted at the I-90 bridge across the CFR downstream of Milltown Dam (presumably due to the bridge forming a channel constriction choke point) but the amount and duration of predicted deposition was small (approximately 0.5 feet thick, most of which would be removed by subsequent high flow events in the first few years after dam removal). This amount and duration of sedimentation would not be expected to significantly effect hydraulic conditions including the ability to pass flood flows at the downstream I-90 bridge [Note: specific evaluations of potential sedimentation impacts at the rail bridge across the CFR or at other downstream bridges were not completed because existing river FEMA cross-section data were not available at these locations but based on the results found for the downstream I-90 bridge significant sedimentation-related hydraulic impacts would not be expected].

The evaluation did determine that there was a potential for scour-related impacts to the piers and abutments of the five bridges across the BFR upstream of Milltown Dam. Assuming no grade control structures are installed in the BFR, scour modeling predicted between a two and seven foot drop in the channel bed elevation in the reach with the bridges due to dam-removal-induced-scour over the estimated four-year-long RA period (assuming a series of average flows occurs during this period). Under current dam-in-place conditions the footings of all the upstream bridge piers across the BFR, except the rail bridge, are already exposed and the level of general bed degradation owing to dam removal would further expose these footings as well as potentially expose the rail bridge pier footings. The general bed degradation and increased water velocities/shear stresses in the BFR upstream of Milltown Dam predicted to result from dam removal could also increase the potential for local scour around the piers and abutments during high flow events.

However, the evaluation predicted that most of the degradation of the BFR channel bed occurs in the final, Stage 3 water level drawdown associated with dam removal. The predicted Stage 1A E1 drawdown-related drop in the BFR channel bed through the reach with the five bridges was small and was not predicted to expose bridge pier footings below what has historically occurred during past drawdowns and/or high flow events (i.e., the general bed surface was predicted to be above the scoured depth locally observed around the I-90 and Hwy 200 bridge piers in an underwater survey performed after the 1997 high flow event). These findings suggest that even if EPA determines countermeasures are ultimately required to protect the BFR bridges from dam-removal-induced scour, they would not need to be implemented as part of Stage 1A E1 drawdown-related activities. As noted in Section 3.5.4, EPA is proceeding with evaluation and design of possible bridge-pier and abutment scour countermeasures and anticipates completing designs and implementing any required work prior to start of Stage 2 drawdown scheduled for October 2007.

In addition to the potential for scour-related impacts to infrastructure, there is the potential that the drop in local surface and groundwater levels associated with Stage 1A E1 drawdown could result in consolidation of sediments that underlie portions of the I-90 embankment and the I-90 and Hwy 200 bridge approaches possibly causing differential settlement affecting the road surface. The available information suggests that the rail bridge was constructed just prior to completion of Milltown Dam and initial placement of much of the reservoir sediments during the 1908 flood. Therefore, its approach is presumably not built over reservoir sediments potentially subject to drawdown-related consolidation. Specific analysis of the expected amount and potential impact of sediment consolidation and differential settlement beneath the I-90 embankment and I-90/Hwy 200 bridge approaches is being completed by EPA and when available the results will be incorporated into subsequent MRSOU RD documents. EPA is also responsible for design of any mitigative measures required to address bridge/embankment consolidation and settlement impacts from reservoir drawdown. However, the fact that the sediment beneath these embankments and bridge approaches has been loaded for over 40 years by the weight of the overlying fill and has been previously exposed to similar magnitude, albeit shorter duration, drawdowns reduces the potential for a significant amount of additional consolidation due to the approximately 10-foot drop in surface water levels associated with Stage 1A E1 drawdown making it likely that even if mitigative measures are needed to address Stage 2 and 3 drawdowns' consolidation impacts they would not need to be implemented as part of Stage 1A E1 drawdown activities.

3.3.5 Predicted Impacts on Wetlands Due to Stage 1A E1 Drawdown

Existing wetlands within the project area will be impacted due to the lowering of reservoir water levels during Stage 1A E1. A report entitled "Milltown Reservoir Sediments Operable Unit Wetland Mitigation Process – Step 3 Detailed Analysis of Impact" (Envirocon, 2005c) was developed to provide a detailed analysis of potential impacts on wetlands from all RA construction activity, including all stages of reservoir drawdown. The objectives of the Step 3 report were to delineate areas where jurisdictional wetlands occur in the MRSOU and to evaluate functional value of wetlands in the site and determine Functionally Effective Wetland Area (FEWA). Wetlands anticipated to be impacted during implementation of RAs were delineated and evaluated. The Step 3 report identified and delineated a total of 400.5 acres of jurisdictional wetlands within two Assessment Areas (AA) of the MRSOU. The FEWA was calculated for each AA based on actual wetland area and the Overall Rating in functional value. The FEWA over the entire study area totaled 358.6 units for jurisdictional wetlands in 2004. These values will provide a baseline that will be used in subsequent determinations of wetland gains and losses after RA activities are completed at the site. A preliminary evaluation of estimated impacts of RA activities on MRSOU wetlands included in the Step 3 report identified that approximately 256.9 of the 400.5 acres of wetlands at the site might be impacted by RA construction and/or dewatering activities. The specific amount of wetlands impacted by Stage 1A E1 drawdown dewatering alone was not separately determined but would presumably be a significant portion of the overall area identified as being impacted by changes to supporting hydrology resulting from all stages of drawdown through dam removal given Stage 1A E1 drawdown effects extend further upstream than subsequent drawdowns.

Mitigation of site wetland impacts will be on an overall project basis with a single mitigation plan that addresses Stage 1, 2 and 3 drawdowns and physical disturbances associated with all the planned remedial action activities. Therefore, development of specific mitigation measures for Stage 1A E1 drawdown wetland impacts is not included in this design element but will be addressed in a project Wetland Mitigation Plan to be completed prior to start of Stage 3 construction activities.

3.3.6 Predicted Sediment Consolidation and Dewatering Rates and Pore Water Release Impacts Due to Stage 1A E1 Drawdown

A pore water release evaluation was performed to determine the amount of consolidation and short-term pore water discharge from the SAA I sediments predicted to occur due to sediment draining associated with reservoir drawdown (broken out into Stages 1, 2 and 3) and/or preloading. RD field sampling and analysis test data were used to estimate the amount of consolidation/dewatering predicted to occur prior to sediment excavation. Sediment dewatering rates and pore water volume release were then determined. This analysis determined that the Stage 1A E1 drawdown dewatering process would be expected to produce approximately 25 million gallons of pore water released via draining from SAA I sediments at a rate of approximately 0.16 million gallons/day (assuming that preloading of SAA I sediment was not required). The majority of the pore water release associated with sediment consolidation was predicted to occur in the first one to two months after drawdown with virtually all consolidation related pore water release occurring within 150 days of drawdown. A 1% to 3% reduction in in-place SAA I sediment volume was predicted to occur due to consolidation from Stage 1A E1 water level drawdown. See draft technical memorandum “Pore Water Release and Sediment Consolidation During Area I Sediment and Dam Removal Evaluation, Milltown Reservoir Sediments Site”, (Envirocon, 2004c) for additional details.

The Envirocon 2004c pore water release evaluation also determined predicted in-stream dissolved arsenic and copper concentrations in the CFR immediately downstream of the reservoir on a mass balance basis after mixing predicted released pore water concentrations with the existing CFR/BFR water concentrations. Expected arsenic and copper concentrations in the released pore water were estimated based on various data sources with the average of SAA I Dredge Elutriate Testing samples data collected by EPA during the 2002 drawdown sampling event used as the most probable concentrations. The additional load of metals in this released pore water was then used, after accounting for dilution, to predict the change in concentrations of the CFR and shallow aquifer as a result of pore water discharge. [Note the likelihood of actively pumping from dewatering wells, trenches or excavations to expedite sediment dewatering and then discharging the pumped water to the CFR (with or without first running through settling ponds) was also analyzed in Envirocon 2004c to further determine possible impacts on downstream CFR water quality. These results will be discussed in Stage 1C design documents]. The predicted dissolved arsenic and copper concentrations in the CFR were then compared to temporary construction-related water quality standards.

The predicted increase in the in-stream dissolved arsenic concentration downstream of the dam due to sediment pore water release during Stage 1A E1 (assuming no pre-load is placed on the SAA I sediment) was calculated to range from negligible (assuming the released pore water has an arsenic concentration equivalent to the 19 μg/L average concentration observed in EPA's modified elutriate tests conducted on SAA I sediment resulting in predicting no change in the current 3.8 μg/L average in-stream dissolved arsenic concentration) to 0.9 μg/L increase (conservatively assuming that the pore water has a higher arsenic concentration of 10,817 μg/L equal to the average concentration observed in-situ at well 900 resulting in predicting a 4.7 μg/L average in-stream dissolved arsenic concentration after mixing). The long-term federal drinking water dissolved arsenic standard is 10 μg/L. The predicted increase in the in-stream copper concentration downstream of the dam was calculated to be <0.1 μg/L (assuming the released pore water has a copper concentration equivalent to the 69 μg/L average concentration observed in EPA's modified elutriate tests conducted on SAA I sediment resulting in a predicted 3.7 μg/L average in-stream dissolved copper concentration after mixing). This predicted in-stream copper concentration is well below the 25 μg/L temporary construction standard.

The predicted lack of significant increase in downstream dissolved metals and arsenic concentrations due to Stage 1A E1 drawdown sediment pore water release discharge is consistent with measured downstream dissolved concentrations during previous drawdowns of similar magnitude. For example during the August 2002 drawdown downstream dissolved copper concentrations did not increase over pre-drawdown levels and remained at, or below, 1.9 μg/L throughout the nearly one month long drawdown period (EPA, 2002b). Similarly dissolved arsenic concentrations during the August 2002 drawdown did not increase over pre-drawdown levels and remained at, or below, 5.2 μg/L throughout the drawdown period. Also, the arsenic levels in the CFR below the Milltown Dam remained below the levels found in the river at Turah during the October-November 2005 drawdown for the Stimson Dam removal.

The Envirocon 2004c pore water release analysis concluded that discharge of pore water into the CFR due to reservoir-drawdown-induced sediment draining would not raise the CFR dissolved arsenic and copper concentrations above temporary construction standards even if all the released pore water discharged directly into the CFR. The analysis also concluded that even if all released pore water were transported into the underlying aquifer, the metals loading rate would be less than is currently occurring under full pool conditions without sediment dewatering.

Therefore, as previously noted these activities are not expected to cause the existing arsenic plume to expand to impact currently unimpacted wells. However, as discussed in Section 3.3.3, water quality in certain existing monitoring and domestic wells will monitored during the RA, and as specified in Section 3.6.4, a replacement clean water supply will be provided if arsenic concentrations above 10 μg/L (or alternate concentration if one is established in the RAMP) are observed in any water supply wells.

3.3.7 Predicted Impacts of Stage 1A E1 Drawdown on Dam Safety and Stability

The safety and stability of Milltown Dam has been periodically evaluated and confirmed as part of FERC license requirements. Most recently this was done as part of the 2001 Part 12 Inspection of Project Works Report (MPC, 2001) and its Addendum 2 (MPC, 2004). These reports showed the dam was stable under all load cases including normal operating and seismic conditions. Stage 1A E1 drawdown activities will not physically modify the dam and will only result in reducing upstream water levels which will result in increased stability compared to normal operating conditions. Therefore, Stage 1A E1 drawdown is not expected to have negative impacts on dam safety or stability and no additional stability evaluations are anticipated. However, as discussed in Sections 3.2.5 and 3.8, standard monitoring of the dam will continue through Stage 1A E1 and if movement or other concerns are detected additional evaluations or mitigative measures would be considered at that time.

3.4 Supporting Data

This section presents a review of supporting data to be utilized in the Stage 1A E1 drawdown design including identifying any remaining data gaps and how they will be filled and/or providing results of any additional field sampling.

Data required to complete the RD for this design element include dam operational information, input parameters for HEC-6 hydraulic and scour modeling, additional dewatering data for SAA I sediment and information for assessment of potential impacts on wetlands, streamside infrastructure or local wells from Stage 1A E1 drawdown.

Existing data for the MRSOU that was reviewed and used for this design element included, but are not limited to, reservoir flow versus stage rating curves for the dam spillway and radial gate, streamside infrastructure construction details, SAA III sediment cores (some with gradation and concentration data); existing channel bed elevation cross-section surveys from 1990, 1996 and 1997; water level data for SAA I piezometers and adjacent alluvial aquifer wells obtained during the 2002, 2004 and 2005 drawdowns; previous hydrogeologic modeling for the site area and historic and current surface water flow data available from USGS. In accordance with the RD Field Sampling Plan (FSP) (EMC^2, 2003) and its supplements, additional channel bed bathymetry/channel sediment characteristic data were collected to provide updated information for HEC-6 scour modeling and additional geotechnical data were collected for streamside infrastructure for use in EPA's bridge mitigation design. Also additional sediment dewatering sampling and testing and Step 3 wetland delineation assessment work was performed to finalize the drawdown impact evaluation as part of this design element.

3.5 Conceptual Design Summary

This section presents a review of the selection of the technology (if applicable) and conceptual designs for the various components that make up this design element.

3.5.1 Coordination with Clark Fork and Blackfoot, LLC

It will be necessary to coordinate Stage 1A E1 drawdown activities and requirements with NorthWestern, whose subsidiary CFBLLC, is the owner of Milltown Dam. Specific to Stage 1A E1 drawdown, the SDs will coordinate efforts with CFBLLC for: establishing and maintaining or modifying reservoir drawdown levels during Stage 1A E1 activities; monitoring the dam; and, if necessary, as discussed in Section 3.6.1, implementing Emergency Action Plan procedures in the event potentially hazardous conditions develop.

3.5.2 Stage 1A E1 Drawdown Operation Plan

The following paragraphs describe the Milltown Dam operations required for the Stage 1A E1 drawdown. Permanent alterations to the dam structures are not required and will not occur for Stage 1A E1 activities. Figure 3 also provides a conceptual overview of the operation plan for Stage 1A E1 drawdown.

Prior to initiation of Stage 1A E1 drawdown, the plant generators will have been shut down in accordance with the requirement for power generation to cease upon the Effective Date of the CD. However, at EPA's request, in order to maintain reservoir level control, intermediate panel-gate spillway stanchions, as well as the boat barrier and the panel-gate spillway trashboom, will remain in place during Stage 1A E1 drawdown. Given the trashboom is to be left in place, initiation of the 2006 drawdown will be delayed until after the period of higher potential for trash coming down from upstream since the management of trash collecting on the boom is not possible under drawdown conditions during peak flow. Generally, the period of greater potential for trash passage is limited to the rising limb of the hydrograph, which typically ends by early June. Since drawdown is anticipated to begin in late spring/early summer after the weather has warmed, there should be no problems associated with ice during the initial drawdown period. If the drawdown occurs in the fall, weather forecasts will be used to ensure the reservoir can be lowered to the crest of the panel-gate spillway prior to any extreme cold weather conditions.

Depending on flow conditions and the timing of Stage 1A E1 drawdown (i.e., late spring/early summer or fall), the drawdown will be achieved by removing and replacing panel gates in combination with adjustments to the radial gate opening or it will be achieved by just using the radial gate. The Milltown Project's FERC license will have been surrendered prior to the start of Stage 1A E1 drawdown and therefore its drawdown rate limitations are not strictly applicable. However, to facilitate agency approval of the Stage 1A E1 drawdown design it is proposed to limit the maximum rate of drawdown to what was allowed under the substantive provisions of the project's former FERC license (i.e., 1 foot/day until elevation 3,258 feet NAVD88 and 0.5 feet/day below 3,258 NAVD88; note that the previously discussed scour modeling conservatively assumed the reservoir is drawdown at a maximum rate of 1 foot per day regardless of reservoir elevation unless the flow rate was limiting the rate of reservoir water level reduction to less than 1 foot/day). As discussed further in Section 3.5.5, the rate and degree of drawdown may be modified in order to mitigate sediment release downstream to protect biological resources and to ensure surface water quality standards are not exceeded.

Regarding the degree of drawdown achievable, based on the Milltown Dam radial gate spill capacity rating curve, the fully open radial gate on its own can maintain a reservoir elevation of approximately 3,252 ft (about a 10 foot drop from full pool conditions based on NAVD88 datum) at a flow rate of 2,000 cubic feet per second (cfs) and a reservoir elevation of approximately 3,254 ft (about a 8 foot drop from full pool conditions) at a flow rate of 3,000 cfs, which is the approximate average combined flow rate for the BFR and CFR. Based on the combined spill capacity rating curves for the spillway and the radial gate, the spillway with stanchions in place but all panels removed along with the fully opened radial gate can pass the average annual peak combined BFR/CFR flow rate of 15,875 cfs and maintain a reservoir water level elevation of approximately 3,259.9 ft, which is approximately 1.9 feet below full pool. Predicted reservoir water level elevations at other flows up to the 10 year event assuming the combined spillway/radial gate rating curves are provided in Figure 4. Drawdown levels at higher flows shown on Figure 4 all assume the reservoir level did not need to be raised back to full pool to facilitate trash management as would likely be required during the rising limb of the flood hydrograph assuming spillway intermediate stanchions are left in place.

As previously stated, at EPA's request, intermediate panel-gate spillway stanchions will be left in place to facilitate replacing panel gates and raising reservoir water elevation if needed as a scour mitigation BMP or as a precautionary measure in case there is a situation, such as an ice floe or trash/debris passage event or a construction problem/delay, that necessitates raising the reservoir elevation. Leaving the intermediate stanchions in place requires that the trashboom also be left in place in order to safely manage trash and debris during the spring 2007 high flow season. In order to safely manage trash and debris, the reservoir elevation will need to be increased back to normal full pool elevation as flows increase in spring 2007 unless prior agreement is reached with the agencies to allow temporary removal of intermediate stanchions from spillway bays during the rising limb of the hydrograph in order to allow trash passage over the panel-gate spillway. Increasing the reservoir elevation back to full pool in the spring of 2007 will occur sometime during the rising limb of the hydrograph with the actual dates dependent on actual flow increases and trash/debris coming from upstream. Following the 2007 peak flow, the reservoir will once again be drawn down as described above. Currently, following the spring 2007 drawdown, it is anticipated that the reservoir should not need to be refilled again.

General maintenance and monitoring of the dam will continue through the Stage 1A E1 drawdown period consistent with applicable sections of 18 CFR Part 12 for a non-power generating facility that will only remain in use temporarily. The general maintenance, monitoring and continued operational requirements for the dam are summarized in Appendix B.

3.5.3 Biological Resource Protection Measures

The SDs responsibilities to protect biological resources are detailed in Section 3.2.5 of the SOW. Terms and Conditions (TC) numbers 3, 4, 6, 7, 7a, 7b, 8 and 9 contained in the Incidental Take

Statement of the Biological Opinion (BO) are the responsibility of the SDs. For Stage 1A E1 drawdown the following TCs are applicable in whole or in part:

- TC6 (in part) – developing and implementing water best management plans for the SDs RA activities;
- TC7 – developing and implementing a surface water monitoring plan;
- TC7a and TC7b – developing and implementing a contingency plan to address exceedances of temporary surface water quality standards;
- TC8 – reporting surface water quality monitoring (TC7) results to the FWS at a frequency to be determined by the EPA in consultation with the FWS; and
- TC9 – reporting dead, injured or sick bull trout and destruction of redds to FWS.

TC6, TC7a and TC7b are addressed in Sections 3.3.1 and 3.6.2. TC7 and TC8 will be addressed in the RAMP. As required by TC9, dead, injured or sick bull trout or destruction of redds that are observed will be reported to Mr. Bill Olsen of the FWS with a phone call followed up by a written account of the observation.

3.5.4 Road, Rail, and Bridge Infrastructure Protection Measures

As identified in Section 3.3.4 the potential for impacts to public infrastructure due to Stage 1A E1 drawdown was primarily limited to possible scour impacts to bridge piers/abutments on the BFR along with the potential for differential settlement of the I-90 roadway or I-90/Hwy 200 bridge approaches due to consolidation of the underlying sediment. The EPA, with consultation from the State, is assessing the measures necessary to mitigate the effects of scour on the I-90 and Highway 200 bridges and is responsible for implementing those measures. Montana Rail Link is assessing the measures necessary to mitigate the effects of scour on its bridge and is responsible for implementing those measures. The EPA, with consultation from the State, is also responsible for implementing measures necessary to mitigate the effects of groundwater level lowering, and the resultant, possible effects of consolidation, if any, on I-90 and Highway 200 roadways and bridges. Missoula county is evaluating the pedestrian bridge and anticipates replacing it prior to the start of Stage 2 drawdown.

3.5.5 SAA I Scour Protection Measures

Scour mitigation protection measures planned for construction during Stage 1A E1 drawdown by the SDs include riprap armoring of the BFR embankment along the BFR boundary of SAA I (evaluated by the SDs in the Addendum 1 scour model with design to be provided in Stage 1B's design submittals). The riprap armoring along the SAA I boundary with the BFR will be constructed by the SDs after Stage 1A E1 drawdown has been initiated and after its design and construction schedule have been approved by the EPA, in consultation with the State. In addition, the need for scour mitigation protection during Stage 1A E1 drawdown along the CFR boundary of SAA I will also be evaluated as part of Stage 1B's design.

3.6 Contingency Plans

In this section contingency plans are presented for the following events:

- Major flood events, ice floes and other events that require implementation of the existing Emergency Action Plan for dam operations;
- Exceedance of surface water quality temporary construction standards or warning levels;
- Sedimentation of irrigation intakes; and
- Exceedance of 10 µg/L arsenic standard (or alternate limit established in the RAMP) in drinking wells or exceedance of statistically-determined trigger levels in early warning wells established in the RAMP.

3.6.1 Contingency/Emergency Action Plan for Milltown Dam During Flood, Ice Floe or other Events

During the Stage 1A E1 drawdown period, the "Milltown Project Emergency Action Plan" (EAP) (CFBLLC, 2005) will be used as a basis for dam operation contingency action in the event of major flooding events, ice floes and other events. Appendix C of this FDR provides a copy of the EAP for reference. The EAP will be in effect throughout the duration of the project until the Milltown dam has been removed. The EAP was developed by CFBLLC as the former Licensee for the Milltown Development on the CFR, which was FERC Licensed Project No. 2543. The purpose of the EAP is to establish a system of response and to identify who is responsible for notification in case the integrity of the Milltown Hydroelectric Project is at risk. Primary components of the EAP include detailed descriptions and notification flow charts for the following three emergency classifications:

- Failure is Imminent or Has Occurred;
- Potentially Hazardous Situation is Developing; and,
- Non-Failure Flood Warning.

The purpose of the EAP is to provide maximum early warning to all persons involved in the unlikely event of a failure (catastrophic or otherwise) of the dam or other water retaining structures. In addition to providing maximum early warning, the objective of the EAP is to minimize or eliminate danger to all people and/or property downstream of the project. The EAP is based on notification of residents, property owners, and recreationists through various public safety agencies and authorities. In addition to describing actions required in the event of major flooding events or adverse weather, the EAP also provides standard operating procedures in the event of significant ice jams and large ice floes.

In the event of seasonal high flows during Stage 1A E1 drawdown, it is important to note that there is essentially no change in reservoir water levels or how the dam will be operated during high flows under Stage 1A E1 drawdown versus how it is operated currently since CFBLLC already removes spillway panels for each spring flow and opens the radial gate so that flow doesn't go above full pool when seasonal high flow is higher than average.

Stages 2 and 3 drawdowns will involve more safety related contingencies that will need to be coordinated (cofferdams across spillway, etc.) but these issues will be addressed in the design submittals developed under those Stages. The contingency plans for Stages 2 and 3 drawdowns will cover items such as emergency spillway usage and debris in the powerhouse intakes, among other things.

3.6.2 Contingency Plan for Additional BMPs if Water Quality Standards are Exceeded

As noted in Sections 3.3.1 and 3.3.6, in-stream arsenic and copper concentrations are not predicted to exceed temporary construction surface water quality standards as a result of either reservoir-drawdown-induced sediment scour or sediment draining/consolidation pore water release but TSS or turbidity warning limits could be exceeded. The SDs developed and will implement as necessary a contingency plan as approved by EPA in consultation with the State for addressing exceedances of surface water quality standards and/or warning limits due to Stage 1A E1 drawdown and subsequent RA activities. The contingency plan includes a decision matrix as to the type of BMP to be employed based on the nature, duration, and extent of the exceedance. This contingency plan was provided under separate cover to the agencies. The contingency plan identified the process to be employed to evaluate additional BMPs, operational controls or treatment in the event water quality standards/warning limits are exceeded downstream. The plan identified options to be considered for all the various RA activities including: 1) reduce rate/amount of drawdown; 2) reduce pumping rate or chemical treatment of well discharge; 3) increase residence time in sediment pond or reduce pumping rate/chemically treat water from excavations or stockpiles; 4) additional run-off/run-on and erosion controls around construction areas; and 5) placement of additional siltation controls around in-stream work areas. Option 1 is the only option directly related to reducing drawdown-induced scour. Figure 4 shows the level of water level control available during Stage 1A E1 drawdown. Under a median flow of 1,680 cfs, drawdown can range from full pool to approximately 10 feet of drawdown. At average flow conditions (i.e., 3,015 cfs), drawdown can range from full pool to approximately 8 feet of drawdown.

3.6.3 Contingency Plan for Cleanout of Irrigation Intakes

The SDs developed and will implement as approved by EPA in consultation with the State a contingency plan for irrigation intake cleanout. This plan was provided under separate cover to the agencies. The contingency plan specifies the actions to be taken by the SDs to cleanout downstream irrigation intakes (between the Milltown Dam and the Bitterroot River) that may clog due to sedimentation related to scour of reservoir sediments during Stage 1A E1 drawdown and subsequent RA activities. Sediment scoured from the reservoir could potentially deposit around the intake inlet or in the intake diversion itself, reducing the efficiency of the diversion. Specific methods for removing this sediment are identified in the contingency plan but focus on mechanical excavation with backhoes.

As presented in the "Final Technical Memorandum Milltown Reservoir Scour During Area I Sediment and Dam Removal Evaluation" (Envirocon, 2004a), there are four legal water withdrawal points that are diversions for moderate-sized ditch companies or irrigation districts along the CFR between the Milltown Dam and the Bitterroot River. From upstream to downstream, these irrigation diversions are:

- Missoula Irrigation District Diversion;
- Orchard Homes Ditch Company Diversion;
- Hellgate Irrigation District (Flynn-Lowney Ditch); and
- Grass Valley – French Ditch.

Photographs and location maps of the four irrigation diversions are included in Envirocon, 2006d.

3.6.4 Contingency Plan for Contamination of Drinking Water Wells

The SDs developed and will implement as necessary a contingency plan as approved by EPA, in consultation with the State, for addressing contamination of current drinking water wells due to Stage 1A E1 drawdown and subsequent RA activities. This contingency plan, provided under separate cover to the agencies, specified those actions to be undertaken by the SDs if current drinking water wells, within or immediately downgradient of the project area, are found to contain arsenic levels above 10 μg/L. The contingency plan does not include requirements for additional monitoring of drinking water wells beyond those identified in the RAMP. Mitigative measures for contamination of local drinking water wells involve notification and temporarily providing replacement water either in bottles, by drilling a replacement well, by implementing point of use treatment or by connecting into the existing local water supply system until the impacted drinking water wells are no longer contaminated. Although not expected, RA actions to be used in the event a Mountain Water Company public water supply well located near the downstream CFR shows arsenic concentrations above 10 μg/L are limited to notification since mitigative actions will likely be based on Mountain Water Company's existing contingency practices which include the ability to use alternate existing system supply wells.

The contingency plan also identifies actions to be considered if early warning wells exceed their statistically-determined trigger levels (established in the RAMP). These actions include reducing the rate or amount of drawdown or reducing dewatering pumping rate/chemical treatment of discharge (if groundwater impact was due to increased surface water arsenic concentrations related to RA activities) or reducing infiltration (if due to increased arsenic loading to groundwater from the site).

3.7 Site Access Control Plan

Once construction-related remedial activities commence on-site access to the Milltown reservoir, dam and SAA I, II and III by unauthorized personnel will be controlled to protect public safety.

A Draft Site Access Control Plan was developed and submitted under separate cover to the agencies for review specifying what access controls will be implemented, how the controls will be constructed and maintained, and when the access controls will be implemented. Access controls will include, at a minimum: signs, locked gates, fences, and temporary closure of existing roads. Full time security personnel will also be employed to enforce access controls and prevent vandalism.

During Stage 1A E1 activities (i.e. Stage 1 drawdown) no access controls to the site will be implemented except for the existing locked gate on the access road off Highway 210 and existing access controls maintained by NorthWestern at the Milltown Dam. Once Stage 1B (or remedial design data-gathering activities that require mobile equipment) begin, access controls described in the access control plan will be implemented.

3.8 Action-Specific Monitoring

Consistent with the requirements of the CD including the SOW, monitoring will be performed during Stage 1A E1 drawdown including biological, surface water/groundwater quality, and river discharge/stage monitoring. General monitoring requirements for the entire RA period that are the responsibility of the SDs are described in the RAMP. These general RA monitoring requirements to be performed by the SDs throughout the Stage 1A E1 drawdown period include:

- Groundwater quality monitoring - biannual monitoring of 10 compliance wells and 11 public health drinking water wells with quarterly monitoring of an additional 21 “early warning” groundwater monitoring wells for arsenic. As detailed in the RAMP, required frequency for monitoring of early warning wells may be increased to biweekly for arsenic depending on surface water quality and previous groundwater sample results;

- Surface water monitoring – including laboratory analysis of water quality samples collected periodically at the downstream CFR above Missoula USGS station gage (combined with continuous turbidity monitoring at the same location) plus laboratory analysis of water quality samples collected on the same day at the USGS BFR near Bonner and CFR at Turah stations. As detailed in the RAMP, required frequency for collecting laboratory analysis samples will be based on observed real-time turbidity readings and prior laboratory analysis results;

- Discharge and stage – continuation of current monitoring by USGS at Turah (CFR above reservoir), above Bonner (BFR above reservoir) and at Deer Creek Bridge (CFR below reservoir) on a real time basis; and

- Annual benthic macroinvertebrate monitoring – will be conducted by EPA at Turah (CFR above reservoir), above Bonner (BFR above reservoir) and at Deer Creek Bridge (CFR below reservoir).

In addition EPA will complete the following supplemental monitoring:

- Additional annual benthic macroinvertebrate monitoring at the existing monitoring points upstream and downstream of the dam;

- Annual fish surveys;

- In-situ bioassays (caged fish studies) during periods of high sediment transport;

- Total metals and suspended sediment monitoring at additional downstream stations to assess the transport of scoured sediment from the project area to the Thompson Falls Reservoir during periods of high sediment transport; and

- Fish evaluation (telemetry).

No action-specific water quality or biological monitoring beyond that specified to be completed by the SDs in the RAMP and/or proposed to be completed by EPA is currently anticipated for the Stage 1A E1 drawdown. If the need for additional action-specific water quality or biological monitoring for the Stage 1A E1 drawdown is identified, a plan to complete it will be included in the pending Final Remedial Action Work Plan or Construction Quality Assurance Plan for this design element.

The purpose of surface water and groundwater quality and biological monitoring during the remediation construction activities described above is to assess the effectiveness of engineering controls and BMPs used during remedial construction activities, and to assess any adverse effects on aquatic habitat and organisms. The EPA and DEQ have established temporary construction-related surface water quality standards for the CFR in the Record of Decision for the protection of human health and downstream aquatic life during the RA. These performance standards are presented in Attachment 1 of the SOW. As discussed in the RAMP, EPA also established warning limits for some constituents that are lower than the construction standards. In the event that surface water monitoring conducted by the SDs identifies exceedances of the temporary construction-related water quality standards and/or warning limits, the monitoring data can be used to determine if additional BMPs should be implemented to eliminate the exceedances. Such additional BMPs will be identified in the contingency plan as described in Section 3.6.2.

As discussed in more detail in Appendix D, some additional action-specific water level monitoring is planned during Stage 1A E1 drawdown to provide additional data for design and implementation of Stage 1B - Site Infrastructure and Stage 1C – Bypass Channel. This additional water level monitoring will include:

- Installing and periodically monitoring a surface water level staff gage in the CFR at Duck Bridge to supplement ongoing reservoir level monitoring at the dam; and

- Periodically monitoring water levels in select existing piezometers in SAA I and along the I-90 embankment.

Monitoring of dam operations will also be ongoing during Stage 1A E1 drawdown. This dam operation monitoring is anticipated to include:

- Alignment surveying;
- Radial gate and standby power operation and testing;
- Panel gate spillway crest monitoring well water level reading;
- Penstock inspection;
- Monthly visual inspection; and
- EAP drill tests.

Specifics of dam monitoring requirements are provided in Appendix B.

3.9 Remedial Action Work Plan

The Remedial Action Work Plan (RAWP) for Stage 1A E1 Reservoir Drawdown and Scour Mitigation is provided in Appendix D. The RAWP provides additional information on the approach and schedule for implementing the Stage 1A E1 design.

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EPA, 2002a, OSWER Directive 9285.6-08, "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites", February.

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MPC, 2001, "Inspection of Project Works, Milltown Hydroelectric Project FERC Licensed Project No. 2543", prepared for Montana Power Company by Washington Infrastructure Services, Inc., December.

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TABLE

Table 1
Milltown Reservoir Superfund Site
Performance Standards/Compliance During Stage 1 Drawdown

PERFORMANCE REQUIREMENTS CATEGORY	METHOD OF COMPLIANCE (How design achieves compliance)	POINT OF COMPLIANCE (POC)	TIME OF COMPLIANCE
CONTAMINANT SPECIFIC REQUIREMENTS			
Ground Water Standards			
Montana ARM § 17.30.1066, 42 U.S.C. §§ 300f, and 40 CFR §§ 1411(b) and 141.62.	Compliance with numeric groundwater quality standards in area of existing MRSOU contaminant plume is not required until 10 years after construction is complete.	The RAMP identifies POC wells.	10 years after completion of RA and/or restoration construction activities.
Montana Requirements, MCA § 75-5-303, ARM § 17.30.1006 and 17.30.1011.	Stage 1 Drawdown starts process of reducing arsenic loading to Milltown's alluvial aquifer so is not expected to result in spread of local groundwater arsenic plume. Drinking water wells within and downstream of the Project Area will be monitored and replacement clean water will be provided to users if exceedance of drinking water standards due to Stage 1 drawdown is observed.	Alluvial aquifer within and downstream of the Project Area (as that term is defined in CD).	During RA construction (including Stage 1 drawdown) and thereafter.
RAMP Warning Limits for Early Warning Wells	If exceedance of RAMP warning limits in groundwater wells is related to increase in surface water quality, control of the rate and degree of drawdown will be used to mitigate scour-related impacts to surface water quality.	The RAMP identifies Early Warning wells.	During RA construction including Stage 1 drawdown.
Surface Water Standards			
Federal Surface Water Quality Requirements, Clean Water Act, 33 U.S.C. §§ 1251, et seq.; State of Montana Surface Water Quality Requirements, Montana Quality Act, MCA § 75-5-101, et seq.; Federal Safe Drinking Water Act, 42 U.S.C. §§ 300f, et seq.; and implementing regulations.	EPA has invoked a waiver of MRSOU ambient surface water standards during construction activities.	USGS East Missoula sampling station.	After completion of all RA construction.
Temporary Surface Water Quality Standards	Control of the rate and degree of drawdown will be used to mitigate scour-related impacts to surface water quality.	USGS East Missoula sampling station.	During RA construction including Stage 1 drawdown.
RAMP Warning Limits for Downstream Surface Water	Control of the rate and degree of drawdown will be used to mitigate scour-related impacts to surface water quality.	USGS East Missoula sampling station.	During RA construction including Stage 1 drawdown.

Table 1
Milltown Reservoir Superfund Site
Performance Standards/Compliance During Stage 1 Drawdown

PERFORMANCE REQUIREMENTS CATEGORY	METHOD OF COMPLIANCE (How design achieves compliance)	POINT OF COMPLIANCE (POC)	TIME OF COMPLIANCE
Air Quality Standards			
Occupational Health and Safety Standards for exposure to arsenic, cadmium and lead; 29 CFR 1910.1018, -1025 and -1027.	Stage 1 drawdown does not include activities that could result in occupational exposures to arsenic, cadmium or lead in the air. Therefore, no further action is required for compliance.	Within the area of RD/RA activities.	During RD/RA.
LOCATION SPECIFIC REQUIREMENTS			
Floodplains			
Floodplain Management, 40 CFR § 6.302(b), and Executive Order No. 11988.	Stage 1 drawdown activities do not directly and physically affect a floodplain. Therefore, no further action is required for compliance.	Within the area of RD/RA activities.	During RD/RA.
Montana Floodplain and Floodway Management Act and Regulations, MCA § 76-5-401, et seq., ARM § 36.15.601, et seq.	Stage 1 drawdown activities do not directly and physically affect a floodplain. Therefore, no further action is required for compliance.	Within the area of RD/RA activities.	During RD/RA.
Montana Natural Streambed and Land Preservation Act and Regulations, MCA § 75-7-101 and ARM §§ 36.2.404, 405, and 406.	Stage 1 drawdown activities do not directly and physically affect any streambeds or banks. Therefore, no further action is required for compliance.	Within the area of RD/RA activities.	During RD/RA.
Endangered Species Act and Fish and Wildlife Coordination Act			
Endangered Species Act, 16 U.S.C. § 1531, 40 CFR § 6.302(h), 50 CFR Part 17 and 402; Fish and Wildlife Coordination Act, 16 U.S.C. §§ 1531, et seq., 40 CFR § 6.302(g).	BO bull trout protection requirements met by: • Developing/implementing BMPs for the Stage 1 drawdown; • Developing/implementing surface water monitoring plan; • Developing/implementing contingency plan if surface water quality standards or warning limits are exceeded; • Reporting surface water quality results to FWS; and • Reporting dead, injured or sick bull trout or destruction of redds to FWS.	Within area affected by RA.	During implementation of RD/RA.

Table 1
Milltown Reservoir Superfund Site
Performance Standards/Compliance During Stage 1 Drawdown

PERFORMANCE REQUIREMENTS CATEGORY	METHOD OF COMPLIANCE (How design achieves compliance)	POINT OF COMPLIANCE (POC)	TIME OF COMPLIANCE
National Historic Preservation Act			
National Historic Preservation Act, 16 U.S.C. § 470, 40 CFR § 6.301(b), 36 CFR Part 800 (NHPA).	SDs settled NHPA or related historic preservation and mitigation obligations related to implementation of the RA under the terms of CD primarily by providing funding to EPA for implementation of their Historic Preservation and Mitigation Plan. Section 3.2.6 of the SOW identified the specific remaining mitigation measure responsibilities of the SDs, none of which are applicable to Stage 1A activities.	Within the area of RD/RA activities.	Complete.
Archaeological and Historic Preservation Act			
Archaeological and Historic Preservation Act, 16 U.S.C. § 469, 40 CFR 6.301(c).	Stage 1 drawdown is not anticipated to result in the destruction of historic and/or archeological data. Therefore, no further action is required for compliance.	Within the area of RD/RA activities.	During RD/RA.
Historic Sites, Buildings and Antiquities Act, 16 U.S.C. § 461, et seq., 40 CFR § 6.301(a).	Stage 1 drawdown is not anticipated to result in undesirable impacts to landmarks. Therefore, no further action is required for compliance.	Within the area of RD/RA activities.	During RD/RA.
Protection of Wetlands			
Protection of Wetlands, 40 CFR Part 6, Appendix A, Executive Order No. 11990.	Compliance with Step 3 has been achieved through mapping the existence and category of, and evaluating RA impacts on, existing wetlands. Loss of wetlands from Stage 1 drawdown will be replaced along reconstructed rivers after RA. Any net loss of wetlands at MRSOU will be accounted for basin wide in Step 4.	At the specific jurisdiction wetland location.	Immediately after completion of RD/RA and restoration activities.

Table 1
Milltown Reservoir Superfund Site
Performance Standards/Compliance During Stage 1 Drawdown

PERFORMANCE REQUIREMENTS CATEGORY	METHOD OF COMPLIANCE (How design achieves compliance)	POINT OF COMPLIANCE (POC)	TIME OF COMPLIANCE
Migratory Bird Treaty Act			
Migratory Bird Treaty Act, 16 U.S.C. §§ 703, et seq.	The Stage 1 drawdown will not adversely impact migratory birds. Therefore, no further action is required.	No additional action required.	During RD/RA.
Bald Eagle Protection Act			
Bald Eagle Protection Act, 16 U.S.C. §§ 668, et seq.	The nearest bald eagle nest is approximately 2 miles from the dam and would not be disturbed by construction activities centered at the dam. Potential TSS increases in CFR which could influence bald eagle sight recognition of prey will be addressed by scour BMPs.	Within the area of RD/RA activities.	During RD/RA.
Native American Graves and Repatriation Act			
Native American Graves and Repatriation Act, 25 U.S.C. § 3001, et seq.	Stage 1 drawdown will not result in any physical disturbance to lands that may contain Native American human remains or related objects.	Within the area of RD/RA activities.	During RD/RA.
ACTION SPECIFIC REQUIREMENTS			
Air Requirements			
Montana Air Quality Regulations, ARM § 17.8.220, -304, -308, and 17.24.761. ARM § 17.8.220. ARM § 17.8.308 (2), (3), and (4). ARM § 17.8304(2). ARM § 17.24.761(2)(a), (e), (h), (j), and (k). Clean Air Act 42 U.S.C. §§ 7401, et seq.	If needed, standard construction best management practices, such as periodic wetting, will satisfy these requirements.	Within the area of RD/RA activities.	During RD/RA.
Water Requirements – Causing of Pollution			
MCA § 75-5-605	EPA has invoked a waiver of MRSOU ambient surface water standards during construction	USGS East Missoula sampling station.	During RD/RA.

Table 1
Milltown Reservoir Superfund Site
Performance Standards/Compliance During Stage 1 Drawdown

PERFORMANCE REQUIREMENTS CATEGORY	METHOD OF COMPLIANCE (How design achieves compliance)	POINT OF COMPLIANCE (POC)	TIME OF COMPLIANCE
	activities. Scour mitigation BMPs will be developed and used to ensure compliance with temporary standards.		
Storm Water Runoff			
ARM § 17.24.633	As discussed in the Stage 1B PDR planned storm water management construction BMPs (i.e., sedimentation pond treatment prior to discharge, erosion controls in disturbed areas to control run-on/run-off, etc.) will be implemented as ground-disturbing construction activities are initiated to prevent surface water quality impacts due to surface drainage from disturbed areas. However, since ground-disturbing construction activities are not anticipated as part of the Stage 1A RA, storm water runoff controls are not anticipated to be needed during Stage 1A.	Within the area of RD/RA activities.	During RD/RA.
Montana Noxious Weed Control Requirements			
Noxious Weeds, MCA 7-22-2101(7)(a) and ARM 4.5.201, et seq.	.Weed control is not anticipated to become an issue until site reclamation activities commence in Stage 3C (at which time a weed control plan will be formulated in consultation with the Missoula County Weed Control Agent). However, if weeds become a problem during Stage 1A construction mowing or herbicide application will be used to temporarily control them.	Within the area of RD/RA activities.	During RD/RA and post-RA monitoring and maintenance (M&M).
Federal RCRA Subtitle D Solid Waste Requirements			
40 CFR 257.3-1(a), Floodplains.	No solid wastes are being generated, actively	No further action required.	During RD/RA.

Table 1
Milltown Reservoir Superfund Site
Performance Standards/Compliance During Stage 1 Drawdown

PERFORMANCE REQUIREMENTS CATEGORY	METHOD OF COMPLIANCE (How design achieves compliance)	POINT OF COMPLIANCE (POC)	TIME OF COMPLIANCE
	managed, or disposed as part of the Stage 1 drawdown RA. Therefore, no further action is anticipated to comply with these requirements.		
40 CFR 257.3-3, Surface Water	There will be no point source discharges from Stage 1 drawdown activities to state or U.S. surface water. BMPs will ensure that there will be no impact to surface water from runoff.	Within the area of RD/RA activities.	During RD/RA and M&M.
Montana Solid Waste Management Act			
ARM 17.50.505 (Facility Standards). ARM 17.50.510 (O&M and Design). MCA § 75-10-212 and ARM 17.50.523 (Transportation)	No solid wastes will be generated by Stage 1 drawdown. Therefore, no further action is anticipated to comply with these requirements.	No further action required.	During RD/RA and M&M.
Montana Strip and Underground Mine Reclamation Act			
MCA 82-4-231. MCA 82-4-233	Stage 1 drawdown activities do not include reclamation or revegetation. Therefore, no further action is required for compliance.	No further action required.	During RD/RA.
Safety of Water Power Projects and Projects Works			
18 CFR Part 12	Operation and monitoring of the dam and if applicable response/notification in the unlikely event potentially hazardous situation develops or a failure has occurred/is imminent, will continue during Stage 1 drawdown in compliance with substantive requirements of 18 CFR Part 12 and/or the dam's current operating plan.	Milltown Dam.	During RD/RA.

FIGURES

Figure 1
Site Location Map
Milltown Reservoir Sediments Site

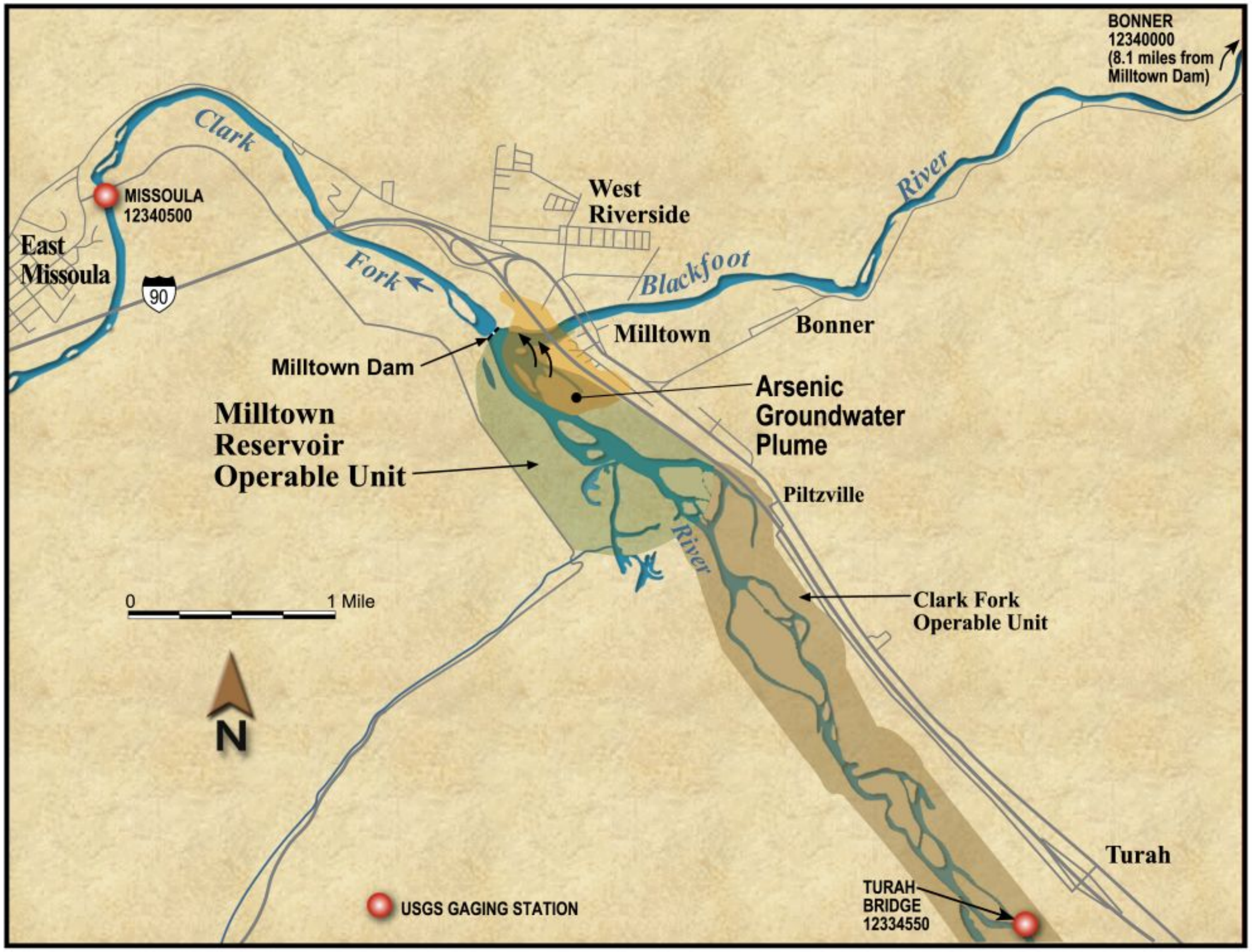
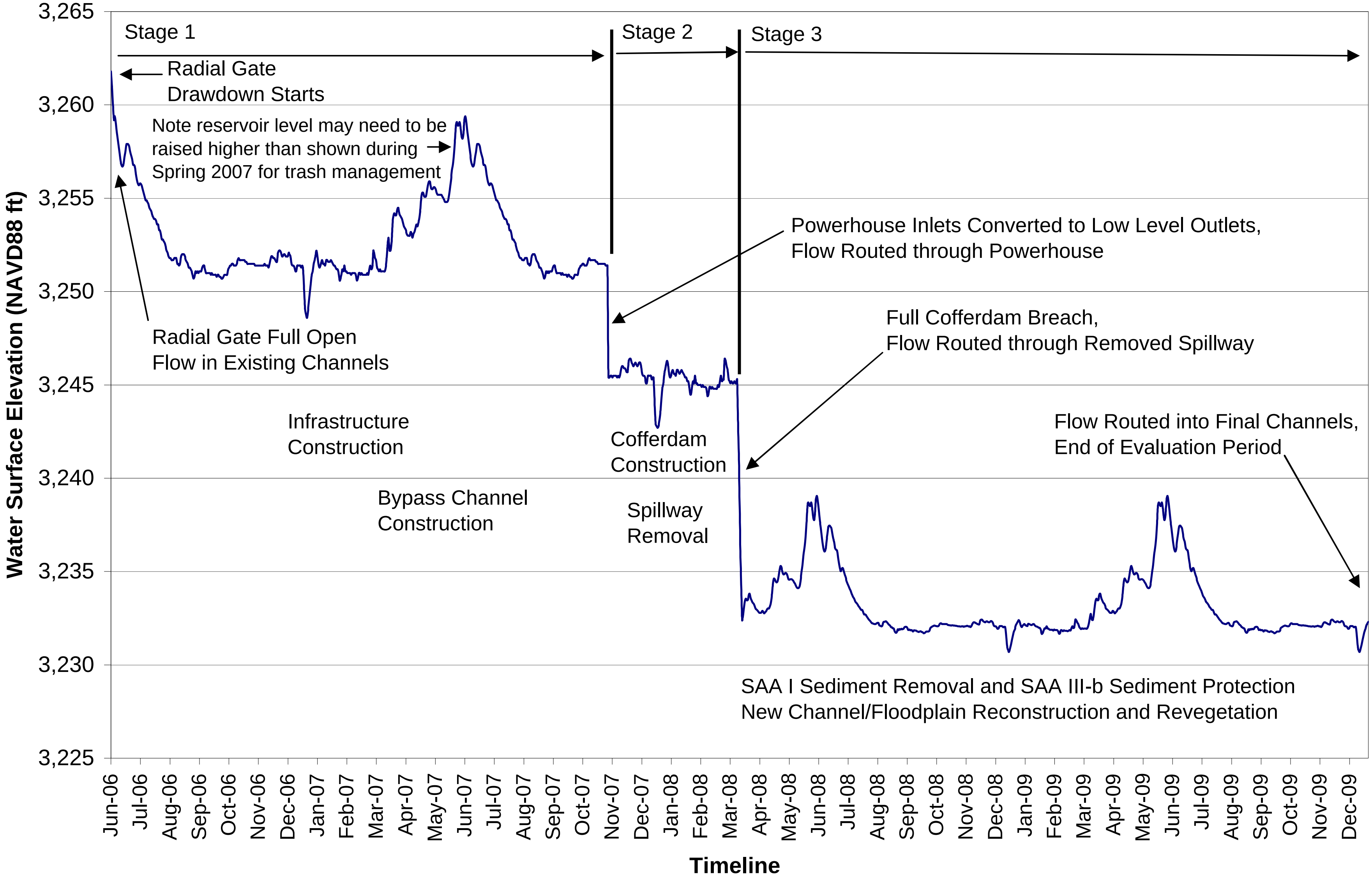
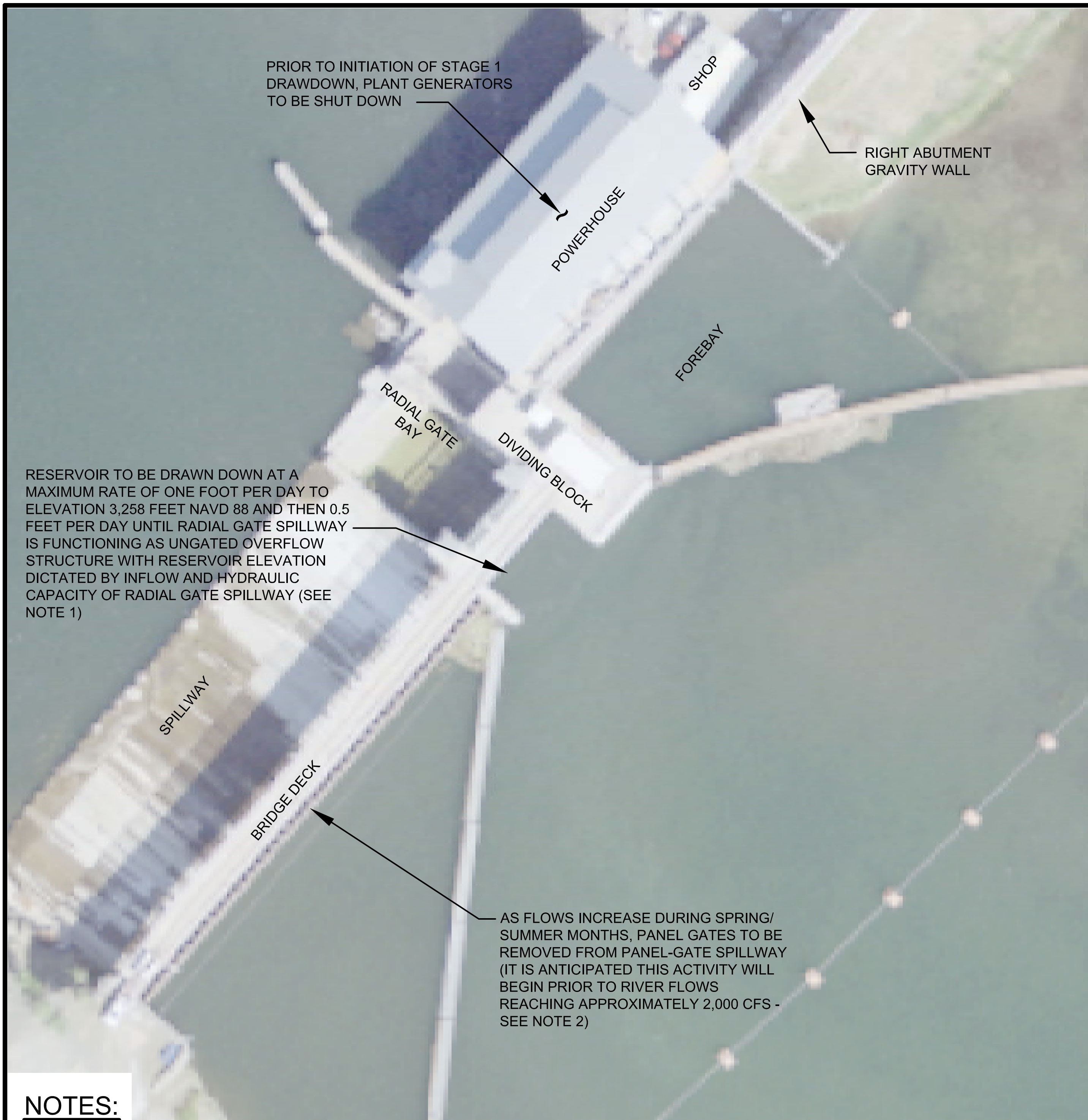


Figure 2
Milltown Reservoir Predicted Water Surface Elevation at Dam during Stages 1, 2 and 3 Drawdown under Average Annual Flow Conditions



Notes: 1) Based on 1999 hydrograph, an average flow year. 2) Stage 1 water levels assume intermediate spillway stanchions left in but panel gates removed.

J:\Projects\Milltown RD-RA\T36 Stage 1A RD\PDR\2006\February 7, 2006 ARC Submittal\Figures\Backup\Rev staging radial gate full open June 06 start, Oct 07 St2, Dec 09 end|Staging Figure



NOTES:

1. STAGE 1 DRAWDOWN INITIATION WILL BE COORDINATED WITH FLOW CONDITIONS AND WILL PREFERABLY BEGIN DURING SEASONAL PEAK FLOW CONDITIONS WHICH TYPICALY OCCUR IN LATE MAY/EARLY JUNE 2006 TO MAXIMIZE SCOUR DILUTION. DRAWDOWN WILL BE INITATED USING THE RADIAL GATE SPILLWAY.

2. DEPENDING ON TIMING OF STAGE 1 DRAWDOWN AGENCY APPROVAL AND FLOW CONDITIONS AT THAT TIME, PANEL-GATE SPILLWAY PANEL REMOVAL MAY BEGIN PRIOR TO, CONCURRENT WITH, OR AFTER INITIATION OF STAGE 1 RADIAL GATE DRAWDOWN. THE PANELS IN THE PANEL-GATE SPILLWAY COULD BE REINSTALLED AFTER INITIATION OF STAGE 1 DRAWDOWN IF THERE ARE SITUATIONS, SUCH AS ICE FLOE EVENTS, TRASH MANAGEMENT REQUIREMENTS, OR CONSTRUCTION PROBLEMS THAT NECESSITATE INCREASING THE RESERVOIR ELEVATION OR AS A BEST MANAGEMENT PRACTICE FOR SCOUR IF DOWNSTREAM WATER QUALITY LIMITS ARE EXCEEDED.

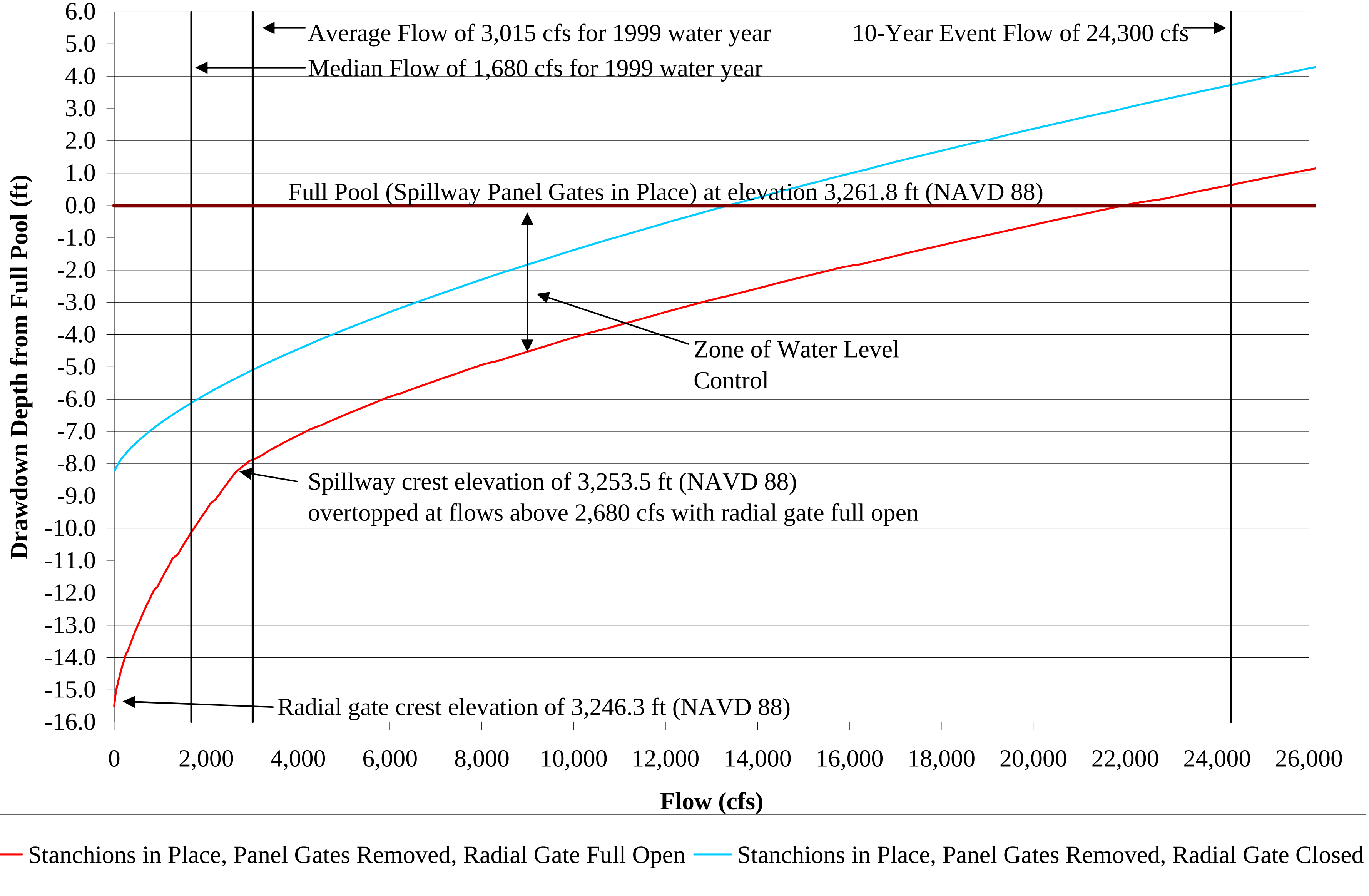
DRAFT

SCALE IN FEET

60 0 60

Drawn: GJR	FIGURE 3	CONCEPTUAL OVERVIEW OF MILLTOWN DAM OPERATION PLAN FOR STAGE 1 DRAWDOWN MILLTOWN RESERVOIR SEDIMENTS SITE	ENVIROCON 101 INTERNATIONAL WAY MISSOULA, MONTANA 59808
Checked: TLW			
Approved: DGB			
Date: 05-25-06	ISSUED FOR: DRAFT FINAL DESIGN REPORT STAGE 1 REMEDIAL DESIGN ELEMENT 1 - RESERVOIR DRAW DOWN AND SCOUR MITIGATION	Revision: 3	
Dwg. # BC1089-A269			

Figure 4
Reservoir Water Level Control During Stage 1 Drawdown



APPENDIX A

Supplemental Scour Modeling for Spring 2006 Drawdown

Purpose

The purpose of this calculation brief was to evaluate a spring rather than fall, start of Stage 1 drawdown timing and to select a drawdown initiation timeframe that mitigates the potential for exceedances of water quality standards/warning limits to increase confidence in being able to maintain a maximum summer/fall Stage 1 drawdown level. HEC-6 scour modeling was used to estimate and compare Total Suspended Solids (TSS) concentrations and mass scoured predicted under a range of drawdown initiation dates and corresponding flows. The drawdown start date simulations were the following:

- June 1, 2006, which based on historical flows should approximately coincide with peak flow conditions (approximately 11,500 cubic feet per second (cfs) flow assuming the 2006 water year hydrograph parallels the 1999 water year, an average year);
- June 15, 2006, on the receding limb of hydrograph (approximately 9,000 cfs flow assuming the 1999 water year hydrograph);
- July 1, 2006, on the receding limb of hydrograph (approximately 6,000 cfs flow assuming the 1999 water year hydrograph); and
- July 15, 2006, on the receding limb of hydrograph (approximately 3,000 cfs flow assuming the 1999 water year hydrograph).

Drawdown initiation dates in advance of peak flow were not evaluated because it is assumed the greater potential for trash to be entrained in the flow during the rising limb of the hydrograph makes an earlier drawdown start more difficult from a dam operational standpoint.

Methods

The previously developed HEC-6 reservoir scour model from "Milltown Reservoir Dry Removal Scour Evaluation Addendum 1" (Addendum 1, Envirocon, 2004) was used to predict TSS concentrations at the USGS Clark Fork River (CFR) above Missoula gage. TSS concentrations from Reservoir scour represent the difference in concentration of outflowing TSS concentration (based on suspended sediment load passing the cross section closest to the CFR above Missoula gage) and inflowing TSS concentration (based on the sum of the suspended sediment load at the upstream boundaries of the model located near the CFR at Turah gage and the Blackfoot River [BFR] near Bonner gage).

For comparison, TSS concentrations for all four scenarios were modeled using the same hydrograph, an average flow year (Water Year 1999), which is a reasonable anticipation for 2006 based on current conditions of average snow pack. One foot per day drawdown until full Stage 1 drawdown was modeled with drawdown water surface elevations based on radial gate full open, stanchions left in place, and panel gates removed. The radial gate full open condition allows more than a 10-foot drawdown at flows below approximately 1,700 cfs.

Addendum 1 sensitivity analysis of the 2002 drawdown (which was similar in amount of drawdown to what is anticipated during the Stage 1 summer/fall drawdown) showed the model overpredicted the 2002 drawdown measured TSS concentrations by 21 to 225 mg/L. To account for the model's apparent overprediction of TSS concentrations during this past drawdown, the predicted TSS results for the average monthly TSS concentrations during the Stage 1 drawdown were adjusted using the regression equation derived from Figure A-1-1 of Attachment A, which plots measured against modeled TSS concentrations during the 2002 drawdown.

Model simulations were compared by evaluating differences in estimated mass of TSS scoured and predicted average monthly TSS concentrations during the following summer/fall user season between the modeled scenarios. A statistical analysis using a paired t-test was performed to evaluate whether differences in average August model predicted TSS concentration between the four start date simulations were significant (see Table A-1-1 of Attachment A-1). Backup TSS Concentration and Mass Scoured Calculation Spreadsheet are included in Attachment A-2.

Results

Table A-1 summarizes the estimated average monthly incremental downstream TSS concentrations generated from scour of reservoir sediment, average monthly drawdown, and the predicted mass of TSS scoured under the four drawdown initiation simulations. The optimal drawdown initiation date appears to be on, or before, peak flow where, as demonstrated for a June 1st start date, the majority of the total predicted Stage 1 scour occurs during the above-average-flow period, which typically extends through July 15th. During this period the model predicts scour of approximately 135,000 tons, or 53% of the total TSS released during Stage 1, with an adjusted average August TSS concentration of 43 mg/L (while the statistical analysis (Table A-1-1) revealed no significant difference in average August TSS concentrations between June 1 and June 15 start dates, the mass of TSS scoured during high flow conditions for the June 15 start date drops to 38% of total Stage 1 TSS released). The adjusted average TSS concentration for the 2006 July 1 through October 19 user season under a June 1st start was estimated to be slightly below the long-term seasonal 86 mg/L construction related standard. However, based on TSS to turbidity relationships developed by EPA from data collected during the 2002 drawdown, the Stage 1 drawdown modeling does predict the potential for exceeding the 12 NTU turbidity warning limit periodically during the user season particularly under lower flow conditions where the amount of drawdown exceeds 10 feet under a radial gate full open scenario.

Discussion

Based on model predictions, Stage 1 drawdown should be initiated on, or before, the occurrence of peak flow (typically occurring in early June) to gain the benefits of allowing sufficient scour during high flow conditions to provide greater confidence that water quality standards/warning limits wouldn't be exceeded and therefore maximum Stage 1 drawdown levels could be maintained during the following summer/fall user season. Operation of Stage 1 drawdown will be performed in a manner to avoid exceedance of all the temporary construction related water quality standards and/or warning limits, if at all possible. However, if monitoring demonstrates exceedances, appropriate additional sediment control BMPs and treatment, if necessary, as specified in the contingency plan will be evaluated and implemented as directed by EPA, in consultation with the State.

References

Envirocon, 2004. "Milltown Reservoir Dry Removal Scour Evaluation Addendum 1 Proposed Plan Updated Scour Evaluation," prepared by EMC^2 for Envirocon, October.

Table A-1
Predicted User Season Total Suspended Solids (TSS) Concentrations from Reservoir Scour for Different Assumed Start Dates of Stage 1 Drawdown

				User Season Average Drawdown and TSS Concentrations									
				July		August		September		October		User Season	
Assumed Drawdown Start Date	Approximate Flow (cfs)	Mass TSS Scoured through 7/15 (tons)	% of TSS Released during Stage 1	Average Drawdown (feet)	Adjusted Average TSS (mg/L) [1]	Average Drawdown (feet)	Adjusted Average TSS (mg/L) [1]	Average Drawdown (feet)	Adjusted Average TSS (mg/L) [1]	Average Drawdown (feet)	Adjusted Average TSS (mg/L) [1]	Average Drawdown (feet)	Adjusted Average TSS (mg/L) [1]
6/1	11,500	134,972	53%	7.9	65	10.3	43	10.8	95	10.3	57	9.8	66
6/15	9,000	93,794	38%	7.9	104	10.3	51	10.8	91	10.3	75	9.8	81
7/1	6,000	22,761	10%	7.1	65	10.3	104	10.8	101	10.3	30	9.5	80
7/15	3,000	0	0%	6.4	63	10.3	88	10.8	116	10.3	46	8.6	84

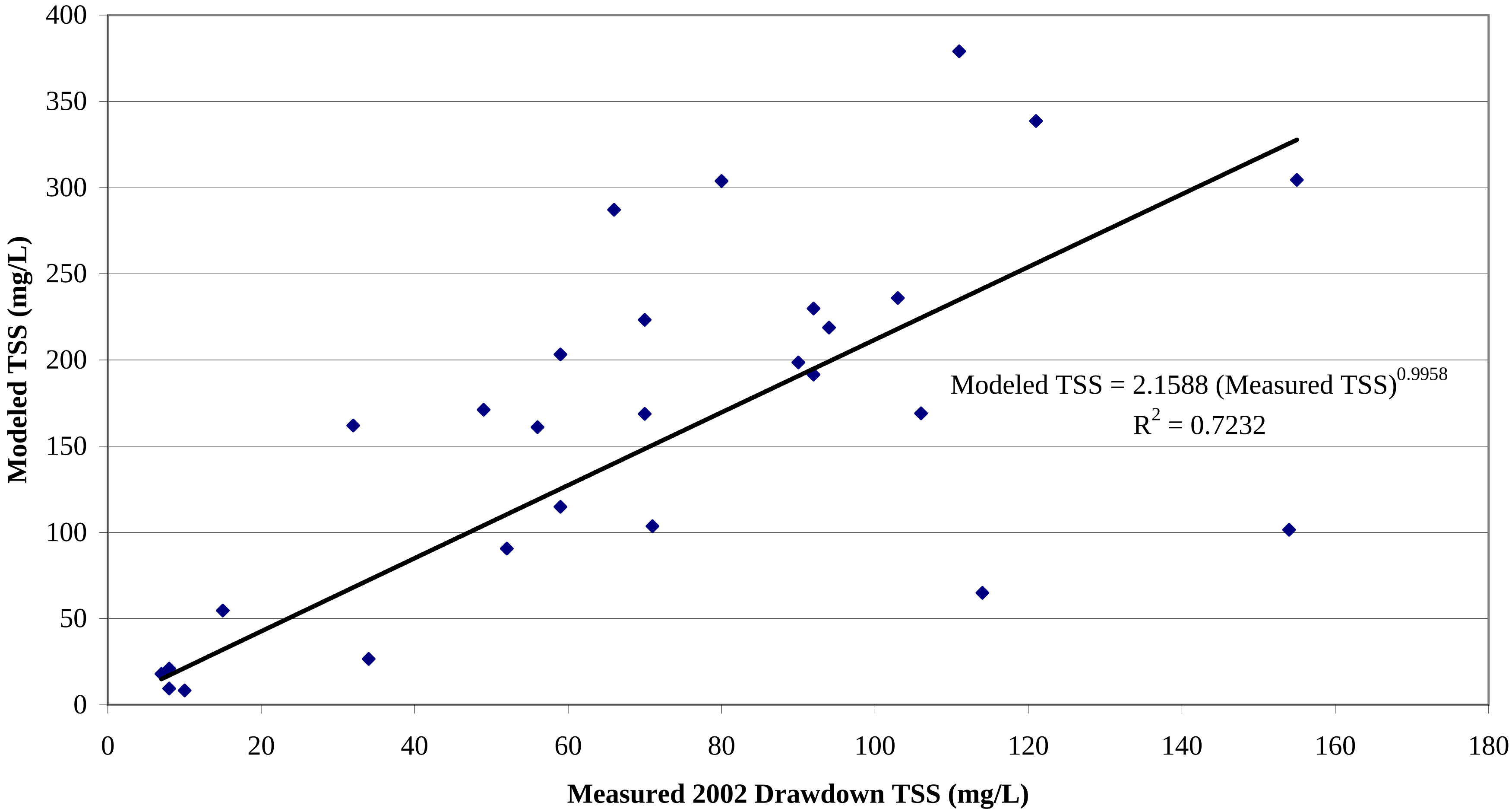
Notes:

1. Adjusted based on model overpredictions of 2002 Drawdown measured TSS concentrations. Adjustment based on regression analysis between measured TSS and model predicted TSS (Power fit trendline with $R^2 = 0.7232$).
2. For Drawdown and TSS, July average for the July 15th start date averaged from July 15th-31st; October averaged through the used season, October 1st -19th.
3. Scour analysis based on flow hydrograph for an average flow year (Water Year 1999)
4. From start date model assumes dam is operated to achieve 1 foot per day drop in reservoir water level elevation until radial gate is full open

Attachment A-1

Supplemental Calculations and Statistical Analyses

Figure A-1-1
Accuracy of Model Predictions from the Addendum 1 2002 Sensitivity Analysis - August Drawdown Period



I:\Projects\Milltown RD-RA\T36 Stage 1 Drawdown Design\PDR\February 3, 2006 ARC Submittal\Appendix A Scour Modeling for Spring 06 Drawdown\2002 sensitivity analysis.xls Fig Drawdown

Table A-1-1
Statistical Analysis of August TSS Concentrations

t-Tests are used to determine whether two samples are likely to have come from the same two underlying populations that have the same mean.A paired t-test is used to compare means on the same or related subject over time or in differing circumstances. Null hypothesis: 6/1 start date yeilds lower mean than other start dates.

t-Test: Paired Two Sample for Means

	6/1 Start	*6/15 Start*
Mean	90.59408043	109.20763
Variance	4453.263878	3219.5804
Observations	31	31
Pearson Correlation	-0.039642337	
Hypothesized Mean Difference	0	
df	30	
t Stat	-1.160640458	
P(T<=t) one-tail	0.127470516	
t Critical one-tail	1.697260851	
P(T<=t) two-tail	0.254941031	
t Critical two-tail	2.042272449	

If t Stat <- t Crit, then significant difference in the means

Result:
No Significant Difference

t-Test: Paired Two Sample for Means

	6/1 Start	*7/1Start*
Mean	90.59408043	219.35299
Variance	4453.263878	6121.8023
Observations	31	31
Pearson Correlation	-0.168330443	
Hypothesized Mean Difference	0	
df	30	
t Stat	-6.455441967	
P(T<=t) one-tail	1.96647E-07	
t Critical one-tail	1.697260851	
P(T<=t) two-tail	3.93295E-07	
t Critical two-tail	2.042272449	

If t Stat <- t Crit, then significant difference in the means

Result:
Significant Difference

t-Test: Paired Two Sample for Means

	6/1 Start	*7/15 Start*
Mean	90.59408043	186.09421
Variance	4453.263878	4231.6263
Observations	31	31
Pearson Correlation	-0.376400931	
Hypothesized Mean Difference	0	
df	30	
t Stat	-4.863506667	
P(T<=t) one-tail	1.7122E-05	
t Critical one-tail	1.697260851	
P(T<=t) two-tail	3.42441E-05	
t Critical two-tail	2.042272449	

If t Stat <- t Crit, then significant difference in the means

Result:
Significant Difference

Attachment A-2

Backup TSS Concentration and Mass Scoured Calculation Spreadsheet

Option 1 Radial Gate Full Open

6/1

Sediment Scoured by reach Sediment Scoured (tons)

Location	Stations	July 15 Time Step 75			Warmup Time Step 30			Net			
		Sand	Silt/Clay	Total	Sand	Silt/Clay	Total	Sand	Silt/Clay	**Total**	
Reservoir (Milltown Dam to Duck Bridge)	364.44-365.38 - TRIB	25883	41876	122275	2275	8972	1006	23608	32904	**56512**	
Blackfoot (Milltown Dam to I-90)	0.00-0.21-TRIB	25175	24098	163830	12319	17645	31276	12856	6453	**19309**	
Blackfoot (I-90 to Stimson Dam)	0.21-1.16	13281	31315	270099	-4903	1722	-6237	18184	29593	**47777**	**Total at Dam**
Blackfoot (Stimson Dam to BFR near Bonner)	1.16-Inflow	20341	14289	90111	13186	12639	23376	7155	1650	**8805**	
Upper Clark Fork (Duck Bridge to Turah)	(365.38-Inflow)	-70	6768	18971	646	3483	14132	-716	3285	**2569**	**134972**
Downstream	361.66-364.44	-14992	8831	-83926	-2681	8777	58974	-12311	54	**-12257**	
	Total	**69618**	**127177**	**581360**	**20842**	**53238**	**122527**	**48776**	**73939**	**122715**	

Location	Stations	End of Stage 1			Net			
		Sand	Silt/Clay	Total	Sand	Silt/Clay	**Total**	
Reservoir (Milltown Dam to Duck Bridge)	364.44-365.38 - TRIB	60435	99709	122275	58160	90737	**148897**	
Blackfoot (Milltown Dam to I-90)	0.00-0.21-TRIB	28656	29078	163830	16337	11433	**27770**	
Blackfoot (I-90 to Stimson Dam)	0.21-1.16	17174	39573	270099	22077	37851	**59928**	**Total at Dam**
Blackfoot (Stimson Dam to BFR near Bonner)	1.16-Inflow	25536	14824	90111	12350	2185	**14535**	
Upper Clark Fork (Duck Bridge to Turah)	(365.38-Inflow)	-606	8855	18971	-1252	5372	**4120**	**255250**
Downstream	361.66-364.44	-12628	8832	-83926	-9947	55	**-9892**	
	Total	**118567**	**200871**	**581360**	**97725**	**147633**	**245358**	

Percent of Stage 1: 53%

6/15

Sediment Scoured by reach Sediment Scoured (tons)

Location	Stations	July 15 Time Step 61			Warmup Time Step 30			Net			
		Sand	Silt/Clay	Total	Sand	Silt/Clay	Total	Sand	Silt/Clay	**Total**	
Reservoir (Milltown Dam to Duck Bridge)	364.44-365.38 - TRIB	12181	24819	122275	-1335	2775	1006	13516	22044	**35560**	
Blackfoot (Milltown Dam to I-90)	0.00-0.21-TRIB	25246	32718	163830	13814	19233	31276	11432	13485	**24917**	
Blackfoot (I-90 to Stimson Dam)	0.21-1.16	2980	17793	270099	-4949	507	-6237	7929	17286	**25215**	**Total at Dam**
Blackfoot (Stimson Dam to BFR near Bonner)	1.16-Inflow	17084	13864	90111	12076	12714	23376	5008	1150	**6158**	
Upper Clark Fork (Duck Bridge to Turah)	(365.38-Inflow)	3875	4376	18971	2825	3482	14132	1050	894	**1944**	**93794**
Downstream	361.66-364.44	-7022	8861	-83926	-1086	8846	58974	-5936	15	**-5921**	
	Total	**54344**	**102431**	**581360**	**21345**	**47557**	**122527**	**32999**	**54874**	**87873**	

Location	Stations	End of Stage 1			Net			
		Sand	Silt/Clay	Total	Sand	Silt/Clay	**Total**	
Reservoir (Milltown Dam to Duck Bridge)	364.44-365.38 - TRIB	57015	87079	122275	58350	84304	**142654**	
Blackfoot (Milltown Dam to I-90)	0.00-0.21-TRIB	24286	44190	163830	10472	24957	**35429**	
Blackfoot (I-90 to Stimson Dam)	0.21-1.16	12155	34514	270099	17104	34007	**51111**	**Total at Dam**
Blackfoot (Stimson Dam to BFR near Bonner)	1.16-Inflow	24805	14838	90111	12729	2124	**14853**	
Upper Clark Fork (Duck Bridge to Turah)	(365.38-Inflow)	4321	6929	18971	1496	3447	**4943**	**248990**
Downstream	361.66-364.44	-9121	8861	-83926	-8035	15	**-8020**	
	Total	**113461**	**196411**	**581360**	**92116**	**148854**	**240970**	

Percent of Stage 1: 38%

7/1

Sediment Scoured by reach

Sediment Scoured (tons)

Location	Stations	July 15 Time Step 45 Sand	July 15 Time Step 45 Silt/Clay	July 15 Time Step 45 Total	Warmup Time Step 30 Sand	Warmup Time Step 30 Silt/Clay	Warmup Time Step 30 Total	Net Sand	Net Silt/Clay	**Net Total**	
Reservoir (Milltown Dam to Duck Bridge)	364.44-365.38 - TRIB	224	9330	122275	-1496	2459	1006	1720	6871	**8591**	
Blackfoot (Milltown Dam to I-90)	0.00-0.21-TRIB	15778	21548	163830	13141	17885	31276	2637	3663	**6300**	
Blackfoot (I-90 to Stimson Dam)	0.21-1.16	-5492	2135	270099	-6729	483	-6237	1237	1652	**2889**	**Total at Dam**
Blackfoot (Stimson Dam to BFR near Bonner)	1.16-Inflow	13262	13051	90111	11487	12436	23376	1775	615	**2390**	
Upper Clark Fork (Duck Bridge to Turah)	(365.38-Inflow)	4592	4403	18971	2921	3483	14132	1671	920	**2591**	**22761**
Downstream	361.66-364.44	-2049	8863	-83926	-1008	8817	58974	-1041	46	**-995**	
	Total	**26315**	**59330**	**581360**	**18316**	**45563**	**122527**	**7999**	**13767**	**21766**	

Location	Stations	End of Stage 1 Sand	End of Stage 1 Silt/Clay	End of Stage 1 Total	Net Sand	Net Silt/Clay	**Net Total**		
Reservoir (Milltown Dam to Duck Bridge)	364.44-365.38 - TRIB	48239	77977	122275	49735	75518	**125253**		
Blackfoot (Milltown Dam to I-90)	0.00-0.21-TRIB	20659	37167	163830	7518	19282	**26800**		
Blackfoot (I-90 to Stimson Dam)	0.21-1.16	16484	32521	270099	23213	32038	**55251**	**Total at Dam**	
Blackfoot (Stimson Dam to BFR near Bonner)	1.16-Inflow	23364	14812	90111	11877	2376	**14253**		
Upper Clark Fork (Duck Bridge to Turah)	(365.38-Inflow)	4236	6653	18971	1315	3170	**4485**	**226042**	
Downstream	361.66-364.44	-9045	8863	-83926	-8037	46	**-7991**		
	Total	**103937**	**177993**	**581360**	**85621**	**132430**	**218051**	**Percent of Stage 1:**	**10%**

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
31	6/1/2006	11500.0	2710.41	0.03	1142.85	201.68	1135.95	0	0	0	2278.8	431.61	73.5	87.4	13.9
32	6/2/2006	11200.0	3591.51	0.02	1137.6	200.75	1036.02	0	0	0	2173.62	1417.89	72.0	118.9	46.9
33	6/3/2006	11900.0	3875.61	0.03	1289.78	227.6	1184.39	0	0	0	2474.17	1401.44	77.1	120.8	43.7
34	6/4/2006	14000.0	14194.39	0.08	2122.27	374.52	1547.58	0	0	0	3669.85	10524.54	97.2	375.9	278.7
35	6/5/2006	14400.0	23403.38	0.09	2227.62	393.11	1685.69	0	0	0	3913.31	19490.07	100.8	602.6	501.9
36	6/6/2006	13500.0	8194.65	0.07	1857.11	327.73	1482.92	0	0	0	3340.03	4854.62	91.7	225.1	133.3
37	6/7/2006	12300.0	7569.34	0.05	1488.51	262.68	1207.54	0	0	0	2696.05	4873.29	81.3	228.2	146.9
38	6/8/2006	11100.0	5219.49	0.04	1190.77	210.13	973.35	0	0	0	2164.12	3055.37	72.3	174.4	102.1
39	6/9/2006	10300.0	4091.21	0.02	1045.23	184.45	832.66	0	0	0	1877.89	2213.32	67.6	147.3	79.7
40	6/10/2006	9300.0	3596	0	823.79	145.37	657.48	0	0	0	1481.27	2114.73	59.1	143.4	84.3
41	6/11/2006	8400.0	4032.64	0	635.98	0	514.7	0	0	0	1150.68	2881.96	50.8	178.0	127.2
42	6/12/2006	7790.0	3825.55	0	537.03	0	436.68	0	0	0	973.71	2851.84	46.3	182.1	135.7
43	6/13/2006	7560.0	3310.83	0	494.25	0	421.31	0	0	0	915.56	2395.27	44.9	162.4	117.5
44	6/14/2006	7870.0	5390.85	0	506.35	0	491.31	0	0	0	997.66	4393.19	47.0	254.0	207.0
45	6/15/2006	8760.0	3052.99	0	561.72	0	722.69	0	0	0	1284.41	1768.58	54.4	129.2	74.9
46	6/16/2006	9530.0	4199.77	0	642.78	0	870.07	0	0	0	1512.85	2686.92	58.9	163.4	104.5
47	6/17/2006	10400.0	4242.74	0.01	832.63	146.93	982.44	0	0	0	1815.07	2427.67	64.7	151.3	86.6
48	6/18/2006	10500.0	9181.56	0.01	823.79	145.37	1019.88	0	0	0	1843.67	7337.89	65.1	324.2	259.1
49	6/19/2006	10400.0	3920.53	0.01	797.56	140.75	1007.19	0	0	0	1804.75	2115.78	64.3	139.8	75.4
50	6/20/2006	10200.0	5120.58	0.01	776.07	136.95	961.41	0	0	0	1737.48	3383.1	63.2	186.1	123.0
51	6/21/2006	9510.0	3908.04	0	656.73	0	854.82	0	0	0	1511.55	2396.49	58.9	152.4	93.4
52	6/22/2006	8940.0	5817.38	0	588.06	0	759.44	0	0	0	1347.5	4469.88	55.9	241.3	185.4
53	6/23/2006	8590.0	2573.24	0	558.9	0	661.18	0	0	0	1220.08	1353.16	52.7	111.1	58.4
54	6/24/2006	7910.0	2374.12	0	480.26	0	535.97	0	0	0	1016.23	1357.89	47.6	111.3	63.7
55	6/25/2006	7770.0	4065.86	0	445.3	0	542.15	0	0	0	987.45	3078.41	47.1	194.0	146.9
56	6/26/2006	7650.0	3341.38	0	437.04	0	517.71	0	0	0	954.75	2386.63	46.3	162.0	115.7
57	6/27/2006	6900.0	2804.51	0	350.64	0	389.55	0	0	0	740.19	2064.32	39.8	150.7	110.9
58	6/28/2006	6270.0	3173.06	0	285.19	0	305.6	0	0	0	590.79	2582.27	34.9	187.7	152.7
59	6/29/2006	5820.0	2739.48	0	240.75	0	257.15	0	0	0	497.9	2241.58	31.7	174.5	142.8
60	6/30/2006	5620.0	2120.8	0	213.28	0	248.45	0	0	0	461.73	1659.07	30.5	139.9	109.5
61	7/1/2006	5890.0	3385.92	0	224.51	0	273.78	0	0	0	498.29	2887.63	31.4	213.2	181.8
62	7/2/2006	5900.0	2201.93	0	217.73	0	286.95	0	0	0	504.68	1697.25	31.7	138.4	106.7
63	7/3/2006	5610.0	1949.35	0	202.37	0	252.81	0	0	0	455.18	1494.17	30.1	128.8	98.8
64	7/4/2006	5290.0	2801.74	0	181.45	0	229.28	0	0	0	410.73	2391.01	28.8	196.4	167.6
65	7/5/2006	5030.0	3137.01	0	157.76	0	212.75	0	0	0	370.51	2766.5	27.3	231.3	203.9
66	7/6/2006	4710.0	2238.89	0	136.28	0	192.7	0	0	0	328.98	1909.91	25.9	176.3	150.4
67	7/7/2006	4500.0	2420.16	0	126.16	0	171.72	0	0	0	297.88	2122.28	24.5	199.4	174.9
68	7/8/2006	4290.0	1319.78	0	104.17	0	162.25	0	0	0	266.42	1053.36	23.0	114.1	91.0
69	7/9/2006	4100.0	1254.35	0	91.19	0	149.24	0	0	0	240.43	1013.92	21.7	113.4	91.7
70	7/10/2006	3950.0	1542.77	0	87.02	0	134.47	0	0	0	221.49	1321.28	20.8	144.8	124.0
71	7/11/2006	3710.0	1322.75	0	71.17	0	120.55	0	0	0	191.72	1131.03	19.2	132.2	113.0
72	7/12/2006	3540.0	764.1	0	62.71	0	109.6	0	0	0	172.31	591.79	18.0	80.0	62.0
73	7/13/2006	3430.0	2164.89	0	61.54	0	99.24	0	0	0	160.78	2004.11	17.4	234.0	216.7
74	7/14/2006	3290.0	1377.17	0	57.01	0	89.45	0	0	0	146.46	1230.71	16.5	155.2	138.7
75	7/15/2006	3120.0	1763.13	0	49.52	0	80.16	0	0	0	129.68	1633.45	15.4	209.5	194.1

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
76	7/16/2006	3020.0	1098.04	0	47.48	0	73.13	0	0	0	120.61	977.43	14.8	134.8	120.0
77	7/17/2006	2930.0	1006.95	0	47.48	0	65.64	0	0	0	113.12	893.83	14.3	127.4	113.1
78	7/18/2006	2810.0	755.5	0	41.63	0	60.93	0	0	0	102.56	652.94	13.5	99.7	86.2
79	7/19/2006	2720.0	872.36	0	44.51	0	52.07	0	0	0	96.58	775.78	13.2	118.9	105.8
80	7/20/2006	2650.0	872.11	0	44.51	0	47.26	0	0	0	91.77	780.34	12.8	122.0	109.2
81	7/21/2006	2530.0	1573.75	0	38.88	0	43.38	0	0	0	82.26	1491.49	12.1	230.7	218.6
82	7/22/2006	2530.0	2275.25	0	44.51	0	39.65	0	0	0	84.16	2191.09	12.3	333.5	321.1
83	7/23/2006	2410.0	924.2	0	39.78	0	35.32	0	0	0	75.1	849.1	11.6	142.2	130.6
84	7/24/2006	2250.0	765.93	0	31.99	0	32.15	0	0	0	64.14	701.79	10.6	126.2	115.7
85	7/25/2006	2260.0	1659.8	0	36.2	0	30.65	0	0	0	66.85	1592.95	11.0	272.3	261.4
86	7/26/2006	2200.0	800.58	0	35.33	0	28.97	0	0	0	64.3	736.28	10.8	134.9	124.1
87	7/27/2006	2110.0	530.92	0	32.81	0	27.11	0	0	0	59.92	471	10.5	93.3	82.8
88	7/28/2006	2010.0	861.01	0	29.58	0	25.37	0	0	0	54.95	806.06	10.1	158.8	148.7
89	7/29/2006	1940.0	604.23	0	28.03	0	23.94	0	0	0	51.97	552.26	9.9	115.5	105.6
90	7/30/2006	1870.0	440.83	0	26.53	0	22.59	0	0	0	49.12	391.71	9.7	87.4	77.7
91	7/31/2006	1800.0	324.8	0	22.98	0	22.03	0	0	0	45.01	279.79	9.3	66.9	57.6
92	8/1/2006	1730.0	279.86	0	19.72	0	21.49	0	0	0	41.21	238.65	8.8	60.0	51.2
93	8/2/2006	1710.0	264.64	0	19.08	0	21.23	0	0	0	40.31	224.33	8.7	57.4	48.6
94	8/3/2006	1690.0	303.74	0	20.34	0	20.18	0	0	0	40.52	263.22	8.9	66.6	57.8
95	8/4/2006	1680.0	635.58	0	20.84	0	19.69	0	0	0	40.53	595.05	8.9	140.3	131.3
96	8/5/2006	1680.0	301.34	0	21.17	0	19.56	0	0	0	40.73	260.61	9.0	66.5	57.5
97	8/6/2006	1710.0	463.14	0	25.02	0	18.89	0	0	0	43.91	419.23	9.5	100.4	90.9
98	8/7/2006	1740.0	790.24	0	22.98	0	20.44	0	0	0	43.42	746.82	9.3	168.4	159.1
99	8/8/2006	1730.0	1375.01	0	24.81	0	19.48	0	0	0	44.29	1330.72	9.5	294.7	285.2
100	8/9/2006	1610.0	1209.3	0	19.63	0	18.37	0	0	0	38	1171.3	8.8	278.5	269.8
101	8/10/2006	1580.0	853.02	0	19.76	0	17.55	0	0	0	37.31	815.71	8.8	200.2	191.4
102	8/11/2006	1550.0	904.25	0	18.83	0	17.18	0	0	0	36.01	868.24	8.6	216.3	207.7
103	8/12/2006	1580.0	494.2	0	19.46	0	17.67	0	0	0	37.13	457.07	8.7	116.0	107.3
104	8/13/2006	1780.0	384.33	0	28.19	0	19.59	0	0	0	47.78	336.55	10.0	80.1	70.1
105	8/14/2006	1810.0	297.82	0	28.03	0	20.44	0	0	0	48.47	249.35	9.9	61.0	51.1
106	8/15/2006	1820.0	335.93	0	31.17	0	19.63	0	0	0	50.8	285.13	10.3	68.4	58.1
107	8/16/2006	1830.0	406.94	0	34.4	0	18.89	0	0	0	53.29	353.65	10.8	82.5	71.7
108	8/17/2006	1780.0	367.34	0	33.73	0	17.8	0	0	0	51.53	315.81	10.7	76.5	65.8
109	8/18/2006	1700.0	333.51	0	29.91	0	16.96	0	0	0	46.87	286.64	10.2	72.7	62.5
110	8/19/2006	1630.0	209.79	0	26.53	0	16.32	0	0	0	42.85	166.94	9.7	47.7	38.0
111	8/20/2006	1600.0	241.63	0	26.61	0	15.54	0	0	0	42.15	199.48	9.8	56.0	46.2
112	8/21/2006	1510.0	184.11	0	21.91	0	14.97	0	0	0	36.88	147.23	9.1	45.2	36.2
113	8/22/2006	1500.0	305.49	0	22.1	0	14.66	0	0	0	36.76	268.73	9.1	75.5	66.4
114	8/23/2006	1450.0	414.79	0	20.01	0	14.22	0	0	0	34.23	380.56	8.8	106.1	97.3
115	8/24/2006	1430.0	479.42	0	19.95	0	13.75	0	0	0	33.7	445.72	8.7	124.3	115.6
116	8/25/2006	1290.0	344.68	0	5.08	0	13.69	0	0	0	18.77	325.91	5.4	99.1	93.7
117	8/26/2006	1220.0	253.99	0	1.34	0	13.42	0	0	0	14.76	239.23	4.5	77.2	72.7
118	8/27/2006	1250.0	153.22	0	4.07	0	12.98	0	0	0	17.05	136.17	5.1	45.5	40.4
119	8/28/2006	1400.0	297.02	0	20.07	0	12.99	0	0	0	33.06	263.96	8.8	78.7	69.9
120	8/29/2006	1340.0	108.46	0	16.05	0	13.16	0	0	0	29.21	79.25	8.1	30.0	21.9

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
121	8/30/2006	1410.0	181.03	0	19.95	0	13.28	0	0	0	33.23	147.8	8.7	47.6	38.9
122	8/31/2006	1380.0	158.58	0	18.35	0	13.17	0	0	0	31.52	127.06	8.5	42.6	34.1
123	9/1/2006	1420.0	192.3	0	21.56	0	12.92	0	0	0	34.48	157.82	9.0	50.2	41.2
124	9/2/2006	1400.0	446.26	0	20.21	0	12.93	0	0	0	33.14	413.12	8.8	118.2	109.4
125	9/3/2006	1420.0	266.06	0	21.43	0	12.98	0	0	0	34.41	231.65	9.0	69.5	60.5
126	9/4/2006	1500.0	227.05	0	24.09	0	13.95	0	0	0	38.04	189.01	9.4	56.1	46.7
127	9/5/2006	1530.0	338.82	0	26.4	0	13.9	0	0	0	40.3	298.52	9.8	82.1	72.3
128	9/6/2006	1530.0	518.61	0	28.35	0	13.28	0	0	0	41.63	476.98	10.1	125.7	115.6
129	9/7/2006	1480.0	796.03	0	27.06	0	12.51	0	0	0	39.57	756.46	9.9	199.4	189.5
130	9/8/2006	1360.0	348.85	0	20.16	0	12.03	0	0	0	32.19	316.66	8.8	95.1	86.3
131	9/9/2006	1380.0	814.15	0	21.72	0	11.93	0	0	0	33.65	780.5	9.0	218.8	209.7
132	9/10/2006	1340.0	680.24	0	19.72	0	11.73	0	0	0	31.45	648.79	8.7	188.2	179.5
133	9/11/2006	1350.0	865.56	0	21.43	0	11.34	0	0	0	32.77	832.79	9.0	237.7	228.7
134	9/12/2006	1340.0	659.81	0	21.52	0	11.08	0	0	0	32.6	627.21	9.0	182.6	173.6
135	9/13/2006	1290.0	343.68	0	17.99	0	11.23	0	0	0	29.22	314.46	8.4	98.8	90.4
136	9/14/2006	1340.0	249.6	0	21.3	0	11.14	0	0	0	32.44	217.16	9.0	69.1	60.1
137	9/15/2006	1330.0	379.29	0	21.17	0	10.97	0	0	0	32.14	347.15	9.0	105.7	96.8
138	9/16/2006	1330.0	369.4	0	21.91	0	10.71	0	0	0	32.62	336.78	9.1	103.0	93.9
139	9/17/2006	1300.0	437.93	0	20.91	0	10.37	0	0	0	31.28	406.65	8.9	124.9	116.0
140	9/18/2006	1290.0	310.73	0	20.6	0	10.27	0	0	0	30.87	279.86	8.9	89.3	80.4
141	9/19/2006	1260.0	1754.04	0	18.83	0	10.21	0	0	0	29.04	1725	8.5	516.2	507.6
142	9/20/2006	1290.0	1078.08	0	20.66	0	10.24	0	0	0	30.9	1047.18	8.9	309.9	301.0
143	9/21/2006	1300.0	1064.31	0	21.63	0	10.12	0	0	0	31.75	1032.56	9.1	303.6	294.5
144	9/22/2006	1260.0	982.71	0	19.76	0	9.89	0	0	0	29.65	953.06	8.7	289.2	280.5
145	9/23/2006	1250.0	574.8	0	19.63	0	9.71	0	0	0	29.34	545.46	8.7	170.5	161.8
146	9/24/2006	1190.0	659.63	0	16.73	0	9.45	0	0	0	26.18	633.45	8.2	205.5	197.4
147	9/25/2006	1200.0	1291.63	0	17.16	0	9.5	0	0	0	26.66	1264.97	8.2	399.1	390.9
148	9/26/2006	1240.0	1430.8	0	18.71	0	9.82	0	0	0	28.53	1402.27	8.5	427.9	419.3
149	9/27/2006	1280.0	1269.41	0	20.6	0	10.04	0	0	0	30.64	1238.77	8.9	367.7	358.9
150	9/28/2006	1290.0	1494.27	0	20.8	0	10.21	0	0	0	31.01	1463.26	8.9	429.5	420.6
151	9/29/2006	1290.0	1356.28	0	21.25	0	10.04	0	0	0	31.29	1324.99	9.0	389.9	380.9
152	9/30/2006	1320.0	1007.49	0	23.27	0	10.04	0	0	0	33.31	974.18	9.4	283.0	273.7
153	10/1/2006	1460.0	1193.42	0	37.08	0	9.25	0	0	0	46.33	1147.09	11.8	303.1	291.3
154	10/2/2006	1500.0	752.62	0	40.05	0	9.4	0	0	0	49.45	703.17	12.2	186.0	173.8
155	10/3/2006	1540.0	986.22	0	42.4	0	9.73	0	0	0	52.13	934.09	12.6	237.5	224.9
156	10/4/2006	1570.0	1283.68	0	45.17	0	9.74	0	0	0	54.91	1228.77	13.0	303.2	290.2
157	10/5/2006	1600.0	572.41	0	48.6	0	9.66	0	0	0	58.26	514.15	13.5	132.7	119.2
158	10/6/2006	1580.0	345.33	0	46.76	0	9.61	0	0	0	56.37	288.96	13.2	81.0	67.8
159	10/7/2006	1570.0	280.98	0	46.38	0	9.49	0	0	0	55.87	225.11	13.2	66.4	53.2
160	10/8/2006	1560.0	305.99	0	45.39	0	9.49	0	0	0	54.88	251.11	13.0	72.7	59.7
161	10/9/2006	1560.0	617.35	0	45.48	0	9.45	0	0	0	54.93	562.42	13.1	146.7	133.7
162	10/10/2006	1600.0	373.13	0	48.07	0	9.76	0	0	0	57.83	315.3	13.4	86.5	73.1
163	10/11/2006	1690.0	547.4	0	54.38	0	10.44	0	0	0	64.82	482.58	14.2	120.1	105.9
164	10/12/2006	1710.0	561.83	0	56.12	0	10.53	0	0	0	66.65	495.18	14.5	121.8	107.4
165	10/13/2006	1670.0	247.16	0	53.52	0	10.18	0	0	0	63.7	183.46	14.1	54.9	40.7

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

													Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
166	10/14/2006	1680.0	453.77	0	54.6	0	10.18	0	0	0	64.78	388.99	14.3	100.2	85.9
167	10/15/2006	1670.0	521.27	0	53.52	0	10.18	0	0	0	63.7	457.57	14.1	115.7	101.6
168	10/16/2006	1680.0	606.99	0	55.25	0	10.04	0	0	0	65.29	541.7	14.4	134.0	119.6
169	10/17/2006	1680.0	404.02	0	56	0	9.89	0	0	0	65.89	338.13	14.5	89.2	74.6
170	10/18/2006	1670.0	322.43	0	55.02	0	9.87	0	0	0	64.89	257.54	14.4	71.6	57.2
171	10/19/2006	1640.0	525.01	0	52.45	0	9.73	0	0	0	62.18	462.83	14.1	118.7	104.6
172	10/20/2006	1620.0	618.68	0	50.86	0	9.61	0	0	0	60.47	558.21	13.8	141.6	127.8
173	10/21/2006	1610.0	475.02	0	50.03	0	9.58	0	0	0	59.61	415.41	13.7	109.4	95.7
174	10/22/2006	1610.0	668.98	0	49.72	0	9.64	0	0	0	59.36	609.62	13.7	154.1	140.4
175	10/23/2006	1600.0	632.56	0	48.81	0	9.61	0	0	0	58.42	574.14	13.5	146.6	133.1
176	10/24/2006	1610.0	236.59	0	49.82	0	9.61	0	0	0	59.43	177.16	13.7	54.5	40.8
177	10/25/2006	1600.0	721.03	0	48.81	0	9.61	0	0	0	58.42	662.61	13.5	167.1	153.6
178	10/26/2006	1590.0	258.5	0	47.77	0	9.61	0	0	0	57.38	201.12	13.4	60.3	46.9
179	10/27/2006	1580.0	166.74	0	47.38	0	9.49	0	0	0	56.87	109.87	13.3	39.1	25.8
180	10/28/2006	1580.0	153.85	0	47.38	0	9.49	0	0	0	56.87	96.98	13.3	36.1	22.8
181	10/29/2006	1570.0	271.14	0	46.47	0	9.45	0	0	0	55.92	215.22	13.2	64.0	50.8
182	10/30/2006	1560.0	305.11	0	45.88	0	9.38	0	0	0	55.26	249.85	13.1	72.5	59.4
183	10/31/2006	1560.0	822.75	0	46.38	0	9.26	0	0	0	55.64	767.11	13.2	195.6	182.3
184	11/1/2006	1540.0	189.01	0	44.6	0	9.22	0	0	0	53.82	135.19	13.0	45.5	32.6
185	11/2/2006	1540.0	196.3	0	44.21	0	9.29	0	0	0	53.5	142.8	12.9	47.3	34.4
186	11/3/2006	1560.0	345.21	0	46.67	0	9.2	0	0	0	55.87	289.34	13.3	82.1	68.8
187	11/4/2006	1550.0	261.14	0	46.18	0	9.1	0	0	0	55.28	205.86	13.2	62.5	49.2
188	11/5/2006	1530.0	178.97	0	44.12	0	9.11	0	0	0	53.23	125.74	12.9	43.4	30.5
189	11/6/2006	1560.0	200.16	0	46.58	0	9.22	0	0	0	55.8	144.36	13.3	47.6	34.3
190	11/7/2006	1560.0	196.24	0	47.17	0	9.1	0	0	0	56.27	139.97	13.4	46.6	33.3
191	11/8/2006	1580.0	195.85	0	48.81	0	9.17	0	0	0	57.98	137.87	13.6	46.0	32.4
192	11/9/2006	1570.0	218.24	0	48.48	0	9.03	0	0	0	57.51	160.73	13.6	51.5	38.0
193	11/10/2006	1540.0	182.29	0	46.98	0	8.7	0	0	0	55.68	126.61	13.4	43.9	30.5
194	11/11/2006	1560.0	201.54	0	48.07	0	8.9	0	0	0	56.97	144.57	13.5	47.9	34.4
195	11/12/2006	1520.0	196.82	0	44.01	0	8.91	0	0	0	52.92	143.9	12.9	48.0	35.1
196	11/13/2006	1580.0	198.25	0	48.18	0	9.29	0	0	0	57.47	140.78	13.5	46.5	33.0
197	11/14/2006	1700.0	203.3	0	51.39	0	11.31	0	0	0	62.7	140.6	13.7	44.3	30.7
198	11/15/2006	1780.0	218.16	0	54.05	0	12.58	0	0	0	66.63	151.53	13.9	45.4	31.6
199	11/16/2006	1780.0	237.86	0	57.25	0	11.91	0	0	0	69.16	168.7	14.4	49.5	35.1
200	11/17/2006	1730.0	263.52	0	55.02	0	11.23	0	0	0	66.25	197.27	14.2	56.5	42.3
201	11/18/2006	1720.0	242.24	0	55.02	0	10.99	0	0	0	66.01	176.23	14.2	52.2	38.0
202	11/19/2006	1680.0	210.94	0	52.54	0	10.61	0	0	0	63.15	147.79	13.9	46.6	32.6
203	11/20/2006	1660.0	240.49	0	51.92	0	10.28	0	0	0	62.2	178.29	13.9	53.7	39.8
204	11/21/2006	1660.0	530.27	0	49.82	0	10.74	0	0	0	60.56	469.71	13.5	118.4	104.9
205	11/22/2006	1880.0	292.86	0	66.26	0	12.43	0	0	0	78.69	214.17	15.5	57.8	42.2
206	11/23/2006	1940.0	293.1	0	71.42	0	12.85	0	0	0	84.27	208.83	16.1	56.0	39.9
207	11/24/2006	1920.0	236.32	0	66.87	0	13.25	0	0	0	80.12	156.2	15.5	45.6	30.2
208	11/25/2006	1850.0	268.95	0	62.35	0	12.51	0	0	0	74.86	194.09	15.0	53.9	38.9
209	11/26/2006	1800.0	342.3	0	59.36	0	11.93	0	0	0	71.29	271.01	14.7	70.5	55.8
210	11/27/2006	1780.0	260.64	0	57.25	0	11.91	0	0	0	69.16	191.48	14.4	54.3	39.9

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
211	11/28/2006	1820.0	267.51	0	59.14	0	12.45	0	0	0	71.59	195.92	14.6	54.5	39.9
212	11/29/2006	1830.0	224.37	0	59.48	0	12.62	0	0	0	72.1	152.27	14.6	45.5	30.9
213	11/30/2006	1790.0	196.47	0	57.56	0	12.07	0	0	0	69.63	126.84	14.4	40.7	26.3
214	12/1/2006	1770.0	184.72	0	56	0	11.93	0	0	0	67.93	116.79	14.2	38.7	24.5
215	12/2/2006	1790.0	193.6	0	57.01	0	12.2	0	0	0	69.21	124.39	14.3	40.1	25.8
216	12/3/2006	1850.0	193.55	0	60.73	0	12.82	0	0	0	73.55	120	14.7	38.8	24.1
217	12/4/2006	1830.0	362.14	0	60.27	0	12.45	0	0	0	72.72	289.42	14.7	73.4	58.6
218	12/5/2006	1760.0	568.7	0	56.89	0	11.51	0	0	0	68.4	500.3	14.4	119.8	105.4
219	12/6/2006	1590.0	159.11	0	46.18	0	9.97	0	0	0	56.15	102.96	13.1	37.1	24.0
220	12/7/2006	1550.0	135.4	0	40.89	0	10.31	0	0	0	51.2	84.2	12.2	32.4	20.1
221	12/8/2006	1560.0	155.3	0	40.98	0	10.52	0	0	0	51.5	103.8	12.2	36.9	24.7
222	12/9/2006	1520.0	141.62	0	39.87	0	9.89	0	0	0	49.76	91.86	12.1	34.5	22.4
223	12/10/2006	1420.0	176.67	0	31.91	0	9.71	0	0	0	41.62	135.05	10.9	46.1	35.3
224	12/11/2006	1430.0	518.69	0	31.1	0	10.16	0	0	0	41.26	477.43	10.7	134.5	123.8
225	12/12/2006	1560.0	130.86	0	43.34	0	9.95	0	0	0	53.29	77.57	12.7	31.1	18.4
226	12/13/2006	1570.0	134.02	0	44.99	0	9.8	0	0	0	54.79	79.23	12.9	31.7	18.7
227	12/14/2006	1570.0	131.35	0	45.69	0	9.64	0	0	0	55.33	76.02	13.1	31.0	18.0
228	12/15/2006	1550.0	121.74	0	44.99	0	9.35	0	0	0	54.34	67.4	13.0	29.1	16.1
229	12/16/2006	1500.0	118.75	0	40.32	0	9.34	0	0	0	49.66	69.09	12.3	29.4	17.1
230	12/17/2006	1530.0	110.79	0	42.2	0	9.56	0	0	0	51.76	59.03	12.5	26.9	14.3
231	12/18/2006	1520.0	182.24	0	43.06	0	9.14	0	0	0	52.2	130.04	12.7	44.5	31.7
232	12/19/2006	1050.0	1568.28	0	17.32	0	6.28	0	0	0	23.6	1544.68	8.3	553.8	545.5
233	12/20/2006	600.0	421.99	0	0	0	4.02	0	0	0	4.02	417.97	2.5	260.8	258.3
234	12/21/2006	500.0	75.69	0	0	0	3.14	0	0	0	3.14	72.55	2.3	56.1	53.8
235	12/22/2006	450.0	187.16	0	0	0	3.48	0	0	0	3.48	183.68	2.9	154.2	151.4
236	12/23/2006	550.0	241.54	0	0	0	4.02	0	0	0	4.02	237.52	2.7	162.8	160.1
237	12/24/2006	700.0	252.68	0	0.03	0	4.95	0	0	0	4.98	247.7	2.6	133.8	131.2
238	12/25/2006	900.0	237.04	0	2.24	0	5.9	0	0	0	8.14	228.9	3.4	97.7	94.3
239	12/26/2006	1100.0	221.11	0	17.27	0	7.32	0	0	0	24.59	196.52	8.3	74.5	66.2
240	12/27/2006	1300.0	605.79	0	27.29	0	8.38	0	0	0	35.67	570.12	10.2	172.8	162.6
241	12/28/2006	1400.0	371.75	0	34.47	0	8.58	0	0	0	43.05	328.7	11.4	98.5	87.1
242	12/29/2006	1600.0	319.13	0	51.59	0	9.03	0	0	0	60.62	258.51	14.0	74.0	59.9
243	12/30/2006	1700.0	348.68	0	59.27	0	9.69	0	0	0	68.96	279.72	15.0	76.1	61.0
244	12/31/2006	1800.0	565.01	0	68.7	0	10.12	0	0	0	78.82	486.19	16.2	116.4	100.2
245	1/1/2007	1900.0	256.94	0	81.55	0	10.12	0	0	0	91.67	165.27	17.9	50.1	32.3
246	1/2/2007	1800.0	204.3	0	71.17	0	9.69	0	0	0	80.86	123.44	16.7	42.1	25.4
247	1/3/2007	1610.0	106.02	0	50.54	0	9.45	0	0	0	59.99	46.03	13.8	24.4	10.6
248	1/4/2007	1520.0	100.05	0	41.63	0	9.45	0	0	0	51.08	48.97	12.5	24.4	11.9
249	1/5/2007	1570.0	132.8	0	45.48	0	9.69	0	0	0	55.17	77.63	13.0	31.4	18.3
250	1/6/2007	1630.0	128.31	0	49.52	0	10.12	0	0	0	59.64	68.67	13.6	29.2	15.6
251	1/7/2007	1670.0	135.98	0	55.91	0	9.69	0	0	0	65.6	70.38	14.6	30.2	15.6
252	1/8/2007	1610.0	112.79	0	50.54	0	9.45	0	0	0	59.99	52.8	13.8	26.0	12.2
253	1/9/2007	1590.0	110.44	0	47.48	0	9.69	0	0	0	57.17	53.27	13.3	25.8	12.4
254	1/10/2007	1570.0	103.1	0	43.25	0	10.21	0	0	0	53.46	49.64	12.6	24.3	11.7
255	1/11/2007	1690.0	488.08	0	51.72	0	11.01	0	0	0	62.73	425.35	13.8	107.1	93.3

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
256	1/12/2007	1680.0	116.72	0	49.19	0	11.34	0	0	0	60.53	56.19	13.4	25.8	12.4
257	1/13/2007	1650.0	119.8	0	45.69	0	11.44	0	0	0	57.13	62.67	12.8	26.9	14.1
258	1/14/2007	1620.0	112.94	0	44.6	0	11.01	0	0	0	55.61	57.33	12.7	25.9	13.1
259	1/15/2007	1640.0	274.8	0	44.89	0	11.4	0	0	0	56.29	218.51	12.7	62.1	49.4
260	1/16/2007	1680.0	412.14	0	48.4	0	11.51	0	0	0	59.91	352.23	13.2	91.0	77.7
261	1/17/2007	1660.0	752.12	0	46.88	0	11.4	0	0	0	58.28	693.84	13.0	168.0	155.0
262	1/18/2007	1600.0	363.56	0	43.34	0	10.85	0	0	0	54.19	309.37	12.6	84.3	71.7
263	1/19/2007	1550.0	175.98	0	40.81	0	10.33	0	0	0	51.14	124.84	12.2	42.1	29.9
264	1/20/2007	1540.0	142.65	0	40.89	0	10.07	0	0	0	50.96	91.69	12.3	34.3	22.1
265	1/21/2007	1520.0	138.29	0	39.97	0	9.87	0	0	0	49.84	88.45	12.2	33.7	21.6
266	1/22/2007	1470.0	142.74	0	36.2	0	9.69	0	0	0	45.89	96.85	11.6	36.0	24.4
267	1/23/2007	1460.0	139.8	0	36.72	0	9.34	0	0	0	46.06	93.74	11.7	35.5	23.8
268	1/24/2007	1350.0	303.18	0	33.81	0	7.71	0	0	0	41.52	261.66	11.4	83.3	71.9
269	1/25/2007	1180.0	197.53	0	26.18	0	6.2	0	0	0	32.38	165.15	10.2	62.1	51.9
270	1/26/2007	1190.0	104.26	0	22.38	0	7.51	0	0	0	29.89	74.37	9.3	32.5	23.2
271	1/27/2007	1330.0	142.18	0	25.59	0	9.53	0	0	0	35.12	107.06	9.8	39.6	29.8
272	1/28/2007	1450.0	305.5	0	35.52	0	9.41	0	0	0	44.93	260.57	11.5	78.1	66.6
273	1/29/2007	1430.0	236.62	0	33.47	0	9.5	0	0	0	42.97	193.65	11.1	61.4	50.2
274	1/30/2007	1550.0	258.47	0	42	0	10.04	0	0	0	52.04	206.43	12.4	61.8	49.4
275	1/31/2007	1430.0	96.41	0	27.29	0	11.27	0	0	0	38.56	57.85	10.0	25.0	15.0
276	2/1/2007	1430.0	94.15	0	27.58	0	11.18	0	0	0	38.76	55.39	10.1	24.4	14.4
277	2/2/2007	1380.0	95.46	0	30.05	0	9.34	0	0	0	39.39	56.07	10.6	25.6	15.1
278	2/3/2007	1370.0	104.52	0	31.49	0	8.72	0	0	0	40.21	64.31	10.9	28.3	17.4
279	2/4/2007	1370.0	112.13	0	32.65	0	8.42	0	0	0	41.07	71.06	11.1	30.3	19.2
280	2/5/2007	1370.0	112.3	0	33.21	0	8.28	0	0	0	41.49	70.81	11.2	30.4	19.2
281	2/6/2007	1330.0	74.87	0	30.22	0	8.2	0	0	0	38.42	36.45	10.7	20.9	10.2
282	2/7/2007	1380.0	111.29	0	33.39	0	8.43	0	0	0	41.82	69.47	11.2	29.9	18.7
283	2/8/2007	1350.0	90.39	0	32.4	0	8.06	0	0	0	40.46	49.93	11.1	24.8	13.7
284	2/9/2007	1350.0	85.54	0	31.82	0	8.2	0	0	0	40.02	45.52	11.0	23.5	12.5
285	2/10/2007	1350.0	146.98	0	31.91	0	8.18	0	0	0	40.09	106.89	11.0	40.4	29.4
286	2/11/2007	1300.0	73.93	0	29.11	0	7.86	0	0	0	36.97	36.96	10.5	21.1	10.5
287	2/12/2007	1170.0	62.85	0	21.82	0	7.26	0	0	0	29.08	33.77	9.2	19.9	10.7
288	2/13/2007	1210.0	72.74	0	23.74	0	7.51	0	0	0	31.25	41.49	9.6	22.3	12.7
289	2/14/2007	1340.0	106.76	0	29.99	0	8.48	0	0	0	38.47	68.29	10.6	29.5	18.9
290	2/15/2007	1340.0	107.07	0	30.45	0	8.35	0	0	0	38.8	68.27	10.7	29.6	18.9
291	2/16/2007	1300.0	71.02	0	27.52	0	8.32	0	0	0	35.84	35.18	10.2	20.3	10.0
292	2/17/2007	1340.0	81.02	0	31.57	0	8.06	0	0	0	39.63	41.39	11.0	22.4	11.5
293	2/18/2007	1320.0	73.85	0	30.22	0	7.98	0	0	0	38.2	35.65	10.7	20.7	10.0
294	2/19/2007	1310.0	73.4	0	29.34	0	8.01	0	0	0	37.35	36.05	10.6	20.8	10.2
295	2/20/2007	1320.0	148.38	0	30.94	0	7.81	0	0	0	38.75	109.63	10.9	41.7	30.8
296	2/21/2007	1300.0	71.99	0	29.52	0	7.75	0	0	0	37.27	34.72	10.6	20.5	9.9
297	2/22/2007	1310.0	86.31	0	30.22	0	7.78	0	0	0	38	48.31	10.8	24.4	13.7
298	2/23/2007	1360.0	104.77	0	32.89	0	8.13	0	0	0	41.02	63.75	11.2	28.6	17.4
299	2/24/2007	1330.0	66.8	0	29.74	0	8.33	0	0	0	38.07	28.73	10.6	18.6	8.0
300	2/25/2007	1470.0	282.55	0	40.89	0	8.54	0	0	0	49.43	233.12	12.5	71.3	58.8

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
301	2/26/2007	1550.0	374.83	0	48.48	0	8.58	0	0	0	57.06	317.77	13.7	89.7	76.0
302	2/27/2007	1460.0	239.32	0	41.08	0	8.29	0	0	0	49.37	189.95	12.5	60.8	48.2
303	2/28/2007	1500.0	490.27	0	40.81	0	9.22	0	0	0	50.03	440.24	12.4	121.2	108.8
304	3/1/2007	1940.0	742.22	0	88.98	0	9.82	0	0	0	98.8	643.42	18.9	141.9	123.0
305	3/2/2007	1890.0	361.04	0	82.23	0	9.8	0	0	0	92.03	269.01	18.1	70.8	52.8
306	3/3/2007	1750.0	161.6	0	60.27	0	10.61	0	0	0	70.88	90.72	15.0	34.2	19.2
307	3/4/2007	1680.0	120.93	0	55.25	0	10.04	0	0	0	65.29	55.64	14.4	26.7	12.3
308	3/5/2007	1510.0	87.38	0	40.98	0	9.4	0	0	0	50.38	37	12.4	21.5	9.1
309	3/6/2007	1460.0	81.14	0	39.52	0	8.65	0	0	0	48.17	32.97	12.2	20.6	8.4
310	3/7/2007	1410.0	74.98	0	35.7	0	8.52	0	0	0	44.22	30.76	11.6	19.7	8.1
311	3/8/2007	1450.0	85.39	0	38.69	0	8.64	0	0	0	47.33	38.06	12.1	21.8	9.7
312	3/9/2007	1420.0	77.68	0	35.76	0	8.7	0	0	0	44.46	33.22	11.6	20.3	8.7
313	3/10/2007	1430.0	134.42	0	37.17	0	8.57	0	0	0	45.74	88.68	11.9	34.9	23.0
314	3/11/2007	1440.0	487.36	0	38.05	0	8.57	0	0	0	46.62	440.74	12.0	125.5	113.5
315	3/12/2007	1430.0	310.55	0	37.27	0	8.54	0	0	0	45.81	264.74	11.9	80.5	68.6
316	3/13/2007	1420.0	209.17	0	36.12	0	8.62	0	0	0	44.74	164.43	11.7	54.6	42.9
317	3/14/2007	1500.0	185.64	0	40.81	0	9.22	0	0	0	50.03	135.61	12.4	45.9	33.5
318	3/15/2007	1690.0	239.15	0	52.66	0	10.81	0	0	0	63.47	175.68	13.9	52.5	38.5
319	3/16/2007	2000.0	654.05	0	69.69	0	14.63	0	0	0	84.32	569.73	15.6	121.3	105.6
320	3/17/2007	2280.0	434.28	0	94.56	0	16.96	0	0	0	111.52	322.76	18.1	70.6	52.5
321	3/18/2007	1940.0	222.44	0	64.94	0	14.12	0	0	0	79.06	143.38	15.1	42.5	27.4
322	3/19/2007	1900.0	158.26	0	60.05	0	14.17	0	0	0	74.22	84.04	14.5	30.9	16.4
323	3/20/2007	2120.0	190.42	0	69.55	0	17.65	0	0	0	87.2	103.22	15.3	33.3	18.1
324	3/21/2007	2650.0	726.94	0	113.33	0	23.39	0	0	0	136.72	590.22	19.1	101.7	82.6
325	3/22/2007	3150.0	552.84	0	148.6	0	32.57	0	0	0	181.17	371.67	21.3	65.1	43.8
326	3/23/2007	3330.0	499.22	0	177.41	0	34.8	0	0	0	212.21	287.01	23.6	55.6	32.0
327	3/24/2007	3210.0	455.39	0	154.06	0	33.86	0	0	0	187.92	267.47	21.7	52.6	30.9
328	3/25/2007	3230.0	486.91	0	148.6	0	36.44	0	0	0	185.04	301.87	21.2	55.9	34.7
329	3/26/2007	3630.0	573.33	0	187.61	0	50.67	0	0	0	238.28	335.05	24.3	58.6	34.2
330	3/27/2007	3720.0	482.81	0	200.24	0	52.78	0	0	0	253.02	229.79	25.2	48.1	22.9
331	3/28/2007	3390.0	380.29	0	150.42	0	45.96	0	0	0	196.38	183.91	21.5	41.6	20.1
332	3/29/2007	3190.0	317.83	0	127.84	0	41.48	0	0	0	169.32	148.51	19.7	36.9	17.3
333	3/30/2007	3050.0	289.28	0	113.33	0	38.35	0	0	0	151.68	137.6	18.4	35.2	16.7
334	3/31/2007	2970.0	255.26	0	107.17	0	35.88	0	0	0	143.05	112.21	17.9	31.9	14.0
335	4/1/2007	2810.0	213.34	0	96.83	0	31.76	0	0	0	128.59	84.75	17.0	28.2	11.2
336	4/2/2007	2620.0	190.45	0	81.55	0	28.97	0	0	0	110.52	79.93	15.6	27.0	11.3
337	4/3/2007	2570.0	174.85	0	80.21	0	27.71	0	0	0	107.92	66.93	15.6	25.2	9.7
338	4/4/2007	2510.0	164.7	0	74.98	0	27.11	0	0	0	102.09	62.61	15.1	24.3	9.2
339	4/5/2007	2430.0	154.63	0	71.17	0	25.64	0	0	0	96.81	57.82	14.8	23.6	8.8
340	4/6/2007	2340.0	289.9	0	63.88	0	24.79	0	0	0	88.67	201.23	14.1	45.9	31.9
341	4/7/2007	2350.0	142.53	0	62.71	0	25.37	0	0	0	88.08	54.45	13.9	22.5	8.6
342	4/8/2007	2370.0	249.69	0	59.27	0	26.81	0	0	0	86.08	163.61	13.5	39.1	25.6
343	4/9/2007	2470.0	199.6	0	65.06	0	28.34	0	0	0	93.4	106.2	14.0	30.0	15.9
344	4/10/2007	2430.0	314.59	0	65.06	0	27.11	0	0	0	92.17	222.42	14.1	48.0	33.9
345	4/11/2007	2320.0	179.58	0	55.91	0	26.21	0	0	0	82.12	97.46	13.1	28.7	15.6

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
346	4/12/2007	2380.0	179.24	0	61.54	0	26.52	0	0	0	88.06	91.18	13.7	27.9	14.2
347	4/13/2007	2450.0	214.48	0	61.54	0	28.65	0	0	0	90.19	124.29	13.6	32.5	18.8
348	4/14/2007	2570.0	183.59	0	66.26	0	31.39	0	0	0	97.65	85.94	14.1	26.5	12.4
349	4/15/2007	2650.0	280.68	0	72.44	0	32.57	0	0	0	105.01	175.67	14.7	39.3	24.6
350	4/16/2007	2640.0	271.36	0	67.48	0	33.86	0	0	0	101.34	170.02	14.2	38.1	23.9
351	4/17/2007	2760.0	265.7	0	73.72	0	37.67	0	0	0	111.39	154.31	15.0	35.7	20.7
352	4/18/2007	3015.0	247.94	0	91.19	0	45.63	0	0	0	136.82	111.12	16.8	30.5	13.7
353	4/19/2007	3520.0	401.4	0	92.57	0	84.74	0	0	0	177.31	224.09	18.7	42.3	23.6
354	4/20/2007	4420.0	949.88	0	143.24	0	148	0	0	0	291.24	658.64	24.4	79.7	55.3
355	4/21/2007	4940.0	1193.95	0	187.61	0	190.12	0	0	0	377.73	816.22	28.4	89.6	61.3
356	4/22/2007	4900.0	881.84	0	179.42	0	190.12	0	0	0	369.54	512.3	28.0	66.7	38.8
357	4/23/2007	4720.0	640.1	0	159.65	0	175.86	0	0	0	335.51	304.59	26.4	50.3	23.9
358	4/24/2007	4610.0	639.56	0	141.5	0	174.47	0	0	0	315.97	323.59	25.4	51.4	26.0
359	4/25/2007	4710.0	697.32	0	132.87	0	194.66	0	0	0	327.53	369.79	25.8	54.9	29.1
360	4/26/2007	5120.0	1114.96	0	148.6	0	227.2	0	0	0	375.8	739.16	27.2	80.7	53.5
361	4/27/2007	5710.0	1246.15	0	191.76	0	269.51	0	0	0	461.27	784.88	30.0	80.9	51.0
362	4/28/2007	6110.0	1310.92	0	238.39	0	311.5	0	0	0	549.89	761.03	33.4	79.6	46.2
363	4/29/2007	5970.0	1111.27	0	229.1	0	292.18	0	0	0	521.28	589.99	32.4	69.0	36.6
364	4/30/2007	5600.0	936.14	0	200.24	0	252.81	0	0	0	453.05	483.09	30.0	62.0	32.0
365	5/1/2007	5340.0	833.03	0	177.41	0	236.69	0	0	0	414.1	418.93	28.8	57.8	29.1
366	5/2/2007	5340.0	864.65	0	179.42	0	235.64	0	0	0	415.06	449.59	28.8	60.0	31.2
367	5/3/2007	5460.0	922	0	202.37	0	236.69	0	0	0	439.06	482.94	29.8	62.6	32.8
368	5/4/2007	5430.0	879.83	0	202.37	0	233.5	0	0	0	435.87	443.96	29.8	60.1	30.3
369	5/5/2007	5250.0	774.91	0	187.61	0	222	0	0	0	409.61	365.3	28.9	54.7	25.8
370	5/6/2007	4950.0	1165	0	157.76	0	204.64	0	0	0	362.4	802.6	27.1	87.3	60.1
371	5/7/2007	4860.0	1201.71	0	146.81	0	201.63	0	0	0	348.44	853.27	26.6	91.7	65.1
372	5/8/2007	4880.0	1204.18	0	152.22	0	200.61	0	0	0	352.83	851.35	26.8	91.5	64.7
373	5/9/2007	4900.0	977.25	0	152.22	0	202.63	0	0	0	354.85	622.4	26.9	74.0	47.1
374	5/10/2007	4890.0	815.57	0	155.9	0	199.62	0	0	0	355.52	460.05	27.0	61.8	34.9
375	5/11/2007	4790.0	738.93	0	154.06	0	190.12	0	0	0	344.18	394.75	26.6	57.2	30.6
376	5/12/2007	4640.0	672.15	0	145.03	0	175.86	0	0	0	320.89	351.26	25.6	53.7	28.1
377	5/13/2007	4560.0	666.54	0	146.81	0	163.59	0	0	0	310.4	356.14	25.2	54.2	29.0
378	5/14/2007	4380.0	562.49	0	131.18	0	151.81	0	0	0	282.99	279.5	24.0	47.6	23.7
379	5/15/2007	4210.0	484.59	0	114.88	0	143	0	0	0	257.88	226.71	22.7	42.7	20.0
380	5/16/2007	4150.0	398.05	0	107.17	0	141.76	0	0	0	248.93	149.12	22.2	35.6	13.3
381	5/17/2007	4160.0	378.42	0	105.68	0	144.22	0	0	0	249.9	128.52	22.3	33.7	11.5
382	5/18/2007	4330.0	416.49	0	110.23	0	162.25	0	0	0	272.48	144.01	23.3	35.7	12.3
383	5/19/2007	4840.0	493.59	0	129.49	0	209.67	0	0	0	339.16	154.43	26.0	37.8	11.8
384	5/20/2007	5540.0	586.1	0	179.42	0	257.15	0	0	0	436.57	149.53	29.2	39.2	10.0
385	5/21/2007	6210.0	938.79	0	208.91	0	359.75	0	0	0	568.66	370.13	34.0	56.1	22.1
386	5/22/2007	7200.0	1478.24	0	280.04	0	542.15	0	0	0	822.19	656.05	42.3	76.1	33.8
387	5/23/2007	7960.0	1702.44	0	362.26	0	702.94	0	0	0	1065.2	637.24	49.6	79.3	29.7
388	5/24/2007	9020.0	1949.42	0	556.09	0	813.73	0	0	0	1369.82	579.6	56.3	80.1	23.8
389	5/25/2007	10800.0	3816.02	0.05	606.55	0	1344.22	0	0	0	1950.77	1865.25	67.0	131.0	64.0
390	5/26/2007	13000.0	5087.92	0.1	957.04	168.89	2111.46	0	0	0	3068.5	2019.42	87.5	145.1	57.6

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

													Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
391	5/27/2007	13500.0	4346.2	0.11	1127.11	198.9	2343.35	0	0	0	3470.46	875.74	95.3	119.4	24.1
392	5/28/2007	13100.0	3701.01	0.11	1111.53	196.15	1955.4	0	0	0	3066.93	634.08	86.8	104.8	17.9
393	5/29/2007	13000.0	3332.78	0.1	1127.11	198.9	1872.84	0	0	0	2999.95	332.83	85.6	95.1	9.5
394	5/30/2007	13500.0	3839.84	0.11	1574.86	277.92	1707.99	0	0	0	3282.85	556.99	90.2	105.5	15.3
395	5/31/2007	12700.0	3036.64	0.09	1500.67	264.83	1366.33	0	0	0	2867	169.64	83.7	88.7	5.0
396	6/1/2007	11500.0	2526.49	0.07	1142.85	201.68	1135.95	0	0	0	2278.8	247.69	73.5	81.5	8.0
397	6/2/2007	11200.0	2733.36	0.05	1137.6	200.75	1036.02	0	0	0	2173.62	559.74	72.0	90.5	18.5
398	6/3/2007	11900.0	2768.57	0.07	1289.78	227.6	1184.39	0	0	0	2474.17	294.4	77.1	86.3	9.2
399	6/4/2007	14000.0	3156.8	0.14	2122.27	374.52	1547.58	0	0	0	3669.85	-513.05	97.2	83.6	-13.6
400	6/5/2007	14400.0	3213.29	0.14	2227.62	393.11	1685.69	0	0	0	3913.31	-700.02	100.8	82.7	-18.0
401	6/6/2007	13500.0	2702.78	0.11	1857.11	327.73	1482.92	0	0	0	3340.03	-637.25	91.7	74.2	-17.5
402	6/7/2007	12300.0	2464.08	0.09	1488.51	262.68	1207.54	0	0	0	2696.05	-231.97	81.3	74.3	-7.0
403	6/8/2007	11100.0	1988	0.06	1190.77	210.13	973.35	0	0	0	2164.12	-176.12	72.3	66.4	-5.9
404	6/9/2007	10300.0	1861.92	0.04	1045.23	184.45	832.66	0	0	0	1877.89	-15.97	67.6	67.0	-0.6
405	6/10/2007	9300.0	1465.9	0.01	823.79	145.37	657.48	0	0	0	1481.27	-15.37	59.1	58.4	-0.6
406	6/11/2007	8400.0	1303.35	0	635.98	0	514.7	0	0	0	1150.68	152.67	50.8	57.5	6.7
407	6/12/2007	7790.0	1132.3	0	537.03	0	436.68	0	0	0	973.71	158.59	46.3	53.9	7.5
408	6/13/2007	7560.0	1095.66	0	494.25	0	421.31	0	0	0	915.56	180.1	44.9	53.7	8.8
409	6/14/2007	7870.0	1105.1	0	506.35	0	491.31	0	0	0	997.66	107.44	47.0	52.1	5.1
410	6/15/2007	8760.0	1346.61	0.01	561.72	0	722.69	0	0	0	1284.41	62.2	54.4	57.0	2.6
411	6/16/2007	9530.0	1527.98	0.01	642.78	0	870.07	0	0	0	1512.85	15.13	58.9	59.5	0.6
412	6/17/2007	10400.0	1701.6	0.02	832.63	146.93	982.44	0	0	0	1815.07	-113.47	64.7	60.7	-4.0
413	6/18/2007	10500.0	1634.61	0.03	823.79	145.37	1019.88	0	0	0	1843.67	-209.06	65.1	57.7	-7.4
414	6/19/2007	10400.0	1823.63	0.02	797.56	140.75	1007.19	0	0	0	1804.75	18.88	64.3	65.0	0.7
415	6/20/2007	10200.0	1614.14	0.02	776.07	136.95	961.41	0	0	0	1737.48	-123.34	63.2	58.7	-4.5
416	6/21/2007	9510.0	1599.26	0.01	656.73	0	854.82	0	0	0	1511.55	87.71	58.9	62.4	3.4
417	6/22/2007	8940.0	1403.74	0	588.06	0	759.44	0	0	0	1347.5	56.24	55.9	58.2	2.3
418	6/23/2007	8590.0	1360.93	0	558.9	0	661.18	0	0	0	1220.08	140.85	52.7	58.7	6.1
419	6/24/2007	7910.0	1155.17	0	480.26	0	535.97	0	0	0	1016.23	138.94	47.6	54.2	6.5
420	6/25/2007	7770.0	1156.59	0	445.3	0	542.15	0	0	0	987.45	169.14	47.1	55.2	8.1
421	6/26/2007	7650.0	1090.48	0	437.04	0	517.71	0	0	0	954.75	135.73	46.3	52.9	6.6
422	6/27/2007	6900.0	950.94	0	350.64	0	389.55	0	0	0	740.19	210.75	39.8	51.1	11.3
423	6/28/2007	6270.0	782.72	0	285.19	0	305.6	0	0	0	590.79	191.93	34.9	46.3	11.4
424	6/29/2007	5820.0	710.04	0	240.75	0	257.15	0	0	0	497.9	212.14	31.7	45.2	13.5
425	6/30/2007	5620.0	669.76	0	213.28	0	248.45	0	0	0	461.73	208.03	30.5	44.2	13.7
426	7/1/2007	5890.0	716.87	0	224.51	0	273.78	0	0	0	498.29	218.58	31.4	45.1	13.8
427	7/2/2007	5900.0	672.11	0	217.73	0	286.95	0	0	0	504.68	167.43	31.7	42.2	10.5
428	7/3/2007	5610.0	641.22	0	202.37	0	252.81	0	0	0	455.18	186.04	30.1	42.4	12.3
429	7/4/2007	5290.0	579.81	0	181.45	0	229.28	0	0	0	410.73	169.08	28.8	40.6	11.9
430	7/5/2007	5030.0	549.11	0	157.76	0	212.75	0	0	0	370.51	178.6	27.3	40.5	13.2
431	7/6/2007	4710.0	493.27	0	136.28	0	192.7	0	0	0	328.98	164.29	25.9	38.8	12.9
432	7/7/2007	4500.0	469.93	0	126.16	0	171.72	0	0	0	297.88	172.05	24.5	38.7	14.2
433	7/8/2007	4290.0	422.62	0	104.17	0	162.25	0	0	0	266.42	156.2	23.0	36.5	13.5
434	7/9/2007	4100.0	399.72	0	91.19	0	149.24	0	0	0	240.43	159.29	21.7	36.2	14.4
435	7/10/2007	3950.0	375.24	0	87.02	0	134.47	0	0	0	221.49	153.75	20.8	35.2	14.4

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
436	7/11/2007	3710.0	355.48	0	71.17	0	120.55	0	0	0	191.72	163.76	19.2	35.5	16.4
437	7/12/2007	3540.0	319.88	0	62.71	0	109.6	0	0	0	172.31	147.57	18.0	33.5	15.5
438	7/13/2007	3430.0	296.06	0	61.54	0	99.24	0	0	0	160.78	135.28	17.4	32.0	14.6
439	7/14/2007	3290.0	267.35	0	57.01	0	89.45	0	0	0	146.46	120.89	16.5	30.1	13.6
440	7/15/2007	3120.0	239.06	0	49.52	0	80.16	0	0	0	129.68	109.38	15.4	28.4	13.0
441	7/16/2007	3020.0	222.63	0	47.48	0	73.13	0	0	0	120.61	102.02	14.8	27.3	12.5
442	7/17/2007	2930.0	214.24	0	47.48	0	65.64	0	0	0	113.12	101.12	14.3	27.1	12.8
443	7/18/2007	2810.0	194.55	0	41.63	0	60.93	0	0	0	102.56	91.99	13.5	25.7	12.1
444	7/19/2007	2720.0	188.1	0	44.51	0	52.07	0	0	0	96.58	91.52	13.2	25.6	12.5
445	7/20/2007	2650.0	181.9	0	44.51	0	47.26	0	0	0	91.77	90.13	12.8	25.5	12.6
446	7/21/2007	2530.0	167.04	0	38.88	0	43.38	0	0	0	82.26	84.78	12.1	24.5	12.4
447	7/22/2007	2530.0	167.72	0	44.51	0	39.65	0	0	0	84.16	83.56	12.3	24.6	12.2
448	7/23/2007	2410.0	154.78	0	39.78	0	35.32	0	0	0	75.1	79.68	11.6	23.8	12.3
449	7/24/2007	2250.0	139.31	0	31.99	0	32.15	0	0	0	64.14	75.17	10.6	23.0	12.4
450	7/25/2007	2260.0	145.98	0	36.2	0	30.65	0	0	0	66.85	79.13	11.0	24.0	13.0
451	7/26/2007	2200.0	132.54	0	35.33	0	28.97	0	0	0	64.3	68.24	10.8	22.3	11.5
452	7/27/2007	2110.0	126.54	0	32.81	0	27.11	0	0	0	59.92	66.62	10.5	22.2	11.7
453	7/28/2007	2010.0	114	0	29.58	0	25.37	0	0	0	54.95	59.05	10.1	21.0	10.9
454	7/29/2007	1940.0	112.3	0	28.03	0	23.94	0	0	0	51.97	60.33	9.9	21.5	11.5
455	7/30/2007	1870.0	107.07	0	26.53	0	22.59	0	0	0	49.12	57.95	9.7	21.2	11.5
456	7/31/2007	1800.0	105.51	0	22.98	0	22.03	0	0	0	45.01	60.5	9.3	21.7	12.5
457	8/1/2007	1730.0	98.21	0	19.72	0	21.49	0	0	0	41.21	57	8.8	21.0	12.2
458	8/2/2007	1710.0	97.9	0	19.08	0	21.23	0	0	0	40.31	57.59	8.7	21.2	12.5
459	8/3/2007	1690.0	92.62	0	20.34	0	20.18	0	0	0	40.52	52.1	8.9	20.3	11.4
460	8/4/2007	1680.0	106.74	0	20.84	0	19.69	0	0	0	40.53	66.21	8.9	23.6	14.6
461	8/5/2007	1680.0	92.41	0	21.17	0	19.56	0	0	0	40.73	51.68	9.0	20.4	11.4
462	8/6/2007	1710.0	117.81	0	25.02	0	18.89	0	0	0	43.91	73.9	9.5	25.5	16.0
463	8/7/2007	1740.0	104.07	0	22.98	0	20.44	0	0	0	43.42	60.65	9.3	22.2	12.9
464	8/8/2007	1730.0	121.42	0	24.81	0	19.48	0	0	0	44.29	77.13	9.5	26.0	16.5
465	8/9/2007	1610.0	170.08	0	19.63	0	18.37	0	0	0	38	132.08	8.8	39.2	30.4
466	8/10/2007	1580.0	108.97	0	19.76	0	17.55	0	0	0	37.31	71.66	8.8	25.6	16.8
467	8/11/2007	1550.0	91.45	0	18.83	0	17.18	0	0	0	36.01	55.44	8.6	21.9	13.3
468	8/12/2007	1580.0	109.56	0	19.46	0	17.67	0	0	0	37.13	72.43	8.7	25.7	17.0
469	8/13/2007	1780.0	117.72	0	28.19	0	19.59	0	0	0	47.78	69.94	10.0	24.5	14.6
470	8/14/2007	1810.0	134.18	0	28.03	0	20.44	0	0	0	48.47	85.71	9.9	27.5	17.6
471	8/15/2007	1820.0	114.57	0	31.17	0	19.63	0	0	0	50.8	63.77	10.3	23.3	13.0
472	8/16/2007	1830.0	139.28	0	34.4	0	18.89	0	0	0	53.29	85.99	10.8	28.2	17.4
473	8/17/2007	1780.0	101.11	0	33.73	0	17.8	0	0	0	51.53	49.58	10.7	21.1	10.3
474	8/18/2007	1700.0	93.79	0	29.91	0	16.96	0	0	0	46.87	46.92	10.2	20.5	10.2
475	8/19/2007	1630.0	166.8	0	26.53	0	16.32	0	0	0	42.85	123.95	9.7	37.9	28.2
476	8/20/2007	1600.0	96.86	0	26.61	0	15.54	0	0	0	42.15	54.71	9.8	22.4	12.7
477	8/21/2007	1510.0	83.04	0	21.91	0	14.97	0	0	0	36.88	46.16	9.1	20.4	11.3
478	8/22/2007	1500.0	94.61	0	22.1	0	14.66	0	0	0	36.76	57.85	9.1	23.4	14.3
479	8/23/2007	1450.0	77.93	0	20.01	0	14.22	0	0	0	34.23	43.7	8.8	19.9	11.2
480	8/24/2007	1430.0	111.2	0	19.95	0	13.75	0	0	0	33.7	77.5	8.7	28.8	20.1

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
481	8/25/2007	1290.0	133.88	0	5.08	0	13.69	0	0	0	18.77	115.11	5.4	38.5	33.1
482	8/26/2007	1220.0	127.16	0	1.34	0	13.42	0	0	0	14.76	112.4	4.5	38.6	34.2
483	8/27/2007	1250.0	48.18	0	4.07	0	12.98	0	0	0	17.05	31.13	5.1	14.3	9.2
484	8/28/2007	1400.0	83.83	0	20.07	0	12.99	0	0	0	33.06	50.77	8.8	22.2	13.4
485	8/29/2007	1340.0	82.76	0	16.05	0	13.16	0	0	0	29.21	53.55	8.1	22.9	14.8
486	8/30/2007	1410.0	99.33	0	19.95	0	13.28	0	0	0	33.23	66.1	8.7	26.1	17.4
487	8/31/2007	1380.0	99.4	0	18.35	0	13.17	0	0	0	31.52	67.88	8.5	26.7	18.2
488	9/1/2007	1420.0	93.87	0	21.56	0	12.92	0	0	0	34.48	59.39	9.0	24.5	15.5
489	9/2/2007	1400.0	90.06	0	20.21	0	12.93	0	0	0	33.14	56.92	8.8	23.9	15.1
490	9/3/2007	1420.0	106.78	0	21.43	0	12.98	0	0	0	34.41	72.37	9.0	27.9	18.9
491	9/4/2007	1500.0	90.61	0	24.09	0	13.95	0	0	0	38.04	52.57	9.4	22.4	13.0
492	9/5/2007	1530.0	81.98	0	26.4	0	13.9	0	0	0	40.3	41.68	9.8	19.9	10.1
493	9/6/2007	1530.0	79.4	0	28.35	0	13.28	0	0	0	41.63	37.77	10.1	19.2	9.2
494	9/7/2007	1480.0	72.93	0	27.06	0	12.51	0	0	0	39.57	33.36	9.9	18.3	8.4
495	9/8/2007	1360.0	62.82	0	20.16	0	12.03	0	0	0	32.19	30.63	8.8	17.1	8.4
496	9/9/2007	1380.0	66.55	0	21.72	0	11.93	0	0	0	33.65	32.9	9.0	17.9	8.8
497	9/10/2007	1340.0	67.49	0	19.72	0	11.73	0	0	0	31.45	36.04	8.7	18.7	10.0
498	9/11/2007	1350.0	89.72	0	21.43	0	11.34	0	0	0	32.77	56.95	9.0	24.6	15.6
499	9/12/2007	1340.0	62.64	0	21.52	0	11.08	0	0	0	32.6	30.04	9.0	17.3	8.3
500	9/13/2007	1290.0	57.73	0	17.99	0	11.23	0	0	0	29.22	28.51	8.4	16.6	8.2
501	9/14/2007	1340.0	61.34	0	21.3	0	11.14	0	0	0	32.44	28.9	9.0	17.0	8.0
502	9/15/2007	1330.0	60.31	0	21.17	0	10.97	0	0	0	32.14	28.17	9.0	16.8	7.9
503	9/16/2007	1330.0	61.97	0	21.91	0	10.71	0	0	0	32.62	29.35	9.1	17.3	8.2
504	9/17/2007	1300.0	61.47	0	20.91	0	10.37	0	0	0	31.28	30.19	8.9	17.5	8.6
505	9/18/2007	1290.0	61.01	0	20.6	0	10.27	0	0	0	30.87	30.14	8.9	17.5	8.7
506	9/19/2007	1260.0	57	0	18.83	0	10.21	0	0	0	29.04	27.96	8.5	16.8	8.2
507	9/20/2007	1290.0	60.87	0	20.66	0	10.24	0	0	0	30.9	29.97	8.9	17.5	8.6
508	9/21/2007	1300.0	63.17	0	21.63	0	10.12	0	0	0	31.75	31.42	9.1	18.0	9.0
509	9/22/2007	1260.0	56.42	0	19.76	0	9.89	0	0	0	29.65	26.77	8.7	16.6	7.9
510	9/23/2007	1250.0	55.26	0	19.63	0	9.71	0	0	0	29.34	25.92	8.7	16.4	7.7
511	9/24/2007	1190.0	50.57	0	16.73	0	9.45	0	0	0	26.18	24.39	8.2	15.8	7.6
512	9/25/2007	1200.0	60.99	0	17.16	0	9.5	0	0	0	26.66	34.33	8.2	18.8	10.6
513	9/26/2007	1240.0	58.17	0	18.71	0	9.82	0	0	0	28.53	29.64	8.5	17.4	8.9
514	9/27/2007	1280.0	60.34	0	20.6	0	10.04	0	0	0	30.64	29.7	8.9	17.5	8.6
515	9/28/2007	1290.0	60.19	0	20.8	0	10.21	0	0	0	31.01	29.18	8.9	17.3	8.4
516	9/29/2007	1290.0	59.56	0	21.25	0	10.04	0	0	0	31.29	28.27	9.0	17.1	8.1
517	9/30/2007	1320.0	60.22	0	23.27	0	10.04	0	0	0	33.31	26.91	9.4	16.9	7.6
518	10/1/2007	1460.0	73.83	0	37.08	0	9.25	0	0	0	46.33	27.5	11.8	18.8	7.0
519	10/2/2007	1500.0	79.4	0	40.05	0	9.4	0	0	0	49.45	29.95	12.2	19.6	7.4
520	10/3/2007	1540.0	79.9	0	42.4	0	9.73	0	0	0	52.13	27.77	12.6	19.2	6.7
521	10/4/2007	1570.0	86.54	0	45.17	0	9.74	0	0	0	54.91	31.63	13.0	20.4	7.5
522	10/5/2007	1600.0	85.92	0	48.6	0	9.66	0	0	0	58.26	27.66	13.5	19.9	6.4
523	10/6/2007	1580.0	89.24	0	46.76	0	9.61	0	0	0	56.37	32.87	13.2	20.9	7.7
524	10/7/2007	1570.0	87.2	0	46.38	0	9.49	0	0	0	55.87	31.33	13.2	20.6	7.4
525	10/8/2007	1560.0	85.69	0	45.39	0	9.49	0	0	0	54.88	30.81	13.0	20.4	7.3

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 1 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

													Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Suspended Sediment coming from Reservoir (tons)	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
526	10/9/2007	1560.0	85.2	0	45.48	0	9.45	0	0	0	54.93	30.27	13.1	20.3	7.2
527	10/10/2007	1600.0	87.25	0	48.07	0	9.76	0	0	0	57.83	29.42	13.4	20.2	6.8
528	10/11/2007	1690.0	95.81	0	54.38	0	10.44	0	0	0	64.82	30.99	14.2	21.0	6.8
529	10/12/2007	1710.0	100.62	0	56.12	0	10.53	0	0	0	66.65	33.97	14.5	21.8	7.4
530	10/13/2007	1670.0	99.71	0	53.52	0	10.18	0	0	0	63.7	36.01	14.1	22.1	8.0
531	10/14/2007	1680.0	95.57	0	54.6	0	10.18	0	0	0	64.78	30.79	14.3	21.1	6.8
532	10/15/2007	1670.0	100.01	0	53.52	0	10.18	0	0	0	63.7	36.31	14.1	22.2	8.1
533	10/16/2007	1680.0	173.9	0	55.25	0	10.04	0	0	0	65.29	108.61	14.4	38.4	24.0
534	10/17/2007	1680.0	117.75	0	56	0	9.89	0	0	0	65.89	51.86	14.5	26.0	11.4
535	10/18/2007	1670.0	105.63	0	55.02	0	9.87	0	0	0	64.89	40.74	14.4	23.5	9.0
536	10/19/2007	1640.0	95.1	0	52.45	0	9.73	0	0	0	62.18	32.92	14.1	21.5	7.4
537	10/20/2007	1620.0	91.93	0	50.86	0	9.61	0	0	0	60.47	31.46	13.8	21.0	7.2
538	10/21/2007	1610.0	90.1	0	50.03	0	9.58	0	0	0	59.61	30.49	13.7	20.8	7.0
539	10/22/2007	1610.0	90.57	0	49.72	0	9.64	0	0	0	59.36	31.21	13.7	20.9	7.2
540	10/23/2007	1600.0	88.95	0	48.81	0	9.61	0	0	0	58.42	30.53	13.5	20.6	7.1
541	10/24/2007	1610.0	93.72	0	49.82	0	9.61	0	0	0	59.43	34.29	13.7	21.6	7.9
542	10/25/2007	1600.0	89.96	0	48.81	0	9.61	0	0	0	58.42	31.54	13.5	20.8	7.3
543	10/26/2007	1590.0	95.87	0	47.77	0	9.61	0	0	0	57.38	38.49	13.4	22.4	9.0
544	10/27/2007	1580.0	94.26	0	47.38	0	9.49	0	0	0	56.87	37.39	13.3	22.1	8.8
545	10/28/2007	1580.0	94.62	0	47.38	0	9.49	0	0	0	56.87	37.75	13.3	22.2	8.9
546	10/29/2007	1570.0	92.41	0	46.47	0	9.45	0	0	0	55.92	36.49	13.2	21.8	8.6
547	10/30/2007	1560.0	90.84	0	45.88	0	9.38	0	0	0	55.26	35.58	13.1	21.6	8.5
548	10/31/2007	1560.0	93.77	0	46.38	0	9.26	0	0	0	55.64	38.13	13.2	22.3	9.1

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
31	6/15/2006	8760.0	1436.28	0	561.72	0	722.69	0	0	0	1284.41	54.4	60.8	6.4
32	6/16/2006	9530.0	4051.98	0	642.78	0	870.07	0	0	0	1512.85	58.9	157.7	98.8
33	6/17/2006	10400.0	2824.73	0.01	832.63	146.93	982.44	0	0	0	1815.07	64.7	100.7	36.0
34	6/18/2006	10500.0	3030.1	0.01	823.79	145.37	1019.88	0	0	0	1843.67	65.1	107.0	41.9
35	6/19/2006	10400.0	3221.92	0.01	797.56	140.75	1007.19	0	0	0	1804.75	64.3	114.9	50.5
36	6/20/2006	10200.0	7137.86	0.01	776.07	136.95	961.41	0	0	0	1737.48	63.2	259.5	196.3
37	6/21/2006	9510.0	8887.6	0.01	656.73	0	854.82	0	0	0	1511.55	58.9	346.5	287.6
38	6/22/2006	8940.0	6003.02	0	588.06	0	759.44	0	0	0	1347.5	55.9	249.0	193.1
39	6/23/2006	8590.0	4434.82	0	558.9	0	661.18	0	0	0	1220.08	52.7	191.4	138.8
40	6/24/2006	7910.0	4389.95	0	480.26	0	535.97	0	0	0	1016.23	47.6	205.8	158.2
41	6/25/2006	7770.0	3065.73	0	445.3	0	542.15	0	0	0	987.45	47.1	146.3	99.2
42	6/26/2006	7650.0	2479.2	0	437.04	0	517.71	0	0	0	954.75	46.3	120.2	73.9
43	6/27/2006	6900.0	1882.18	0	350.64	0	389.55	0	0	0	740.19	39.8	101.1	61.4
44	6/28/2006	6270.0	1960.32	0	285.19	0	305.6	0	0	0	590.79	34.9	115.9	81.0
45	6/29/2006	5820.0	2091.45	0	240.75	0	257.15	0	0	0	497.9	31.7	133.2	101.5
46	6/30/2006	5620.0	1669.2	0	213.28	0	248.45	0	0	0	461.73	30.5	110.1	79.7
47	7/1/2006	5890.0	2984.67	0	224.51	0	273.78	0	0	0	498.29	31.4	187.9	156.5
48	7/2/2006	5900.0	1767.27	0	217.73	0	286.95	0	0	0	504.68	31.7	111.1	79.4
49	7/3/2006	5610.0	3515.46	0	202.37	0	252.81	0	0	0	455.18	30.1	232.4	202.3
50	7/4/2006	5290.0	3762.62	0	181.45	0	229.28	0	0	0	410.73	28.8	263.7	234.9
51	7/5/2006	5030.0	4965.15	0	157.76	0	212.75	0	0	0	370.51	27.3	366.0	338.7
52	7/6/2006	4710.0	4392.38	0	136.28	0	192.7	0	0	0	328.98	25.9	345.8	319.9
53	7/7/2006	4500.0	4647.71	0	126.16	0	171.72	0	0	0	297.88	24.5	383.0	358.4
54	7/8/2006	4290.0	3500.23	0	104.17	0	162.25	0	0	0	266.42	23.0	302.5	279.5
55	7/9/2006	4100.0	3118.35	0	91.19	0	149.24	0	0	0	240.43	21.7	282.0	260.3
56	7/10/2006	3950.0	3456.41	0	87.02	0	134.47	0	0	0	221.49	20.8	324.5	303.7
57	7/11/2006	3710.0	2593.19	0	71.17	0	120.55	0	0	0	191.72	19.2	259.2	240.0
58	7/12/2006	3540.0	3089.56	0	62.71	0	109.6	0	0	0	172.31	18.0	323.6	305.6
59	7/13/2006	3430.0	2311.41	0	61.54	0	99.24	0	0	0	160.78	17.4	249.9	232.5
60	7/14/2006	3290.0	1655.93	0	57.01	0	89.45	0	0	0	146.46	16.5	186.6	170.1
61	7/15/2006	3120.0	1575.03	0	49.52	0	80.16	0	0	0	129.68	15.4	187.2	171.8
62	7/16/2006	3020.0	1391.81	0	47.48	0	73.13	0	0	0	120.61	14.8	170.9	156.1
63	7/17/2006	2930.0	1329.35	0	47.48	0	65.64	0	0	0	113.12	14.3	168.2	153.9
64	7/18/2006	2810.0	1092.97	0	41.63	0	60.93	0	0	0	102.56	13.5	144.2	130.7
65	7/19/2006	2720.0	1159.06	0	44.51	0	52.07	0	0	0	96.58	13.2	158.0	144.8
66	7/20/2006	2650.0	814.73	0	44.51	0	47.26	0	0	0	91.77	12.8	114.0	101.2
67	7/21/2006	2530.0	1083.29	0	38.88	0	43.38	0	0	0	82.26	12.1	158.8	146.7
68	7/22/2006	2530.0	1173.26	0	44.51	0	39.65	0	0	0	84.16	12.3	172.0	159.6
69	7/23/2006	2410.0	1100.34	0	39.78	0	35.32	0	0	0	75.1	11.6	169.3	157.7
70	7/24/2006	2250.0	931.91	0	31.99	0	32.15	0	0	0	64.14	10.6	153.6	143.0
71	7/25/2006	2260.0	1552.26	0	36.2	0	30.65	0	0	0	66.85	11.0	254.7	243.7
72	7/26/2006	2200.0	1292.67	0	35.33	0	28.97	0	0	0	64.3	10.8	217.9	207.0
73	7/27/2006	2110.0	2095.39	0	32.81	0	27.11	0	0	0	59.92	10.5	368.2	357.7
74	7/28/2006	2010.0	2054.2	0	29.58	0	25.37	0	0	0	54.95	10.1	379.0	368.8
75	7/29/2006	1940.0	1850.03	0	28.03	0	23.94	0	0	0	51.97	9.9	353.6	343.7
76	7/30/2006	1870.0	1283.92	0	26.53	0	22.59	0	0	0	49.12	9.7	254.6	244.8

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
77	7/31/2006	1800.0	672.12	0	22.98	0	22.03	0	0	0	45.01	9.3	138.5	129.2
78	8/1/2006	1730.0	536.65	0	19.72	0	21.49	0	0	0	41.21	8.8	115.0	106.2
79	8/2/2006	1710.0	428.41	0	19.08	0	21.23	0	0	0	40.31	8.7	92.9	84.2
80	8/3/2006	1690.0	454.54	0	20.34	0	20.18	0	0	0	40.52	8.9	99.7	90.8
81	8/4/2006	1680.0	752.27	0	20.84	0	19.69	0	0	0	40.53	8.9	166.0	157.1
82	8/5/2006	1680.0	495.07	0	21.17	0	19.56	0	0	0	40.73	9.0	109.3	100.3
83	8/6/2006	1710.0	529.77	0	25.02	0	18.89	0	0	0	43.91	9.5	114.9	105.4
84	8/7/2006	1740.0	400.21	0	22.98	0	20.44	0	0	0	43.42	9.3	85.3	76.0
85	8/8/2006	1730.0	442.95	0	24.81	0	19.48	0	0	0	44.29	9.5	94.9	85.4
86	8/9/2006	1610.0	389.75	0	19.63	0	18.37	0	0	0	38	8.8	89.8	81.0
87	8/10/2006	1580.0	350.26	0	19.76	0	17.55	0	0	0	37.31	8.8	82.2	73.4
88	8/11/2006	1550.0	485.1	0	18.83	0	17.18	0	0	0	36.01	8.6	116.0	107.4
89	8/12/2006	1580.0	404.73	0	19.46	0	17.67	0	0	0	37.13	8.7	95.0	86.3
90	8/13/2006	1780.0	648.72	0	28.19	0	19.59	0	0	0	47.78	10.0	135.1	125.2
91	8/14/2006	1810.0	428.02	0	28.03	0	20.44	0	0	0	48.47	9.9	87.7	77.8
92	8/15/2006	1820.0	536.57	0	31.17	0	19.63	0	0	0	50.8	10.3	109.3	99.0
93	8/16/2006	1830.0	480.07	0	34.4	0	18.89	0	0	0	53.29	10.8	97.3	86.5
94	8/17/2006	1780.0	467.25	0	33.73	0	17.8	0	0	0	51.53	10.7	97.3	86.6
95	8/18/2006	1700.0	288.18	0	29.91	0	16.96	0	0	0	46.87	10.2	62.9	52.6
96	8/19/2006	1630.0	208.6	0	26.53	0	16.32	0	0	0	42.85	9.7	47.5	37.7
97	8/20/2006	1600.0	827.49	0	26.61	0	15.54	0	0	0	42.15	9.8	191.8	182.0
98	8/21/2006	1510.0	270.4	0	21.91	0	14.97	0	0	0	36.88	9.1	66.4	57.3
99	8/22/2006	1500.0	330.73	0	22.1	0	14.66	0	0	0	36.76	9.1	81.8	72.7
100	8/23/2006	1450.0	242.67	0	20.01	0	14.22	0	0	0	34.23	8.8	62.1	53.3
101	8/24/2006	1430.0	1163.73	0	19.95	0	13.75	0	0	0	33.7	8.7	301.8	293.0
102	8/25/2006	1290.0	855.45	0	5.08	0	13.69	0	0	0	18.77	5.4	245.9	240.5
103	8/26/2006	1220.0	320.45	0	1.34	0	13.42	0	0	0	14.76	4.5	97.4	92.9
104	8/27/2006	1250.0	297.35	0	4.07	0	12.98	0	0	0	17.05	5.1	88.2	83.1
105	8/28/2006	1400.0	769.63	0	20.07	0	12.99	0	0	0	33.06	8.8	203.8	195.1
106	8/29/2006	1340.0	713.05	0	16.05	0	13.16	0	0	0	29.21	8.1	197.3	189.2
107	8/30/2006	1410.0	436.17	0	19.95	0	13.28	0	0	0	33.23	8.7	114.7	106.0
108	8/31/2006	1380.0	408.86	0	18.35	0	13.17	0	0	0	31.52	8.5	109.9	101.4
109	9/1/2006	1420.0	435.61	0	21.56	0	12.92	0	0	0	34.48	9.0	113.7	104.7
110	9/2/2006	1400.0	409.02	0	20.21	0	12.93	0	0	0	33.14	8.8	108.3	99.6
111	9/3/2006	1420.0	636.8	0	21.43	0	12.98	0	0	0	34.41	9.0	166.3	157.3
112	9/4/2006	1500.0	417.88	0	24.09	0	13.95	0	0	0	38.04	9.4	103.3	93.9
113	9/5/2006	1530.0	1271.74	0	26.4	0	13.9	0	0	0	40.3	9.8	308.2	298.4
114	9/6/2006	1530.0	1030.45	0	28.35	0	13.28	0	0	0	41.63	10.1	249.7	239.6
115	9/7/2006	1480.0	605	0	27.06	0	12.51	0	0	0	39.57	9.9	151.6	141.7
116	9/8/2006	1360.0	1060.92	0	20.16	0	12.03	0	0	0	32.19	8.8	289.3	280.5
117	9/9/2006	1380.0	1056.89	0	21.72	0	11.93	0	0	0	33.65	9.0	284.0	274.9
118	9/10/2006	1340.0	944.96	0	19.72	0	11.73	0	0	0	31.45	8.7	261.5	252.8
119	9/11/2006	1350.0	1079.1	0	21.43	0	11.34	0	0	0	32.77	9.0	296.4	287.4
120	9/12/2006	1340.0	659.31	0	21.52	0	11.08	0	0	0	32.6	9.0	182.4	173.4
121	9/13/2006	1290.0	549.89	0	17.99	0	11.23	0	0	0	29.22	8.4	158.1	149.7
122	9/14/2006	1340.0	862	0	21.3	0	11.14	0	0	0	32.44	9.0	238.5	229.6

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
123	9/15/2006	1330.0	871.55	0	21.17	0	10.97	0	0	0	32.14	9.0	243.0	234.0
124	9/16/2006	1330.0	592.97	0	21.91	0	10.71	0	0	0	32.62	9.1	165.3	156.2
125	9/17/2006	1300.0	812.86	0	20.91	0	10.37	0	0	0	31.28	8.9	231.9	222.9
126	9/18/2006	1290.0	654.64	0	20.6	0	10.27	0	0	0	30.87	8.9	188.2	179.3
127	9/19/2006	1260.0	663.15	0	18.83	0	10.21	0	0	0	29.04	8.5	195.2	186.6
128	9/20/2006	1290.0	971.74	0	20.66	0	10.24	0	0	0	30.9	8.9	279.3	270.4
129	9/21/2006	1300.0	1157.61	0	21.63	0	10.12	0	0	0	31.75	9.1	330.2	321.1
130	9/22/2006	1260.0	607.22	0	19.76	0	9.89	0	0	0	29.65	8.7	178.7	170.0
131	9/23/2006	1250.0	468.11	0	19.63	0	9.71	0	0	0	29.34	8.7	138.9	130.2
132	9/24/2006	1190.0	198.86	0	16.73	0	9.45	0	0	0	26.18	8.2	62.0	53.8
133	9/25/2006	1200.0	528.9	0	17.16	0	9.5	0	0	0	26.66	8.2	163.4	155.2
134	9/26/2006	1240.0	589	0	18.71	0	9.82	0	0	0	28.53	8.5	176.1	167.6
135	9/27/2006	1280.0	613.76	0	20.6	0	10.04	0	0	0	30.64	8.9	177.8	168.9
136	9/28/2006	1290.0	534.17	0	20.8	0	10.21	0	0	0	31.01	8.9	153.5	144.6
137	9/29/2006	1290.0	967.87	0	21.25	0	10.04	0	0	0	31.29	9.0	278.2	269.2
138	9/30/2006	1320.0	663.95	0	23.27	0	10.04	0	0	0	33.31	9.4	186.5	177.2
139	10/1/2006	1460.0	858.74	0	37.08	0	9.25	0	0	0	46.33	11.8	218.1	206.3
140	10/2/2006	1500.0	659.47	0	40.05	0	9.4	0	0	0	49.45	12.2	163.0	150.8
141	10/3/2006	1540.0	583.99	0	42.4	0	9.73	0	0	0	52.13	12.6	140.6	128.1
142	10/4/2006	1570.0	498.26	0	45.17	0	9.74	0	0	0	54.91	13.0	117.7	104.7
143	10/5/2006	1600.0	411.78	0	48.6	0	9.66	0	0	0	58.26	13.5	95.4	81.9
144	10/6/2006	1580.0	383.1	0	46.76	0	9.61	0	0	0	56.37	13.2	89.9	76.7
145	10/7/2006	1570.0	531.13	0	46.38	0	9.49	0	0	0	55.87	13.2	125.4	112.2
146	10/8/2006	1560.0	1607.51	0	45.39	0	9.49	0	0	0	54.88	13.0	382.1	369.0
147	10/9/2006	1560.0	1034.38	0	45.48	0	9.45	0	0	0	54.93	13.1	245.9	232.8
148	10/10/2006	1600.0	842.7	0	48.07	0	9.76	0	0	0	57.83	13.4	195.3	181.9
149	10/11/2006	1690.0	709.15	0	54.38	0	10.44	0	0	0	64.82	14.2	155.6	141.4
150	10/12/2006	1710.0	541.6	0	56.12	0	10.53	0	0	0	66.65	14.5	117.4	103.0
151	10/13/2006	1670.0	871.88	0	53.52	0	10.18	0	0	0	63.7	14.1	193.6	179.4
152	10/14/2006	1680.0	861.65	0	54.6	0	10.18	0	0	0	64.78	14.3	190.2	175.9
153	10/15/2006	1670.0	959.39	0	53.52	0	10.18	0	0	0	63.7	14.1	213.0	198.9
154	10/16/2006	1680.0	627.87	0	55.25	0	10.04	0	0	0	65.29	14.4	138.6	124.2
155	10/17/2006	1680.0	868.03	0	56	0	9.89	0	0	0	65.89	14.5	191.6	177.0
156	10/18/2006	1670.0	758.92	0	55.02	0	9.87	0	0	0	64.89	14.4	168.5	154.1
157	10/19/2006	1640.0	656.17	0	52.45	0	9.73	0	0	0	62.18	14.1	148.4	134.3
158	10/20/2006	1620.0	328.75	0	50.86	0	9.61	0	0	0	60.47	13.8	75.2	61.4
159	10/21/2006	1610.0	261.24	0	50.03	0	9.58	0	0	0	59.61	13.7	60.2	46.4
160	10/22/2006	1610.0	610.01	0	49.72	0	9.64	0	0	0	59.36	13.7	140.5	126.8
161	10/23/2006	1600.0	570.7	0	48.81	0	9.61	0	0	0	58.42	13.5	132.3	118.7
162	10/24/2006	1610.0	486.36	0	49.82	0	9.61	0	0	0	59.43	13.7	112.0	98.3
163	10/25/2006	1600.0	353.59	0	48.81	0	9.61	0	0	0	58.42	13.5	81.9	68.4
164	10/26/2006	1590.0	248.11	0	47.77	0	9.61	0	0	0	57.38	13.4	57.9	44.5
165	10/27/2006	1580.0	197.21	0	47.38	0	9.49	0	0	0	56.87	13.3	46.3	32.9
166	10/28/2006	1580.0	183.68	0	47.38	0	9.49	0	0	0	56.87	13.3	43.1	29.8
167	10/29/2006	1570.0	202.01	0	46.47	0	9.45	0	0	0	55.92	13.2	47.7	34.5
168	10/30/2006	1560.0	147.03	0	45.88	0	9.38	0	0	0	55.26	13.1	34.9	21.8

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

												Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
169	10/31/2006	1560.0	159.91	0	46.38	0	9.26	0	0	0	55.64	13.2	38.0	24.8
170	11/1/2006	1540.0	139.5	0	44.6	0	9.22	0	0	0	53.82	13.0	33.6	20.6
171	11/2/2006	1540.0	152.65	0	44.21	0	9.29	0	0	0	53.5	12.9	36.8	23.9
172	11/3/2006	1560.0	146.96	0	46.67	0	9.2	0	0	0	55.87	13.3	34.9	21.7
173	11/4/2006	1550.0	138.48	0	46.18	0	9.1	0	0	0	55.28	13.2	33.1	19.9
174	11/5/2006	1530.0	126.08	0	44.12	0	9.11	0	0	0	53.23	12.9	30.6	17.7
175	11/6/2006	1560.0	192.44	0	46.58	0	9.22	0	0	0	55.8	13.3	45.7	32.5
176	11/7/2006	1560.0	209.64	0	47.17	0	9.1	0	0	0	56.27	13.4	49.8	36.5
177	11/8/2006	1580.0	192.93	0	48.81	0	9.17	0	0	0	57.98	13.6	45.3	31.7
178	11/9/2006	1570.0	236.98	0	48.48	0	9.03	0	0	0	57.51	13.6	56.0	42.4
179	11/10/2006	1540.0	240.9	0	46.98	0	8.7	0	0	0	55.68	13.4	58.0	44.6
180	11/11/2006	1560.0	282.39	0	48.07	0	8.9	0	0	0	56.97	13.5	67.1	53.6
181	11/12/2006	1520.0	253.04	0	44.01	0	8.91	0	0	0	52.92	12.9	61.7	48.8
182	11/13/2006	1580.0	236.21	0	48.18	0	9.29	0	0	0	57.47	13.5	55.4	41.9
183	11/14/2006	1700.0	209.24	0	51.39	0	11.31	0	0	0	62.7	13.7	45.6	32.0
184	11/15/2006	1780.0	219.63	0	54.05	0	12.58	0	0	0	66.63	13.9	45.8	31.9
185	11/16/2006	1780.0	284.31	0	57.25	0	11.91	0	0	0	69.16	14.4	59.2	44.8
186	11/17/2006	1730.0	262.39	0	55.02	0	11.23	0	0	0	66.25	14.2	56.2	42.0
187	11/18/2006	1720.0	238.73	0	55.02	0	10.99	0	0	0	66.01	14.2	51.5	37.2
188	11/19/2006	1680.0	178.12	0	52.54	0	10.61	0	0	0	63.15	13.9	39.3	25.4
189	11/20/2006	1660.0	200.51	0	51.92	0	10.28	0	0	0	62.2	13.9	44.8	30.9
190	11/21/2006	1660.0	288.06	0	49.82	0	10.74	0	0	0	60.56	13.5	64.3	50.8
191	11/22/2006	1880.0	263.81	0	66.26	0	12.43	0	0	0	78.69	15.5	52.0	36.5
192	11/23/2006	1940.0	284.04	0	71.42	0	12.85	0	0	0	84.27	16.1	54.3	38.2
193	11/24/2006	1920.0	286.08	0	66.87	0	13.25	0	0	0	80.12	15.5	55.2	39.8
194	11/25/2006	1850.0	248.77	0	62.35	0	12.51	0	0	0	74.86	15.0	49.9	34.9
195	11/26/2006	1800.0	240.3	0	59.36	0	11.93	0	0	0	71.29	14.7	49.5	34.8
196	11/27/2006	1780.0	205.67	0	57.25	0	11.91	0	0	0	69.16	14.4	42.8	28.4
197	11/28/2006	1820.0	229.74	0	59.14	0	12.45	0	0	0	71.59	14.6	46.8	32.2
198	11/29/2006	1830.0	232.08	0	59.48	0	12.62	0	0	0	72.1	14.6	47.0	32.4
199	11/30/2006	1790.0	213.1	0	57.56	0	12.07	0	0	0	69.63	14.4	44.1	29.7
200	12/1/2006	1770.0	200.87	0	56	0	11.93	0	0	0	67.93	14.2	42.1	27.8
201	12/2/2006	1790.0	209.7	0	57.01	0	12.2	0	0	0	69.21	14.3	43.4	29.1
202	12/3/2006	1850.0	210.8	0	60.73	0	12.82	0	0	0	73.55	14.7	42.3	27.5
203	12/4/2006	1830.0	239.43	0	60.27	0	12.45	0	0	0	72.72	14.7	48.5	33.8
204	12/5/2006	1760.0	188.01	0	56.89	0	11.51	0	0	0	68.4	14.4	39.6	25.2
205	12/6/2006	1590.0	190.41	0	46.18	0	9.97	0	0	0	56.15	13.1	44.4	31.3
206	12/7/2006	1550.0	290.3	0	40.89	0	10.31	0	0	0	51.2	12.2	69.4	57.2
207	12/8/2006	1560.0	267.44	0	40.98	0	10.52	0	0	0	51.5	12.2	63.6	51.3
208	12/9/2006	1520.0	244.86	0	39.87	0	9.89	0	0	0	49.76	12.1	59.7	47.6
209	12/10/2006	1420.0	431.13	0	31.91	0	9.71	0	0	0	41.62	10.9	112.6	101.7
210	12/11/2006	1430.0	367.98	0	31.1	0	10.16	0	0	0	41.26	10.7	95.4	84.7
211	12/12/2006	1560.0	516.27	0	43.34	0	9.95	0	0	0	53.29	12.7	122.7	110.0
212	12/13/2006	1570.0	637.13	0	44.99	0	9.8	0	0	0	54.79	12.9	150.5	137.5
213	12/14/2006	1570.0	322.56	0	45.69	0	9.64	0	0	0	55.33	13.1	76.2	63.1
214	12/15/2006	1550.0	174.6	0	44.99	0	9.35	0	0	0	54.34	13.0	41.8	28.8

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
215	12/16/2006	1500.0	174.11	0	40.32	0	9.34	0	0	0	49.66	12.3	43.0	30.8
216	12/17/2006	1530.0	482.26	0	42.2	0	9.56	0	0	0	51.76	12.5	116.9	104.3
217	12/18/2006	1520.0	194.98	0	43.06	0	9.14	0	0	0	52.2	12.7	47.6	34.8
218	12/19/2006	1050.0	415.72	0	17.32	0	6.28	0	0	0	23.6	8.3	146.8	138.5
219	12/20/2006	600.0	498.05	0	0	0	4.02	0	0	0	4.02	2.5	307.8	305.3
220	12/21/2006	500.0	634.49	0	0	0	3.14	0	0	0	3.14	2.3	470.5	468.2
221	12/22/2006	450.0	388.74	0	0	0	3.48	0	0	0	3.48	2.9	320.3	317.5
222	12/23/2006	550.0	240.14	0	0	0	4.02	0	0	0	4.02	2.7	161.9	159.2
223	12/24/2006	700.0	379.56	0	0.03	0	4.95	0	0	0	4.98	2.6	201.1	198.4
224	12/25/2006	900.0	1006.01	0	2.24	0	5.9	0	0	0	8.14	3.4	414.5	411.1
225	12/26/2006	1100.0	626	0	17.27	0	7.32	0	0	0	24.59	8.3	211.0	202.7
226	12/27/2006	1300.0	488.62	0	27.29	0	8.38	0	0	0	35.67	10.2	139.4	129.2
227	12/28/2006	1400.0	382.71	0	34.47	0	8.58	0	0	0	43.05	11.4	101.4	90.0
228	12/29/2006	1600.0	564.38	0	51.59	0	9.03	0	0	0	60.62	14.0	130.8	116.7
229	12/30/2006	1700.0	399.82	0	59.27	0	9.69	0	0	0	68.96	15.0	87.2	72.2
230	12/31/2006	1800.0	317.79	0	68.7	0	10.12	0	0	0	78.82	16.2	65.5	49.2
231	1/1/2007	1900.0	340.7	0	81.55	0	10.12	0	0	0	91.67	17.9	66.5	48.6
232	1/2/2007	1800.0	559.72	0	71.17	0	9.69	0	0	0	80.86	16.7	115.3	98.6
233	1/3/2007	1610.0	385.24	0	50.54	0	9.45	0	0	0	59.99	13.8	88.7	74.9
234	1/4/2007	1520.0	284.31	0	41.63	0	9.45	0	0	0	51.08	12.5	69.4	56.9
235	1/5/2007	1570.0	228.25	0	45.48	0	9.69	0	0	0	55.17	13.0	53.9	40.9
236	1/6/2007	1630.0	272.62	0	49.52	0	10.12	0	0	0	59.64	13.6	62.0	48.4
237	1/7/2007	1670.0	279.22	0	55.91	0	9.69	0	0	0	65.6	14.6	62.0	47.4
238	1/8/2007	1610.0	267.98	0	50.54	0	9.45	0	0	0	59.99	13.8	61.7	47.9
239	1/9/2007	1590.0	174.77	0	47.48	0	9.69	0	0	0	57.17	13.3	40.8	27.4
240	1/10/2007	1570.0	145.24	0	43.25	0	10.21	0	0	0	53.46	12.6	34.3	21.7
241	1/11/2007	1690.0	152.45	0	51.72	0	11.01	0	0	0	62.73	13.8	33.4	19.7
242	1/12/2007	1680.0	127.62	0	49.19	0	11.34	0	0	0	60.53	13.4	28.2	14.8
243	1/13/2007	1650.0	136.7	0	45.69	0	11.44	0	0	0	57.13	12.8	30.7	17.9
244	1/14/2007	1620.0	128	0	44.6	0	11.01	0	0	0	55.61	12.7	29.3	16.6
245	1/15/2007	1640.0	138.71	0	44.89	0	11.4	0	0	0	56.29	12.7	31.4	18.6
246	1/16/2007	1680.0	138.61	0	48.4	0	11.51	0	0	0	59.91	13.2	30.6	17.4
247	1/17/2007	1660.0	156.64	0	46.88	0	11.4	0	0	0	58.28	13.0	35.0	22.0
248	1/18/2007	1600.0	130.28	0	43.34	0	10.85	0	0	0	54.19	12.6	30.2	17.6
249	1/19/2007	1550.0	295.28	0	40.81	0	10.33	0	0	0	51.14	12.2	70.6	58.4
250	1/20/2007	1540.0	229.61	0	40.89	0	10.07	0	0	0	50.96	12.3	55.3	43.0
251	1/21/2007	1520.0	193.22	0	39.97	0	9.87	0	0	0	49.84	12.2	47.1	35.0
252	1/22/2007	1470.0	122.5	0	36.2	0	9.69	0	0	0	45.89	11.6	30.9	19.3
253	1/23/2007	1460.0	121.34	0	36.72	0	9.34	0	0	0	46.06	11.7	30.8	19.1
254	1/24/2007	1350.0	127.59	0	33.81	0	7.71	0	0	0	41.52	11.4	35.0	23.6
255	1/25/2007	1180.0	115.26	0	26.18	0	6.2	0	0	0	32.38	10.2	36.2	26.0
256	1/26/2007	1190.0	324.69	0	22.38	0	7.51	0	0	0	29.89	9.3	101.2	91.9
257	1/27/2007	1330.0	273.3	0	25.59	0	9.53	0	0	0	35.12	9.8	76.2	66.4
258	1/28/2007	1450.0	381.39	0	35.52	0	9.41	0	0	0	44.93	11.5	97.5	86.0
259	1/29/2007	1430.0	257.86	0	33.47	0	9.5	0	0	0	42.97	11.1	66.9	55.7
260	1/30/2007	1550.0	350.72	0	42	0	10.04	0	0	0	52.04	12.4	83.9	71.5

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
261	1/31/2007	1430.0	121.32	0	27.29	0	11.27	0	0	0	38.56	10.0	31.5	21.5
262	2/1/2007	1430.0	121.17	0	27.58	0	11.18	0	0	0	38.76	10.1	31.4	21.4
263	2/2/2007	1380.0	120.6	0	30.05	0	9.34	0	0	0	39.39	10.6	32.4	21.8
264	2/3/2007	1370.0	119.73	0	31.49	0	8.72	0	0	0	40.21	10.9	32.4	21.5
265	2/4/2007	1370.0	131.21	0	32.65	0	8.42	0	0	0	41.07	11.1	35.5	24.4
266	2/5/2007	1370.0	131.93	0	33.21	0	8.28	0	0	0	41.49	11.2	35.7	24.5
267	2/6/2007	1330.0	112.15	0	30.22	0	8.2	0	0	0	38.42	10.7	31.3	20.6
268	2/7/2007	1380.0	301.22	0	33.39	0	8.43	0	0	0	41.82	11.2	80.9	69.7
269	2/8/2007	1350.0	509.26	0	32.4	0	8.06	0	0	0	40.46	11.1	139.9	128.8
270	2/9/2007	1350.0	140.79	0	31.82	0	8.2	0	0	0	40.02	11.0	38.7	27.7
271	2/10/2007	1350.0	146.21	0	31.91	0	8.18	0	0	0	40.09	11.0	40.2	29.1
272	2/11/2007	1300.0	114.47	0	29.11	0	7.86	0	0	0	36.97	10.5	32.7	22.1
273	2/12/2007	1170.0	947.75	0	21.82	0	7.26	0	0	0	29.08	9.2	300.4	291.1
274	2/13/2007	1210.0	331.02	0	23.74	0	7.51	0	0	0	31.25	9.6	101.4	91.9
275	2/14/2007	1340.0	123.85	0	29.99	0	8.48	0	0	0	38.47	10.6	34.3	23.6
276	2/15/2007	1340.0	119.7	0	30.45	0	8.35	0	0	0	38.8	10.7	33.1	22.4
277	2/16/2007	1300.0	93.02	0	27.52	0	8.32	0	0	0	35.84	10.2	26.5	16.3
278	2/17/2007	1340.0	108.04	0	31.57	0	8.06	0	0	0	39.63	11.0	29.9	18.9
279	2/18/2007	1320.0	120.82	0	30.22	0	7.98	0	0	0	38.2	10.7	33.9	23.2
280	2/19/2007	1310.0	80.16	0	29.34	0	8.01	0	0	0	37.35	10.6	22.7	12.1
281	2/20/2007	1320.0	123.39	0	30.94	0	7.81	0	0	0	38.75	10.9	34.7	23.8
282	2/21/2007	1300.0	76.25	0	29.52	0	7.75	0	0	0	37.27	10.6	21.7	11.1
283	2/22/2007	1310.0	90.05	0	30.22	0	7.78	0	0	0	38	10.8	25.5	14.7
284	2/23/2007	1360.0	126.72	0	32.89	0	8.13	0	0	0	41.02	11.2	34.5	23.4
285	2/24/2007	1330.0	69.4	0	29.74	0	8.33	0	0	0	38.07	10.6	19.3	8.7
286	2/25/2007	1470.0	248.08	0	40.89	0	8.54	0	0	0	49.43	12.5	62.6	50.1
287	2/26/2007	1550.0	336.36	0	48.48	0	8.58	0	0	0	57.06	13.7	80.5	66.8
288	2/27/2007	1460.0	170.32	0	41.08	0	8.29	0	0	0	49.37	12.5	43.3	30.7
289	2/28/2007	1500.0	118.15	0	40.81	0	9.22	0	0	0	50.03	12.4	29.2	16.8
290	3/1/2007	1940.0	658.19	0	88.98	0	9.82	0	0	0	98.8	18.9	125.8	106.9
291	3/2/2007	1890.0	456.02	0	82.23	0	9.8	0	0	0	92.03	18.1	89.5	71.4
292	3/3/2007	1750.0	215.37	0	60.27	0	10.61	0	0	0	70.88	15.0	45.6	30.6
293	3/4/2007	1680.0	151.62	0	55.25	0	10.04	0	0	0	65.29	14.4	33.5	19.1
294	3/5/2007	1510.0	103.36	0	40.98	0	9.4	0	0	0	50.38	12.4	25.4	13.0
295	3/6/2007	1460.0	90.77	0	39.52	0	8.65	0	0	0	48.17	12.2	23.1	10.8
296	3/7/2007	1410.0	89.83	0	35.7	0	8.52	0	0	0	44.22	11.6	23.6	12.0
297	3/8/2007	1450.0	103.9	0	38.69	0	8.64	0	0	0	47.33	12.1	26.6	14.5
298	3/9/2007	1420.0	93.54	0	35.76	0	8.7	0	0	0	44.46	11.6	24.4	12.8
299	3/10/2007	1430.0	97.79	0	37.17	0	8.57	0	0	0	45.74	11.9	25.4	13.5
300	3/11/2007	1440.0	116.25	0	38.05	0	8.57	0	0	0	46.62	12.0	29.9	17.9
301	3/12/2007	1430.0	100.73	0	37.27	0	8.54	0	0	0	45.81	11.9	26.1	14.2
302	3/13/2007	1420.0	95.92	0	36.12	0	8.62	0	0	0	44.74	11.7	25.0	13.4
303	3/14/2007	1500.0	106.09	0	40.81	0	9.22	0	0	0	50.03	12.4	26.2	13.9
304	3/15/2007	1690.0	385.48	0	52.66	0	10.81	0	0	0	63.47	13.9	84.6	70.7
305	3/16/2007	2000.0	241.73	0	69.69	0	14.63	0	0	0	84.32	15.6	44.8	29.2
306	3/17/2007	2280.0	408.99	0	94.56	0	16.96	0	0	0	111.52	18.1	66.5	48.4

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

												Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
307	3/18/2007	1940.0	203.41	0	64.94	0	14.12	0	0	0	79.06	15.1	38.9	23.8
308	3/19/2007	1900.0	134.06	0	60.05	0	14.17	0	0	0	74.22	14.5	26.2	11.7
309	3/20/2007	2120.0	286.65	0	69.55	0	17.65	0	0	0	87.2	15.3	50.1	34.9
310	3/21/2007	2650.0	261.44	0	113.33	0	23.39	0	0	0	136.72	19.1	36.6	17.5
311	3/22/2007	3150.0	261.4	0	148.6	0	32.57	0	0	0	181.17	21.3	30.8	9.4
312	3/23/2007	3330.0	574.01	0	177.41	0	34.8	0	0	0	212.21	23.6	63.9	40.3
313	3/24/2007	3210.0	252.3	0	154.06	0	33.86	0	0	0	187.92	21.7	29.1	7.4
314	3/25/2007	3230.0	251.77	0	148.6	0	36.44	0	0	0	185.04	21.2	28.9	7.7
315	3/26/2007	3630.0	334.72	0	187.61	0	50.67	0	0	0	238.28	24.3	34.2	9.9
316	3/27/2007	3720.0	364.79	0	200.24	0	52.78	0	0	0	253.02	25.2	36.4	11.1
317	3/28/2007	3390.0	251.19	0	150.42	0	45.96	0	0	0	196.38	21.5	27.5	6.0
318	3/29/2007	3190.0	218.49	0	127.84	0	41.48	0	0	0	169.32	19.7	25.4	5.7
319	3/30/2007	3050.0	195.53	0	113.33	0	38.35	0	0	0	151.68	18.4	23.8	5.3
320	3/31/2007	2970.0	186.33	0	107.17	0	35.88	0	0	0	143.05	17.9	23.3	5.4
321	4/1/2007	2810.0	167.35	0	96.83	0	31.76	0	0	0	128.59	17.0	22.1	5.1
322	4/2/2007	2620.0	147.8	0	81.55	0	28.97	0	0	0	110.52	15.6	20.9	5.3
323	4/3/2007	2570.0	144.64	0	80.21	0	27.71	0	0	0	107.92	15.6	20.9	5.3
324	4/4/2007	2510.0	138.17	0	74.98	0	27.11	0	0	0	102.09	15.1	20.4	5.3
325	4/5/2007	2430.0	132.19	0	71.17	0	25.64	0	0	0	96.81	14.8	20.2	5.4
326	4/6/2007	2340.0	125.14	0	63.88	0	24.79	0	0	0	88.67	14.1	19.8	5.8
327	4/7/2007	2350.0	125.2	0	62.71	0	25.37	0	0	0	88.08	13.9	19.8	5.9
328	4/8/2007	2370.0	202.81	0	59.27	0	26.81	0	0	0	86.08	13.5	31.7	18.3
329	4/9/2007	2470.0	199.49	0	65.06	0	28.34	0	0	0	93.4	14.0	29.9	15.9
330	4/10/2007	2430.0	218.91	0	65.06	0	27.11	0	0	0	92.17	14.1	33.4	19.3
331	4/11/2007	2320.0	138.17	0	55.91	0	26.21	0	0	0	82.12	13.1	22.1	9.0
332	4/12/2007	2380.0	206.09	0	61.54	0	26.52	0	0	0	88.06	13.7	32.1	18.4
333	4/13/2007	2450.0	229.44	0	61.54	0	28.65	0	0	0	90.19	13.6	34.7	21.1
334	4/14/2007	2570.0	181.11	0	66.26	0	31.39	0	0	0	97.65	14.1	26.1	12.0
335	4/15/2007	2650.0	195.31	0	72.44	0	32.57	0	0	0	105.01	14.7	27.3	12.6
336	4/16/2007	2640.0	167.23	0	67.48	0	33.86	0	0	0	101.34	14.2	23.5	9.3
337	4/17/2007	2760.0	182.87	0	73.72	0	37.67	0	0	0	111.39	15.0	24.6	9.6
338	4/18/2007	3015.0	219.81	0	91.19	0	45.63	0	0	0	136.82	16.8	27.0	10.2
339	4/19/2007	3520.0	436.86	0	92.57	0	84.74	0	0	0	177.31	18.7	46.0	27.3
340	4/20/2007	4420.0	1253.84	0	143.24	0	148	0	0	0	291.24	24.4	105.2	80.8
341	4/21/2007	4940.0	1504.54	0	187.61	0	190.12	0	0	0	377.73	28.4	112.9	84.6
342	4/22/2007	4900.0	1251.49	0	179.42	0	190.12	0	0	0	369.54	28.0	94.7	66.7
343	4/23/2007	4720.0	1070.89	0	159.65	0	175.86	0	0	0	335.51	26.4	84.1	57.8
344	4/24/2007	4610.0	995.61	0	141.5	0	174.47	0	0	0	315.97	25.4	80.1	54.7
345	4/25/2007	4710.0	1193.75	0	132.87	0	194.66	0	0	0	327.53	25.8	94.0	68.2
346	4/26/2007	5120.0	1290.09	0	148.6	0	227.2	0	0	0	375.8	27.2	93.4	66.2
347	4/27/2007	5710.0	1810.61	0	191.76	0	269.51	0	0	0	461.27	30.0	117.6	87.6
348	4/28/2007	6110.0	1945.63	0	238.39	0	311.5	0	0	0	549.89	33.4	118.1	84.7
349	4/29/2007	5970.0	1932.65	0	229.1	0	292.18	0	0	0	521.28	32.4	120.0	87.7
350	4/30/2007	5600.0	1710.79	0	200.24	0	252.81	0	0	0	453.05	30.0	113.3	83.3
351	5/1/2007	5340.0	1562.61	0	177.41	0	236.69	0	0	0	414.1	28.8	108.5	79.8
352	5/2/2007	5340.0	1358.02	0	179.42	0	235.64	0	0	0	415.06	28.8	94.3	65.5

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
353	5/3/2007	5460.0	1232.62	0	202.37	0	236.69	0	0	0	439.06	29.8	83.7	53.9
354	5/4/2007	5430.0	843.75	0	202.37	0	233.5	0	0	0	435.87	29.8	57.6	27.9
355	5/5/2007	5250.0	729.26	0	187.61	0	222	0	0	0	409.61	28.9	51.5	22.6
356	5/6/2007	4950.0	487.57	0	157.76	0	204.64	0	0	0	362.4	27.1	36.5	9.4
357	5/7/2007	4860.0	466.61	0	146.81	0	201.63	0	0	0	348.44	26.6	35.6	9.0
358	5/8/2007	4880.0	478.26	0	152.22	0	200.61	0	0	0	352.83	26.8	36.3	9.5
359	5/9/2007	4900.0	482.61	0	152.22	0	202.63	0	0	0	354.85	26.9	36.5	9.7
360	5/10/2007	4890.0	526.05	0	155.9	0	199.62	0	0	0	355.52	27.0	39.9	12.9
361	5/11/2007	4790.0	532.21	0	154.06	0	190.12	0	0	0	344.18	26.6	41.2	14.6
362	5/12/2007	4640.0	519.28	0	145.03	0	175.86	0	0	0	320.89	25.6	41.5	15.9
363	5/13/2007	4560.0	475.84	0	146.81	0	163.59	0	0	0	310.4	25.2	38.7	13.5
364	5/14/2007	4380.0	424.29	0	131.18	0	151.81	0	0	0	282.99	24.0	35.9	12.0
365	5/15/2007	4210.0	418.27	0	114.88	0	143	0	0	0	257.88	22.7	36.8	14.1
366	5/16/2007	4150.0	373.72	0	107.17	0	141.76	0	0	0	248.93	22.2	33.4	11.1
367	5/17/2007	4160.0	380.05	0	105.68	0	144.22	0	0	0	249.9	22.3	33.9	11.6
368	5/18/2007	4330.0	465.53	0	110.23	0	162.25	0	0	0	272.48	23.3	39.9	16.5
369	5/19/2007	4840.0	867.38	0	129.49	0	209.67	0	0	0	339.16	26.0	66.5	40.5
370	5/20/2007	5540.0	1263.04	0	179.42	0	257.15	0	0	0	436.57	29.2	84.5	55.3
371	5/21/2007	6210.0	1764.87	0	208.91	0	359.75	0	0	0	568.66	34.0	105.4	71.4
372	5/22/2007	7200.0	1677.58	0	280.04	0	542.15	0	0	0	822.19	42.3	86.4	44.1
373	5/23/2007	7960.0	2556.6	0	362.26	0	702.94	0	0	0	1065.2	49.6	119.1	69.5
374	5/24/2007	9020.0	3207.27	0.01	556.09	0	813.73	0	0	0	1369.82	56.3	131.8	75.5
375	5/25/2007	10800.0	4712.89	0.05	606.55	0	1344.22	0	0	0	1950.77	67.0	161.8	94.8
376	5/26/2007	13000.0	5553.87	0.1	957.04	168.89	2111.46	0	0	0	3068.5	87.5	158.4	70.9
377	5/27/2007	13500.0	4709.56	0.11	1127.11	198.9	2343.35	0	0	0	3470.46	95.3	129.4	34.0
378	5/28/2007	13100.0	3984.83	0.11	1111.53	196.15	1955.4	0	0	0	3066.93	86.8	112.8	26.0
379	5/29/2007	13000.0	4139.74	0.1	1127.11	198.9	1872.84	0	0	0	2999.95	85.6	118.1	32.5
380	5/30/2007	13500.0	4402.25	0.11	1574.86	277.92	1707.99	0	0	0	3282.85	90.2	120.9	30.7
381	5/31/2007	12700.0	3822.5	0.09	1500.67	264.83	1366.33	0	0	0	2867	83.7	111.6	27.9
382	6/1/2007	11500.0	3450.22	0.07	1142.85	201.68	1135.95	0	0	0	2278.8	73.5	111.2	37.8
383	6/2/2007	11200.0	3152.12	0.06	1137.6	200.75	1036.02	0	0	0	2173.62	72.0	104.4	32.4
384	6/3/2007	11900.0	2945.62	0.07	1289.78	227.6	1184.39	0	0	0	2474.17	77.1	91.8	14.7
385	6/4/2007	14000.0	3656.86	0.15	2122.27	374.52	1547.58	0	0	0	3669.85	97.2	96.9	-0.3
386	6/5/2007	14400.0	3782.82	0.15	2227.62	393.11	1685.69	0	0	0	3913.31	100.8	97.4	-3.4
387	6/6/2007	13500.0	3293.38	0.12	1857.11	327.73	1482.92	0	0	0	3340.03	91.7	90.5	-1.3
388	6/7/2007	12300.0	2516.64	0.1	1488.51	262.68	1207.54	0	0	0	2696.05	81.3	75.9	-5.4
389	6/8/2007	11100.0	2806.23	0.07	1190.77	210.13	973.35	0	0	0	2164.12	72.3	93.7	21.4
390	6/9/2007	10300.0	2183.89	0.05	1045.23	184.45	832.66	0	0	0	1877.89	67.6	78.6	11.0
391	6/10/2007	9300.0	1682.42	0.02	823.79	145.37	657.48	0	0	0	1481.27	59.1	67.1	8.0
392	6/11/2007	8400.0	1392.81	0	635.98	0	514.7	0	0	0	1150.68	50.8	61.5	10.7
393	6/12/2007	7790.0	1255.78	0	537.03	0	436.68	0	0	0	973.71	46.3	59.8	13.4
394	6/13/2007	7560.0	1144.1	0	494.25	0	421.31	0	0	0	915.56	44.9	56.1	11.2
395	6/14/2007	7870.0	1090.82	0	506.35	0	491.31	0	0	0	997.66	47.0	51.4	4.4
396	6/15/2007	8760.0	1299.94	0.01	561.72	0	722.69	0	0	0	1284.41	54.4	55.0	0.7
397	6/16/2007	9530.0	1482.87	0.02	642.78	0	870.07	0	0	0	1512.85	58.9	57.7	-1.2
398	6/17/2007	10400.0	1686.89	0.04	832.63	146.93	982.44	0	0	0	1815.07	64.7	60.1	-4.6

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
399	6/18/2007	10500.0	1619.56	0.04	823.79	145.37	1019.88	0	0	0	1843.67	65.1	57.2	-7.9
400	6/19/2007	10400.0	1643.16	0.04	797.56	140.75	1007.19	0	0	0	1804.75	64.3	58.6	-5.8
401	6/20/2007	10200.0	1696.22	0.03	776.07	136.95	961.41	0	0	0	1737.48	63.2	61.7	-1.5
402	6/21/2007	9510.0	1535.04	0.02	656.73	0	854.82	0	0	0	1511.55	58.9	59.9	0.9
403	6/22/2007	8940.0	1470.42	0.01	588.06	0	759.44	0	0	0	1347.5	55.9	61.0	5.1
404	6/23/2007	8590.0	1283.67	0	558.9	0	661.18	0	0	0	1220.08	52.7	55.4	2.7
405	6/24/2007	7910.0	1223.2	0	480.26	0	535.97	0	0	0	1016.23	47.6	57.3	9.7
406	6/25/2007	7770.0	1159.63	0	445.3	0	542.15	0	0	0	987.45	47.1	55.3	8.2
407	6/26/2007	7650.0	1178.04	0	437.04	0	517.71	0	0	0	954.75	46.3	57.1	10.8
408	6/27/2007	6900.0	894.41	0	350.64	0	389.55	0	0	0	740.19	39.8	48.1	8.3
409	6/28/2007	6270.0	776.28	0	285.19	0	305.6	0	0	0	590.79	34.9	45.9	11.0
410	6/29/2007	5820.0	674.78	0	240.75	0	257.15	0	0	0	497.9	31.7	43.0	11.3
411	6/30/2007	5620.0	629.31	0	213.28	0	248.45	0	0	0	461.73	30.5	41.5	11.1
412	7/1/2007	5890.0	641.69	0	224.51	0	273.78	0	0	0	498.29	31.4	40.4	9.0
413	7/2/2007	5900.0	646.54	0	217.73	0	286.95	0	0	0	504.68	31.7	40.6	8.9
414	7/3/2007	5610.0	590.85	0	202.37	0	252.81	0	0	0	455.18	30.1	39.1	9.0
415	7/4/2007	5290.0	551.09	0	181.45	0	229.28	0	0	0	410.73	28.8	38.6	9.8
416	7/5/2007	5030.0	501.91	0	157.76	0	212.75	0	0	0	370.51	27.3	37.0	9.7
417	7/6/2007	4710.0	464.97	0	136.28	0	192.7	0	0	0	328.98	25.9	36.6	10.7
418	7/7/2007	4500.0	421.06	0	126.16	0	171.72	0	0	0	297.88	24.5	34.7	10.2
419	7/8/2007	4290.0	396.03	0	104.17	0	162.25	0	0	0	266.42	23.0	34.2	11.2
420	7/9/2007	4100.0	377.81	0	91.19	0	149.24	0	0	0	240.43	21.7	34.2	12.4
421	7/10/2007	3950.0	363.8	0	87.02	0	134.47	0	0	0	221.49	20.8	34.2	13.4
422	7/11/2007	3710.0	315.16	0	71.17	0	120.55	0	0	0	191.72	19.2	31.5	12.3
423	7/12/2007	3540.0	275.34	0	62.71	0	109.6	0	0	0	172.31	18.0	28.8	10.8
424	7/13/2007	3430.0	253.63	0	61.54	0	99.24	0	0	0	160.78	17.4	27.4	10.0
425	7/14/2007	3290.0	227.16	0	57.01	0	89.45	0	0	0	146.46	16.5	25.6	9.1
426	7/15/2007	3120.0	198.54	0	49.52	0	80.16	0	0	0	129.68	15.4	23.6	8.2
427	7/16/2007	3020.0	187.28	0	47.48	0	73.13	0	0	0	120.61	14.8	23.0	8.2
428	7/17/2007	2930.0	176.16	0	47.48	0	65.64	0	0	0	113.12	14.3	22.3	8.0
429	7/18/2007	2810.0	161.4	0	41.63	0	60.93	0	0	0	102.56	13.5	21.3	7.8
430	7/19/2007	2720.0	153.17	0	44.51	0	52.07	0	0	0	96.58	13.2	20.9	7.7
431	7/20/2007	2650.0	148.71	0	44.51	0	47.26	0	0	0	91.77	12.8	20.8	8.0
432	7/21/2007	2530.0	134.48	0	38.88	0	43.38	0	0	0	82.26	12.1	19.7	7.7
433	7/22/2007	2530.0	136.87	0	44.51	0	39.65	0	0	0	84.16	12.3	20.1	7.7
434	7/23/2007	2410.0	123.69	0	39.78	0	35.32	0	0	0	75.1	11.6	19.0	7.5
435	7/24/2007	2250.0	111.61	0	31.99	0	32.15	0	0	0	64.14	10.6	18.4	7.8
436	7/25/2007	2260.0	115	0	36.2	0	30.65	0	0	0	66.85	11.0	18.9	7.9
437	7/26/2007	2200.0	107.54	0	35.33	0	28.97	0	0	0	64.3	10.8	18.1	7.3
438	7/27/2007	2110.0	100.46	0	32.81	0	27.11	0	0	0	59.92	10.5	17.7	7.1
439	7/28/2007	2010.0	92.58	0	29.58	0	25.37	0	0	0	54.95	10.1	17.1	6.9
440	7/29/2007	1940.0	88.99	0	28.03	0	23.94	0	0	0	51.97	9.9	17.0	7.1
441	7/30/2007	1870.0	85.52	0	26.53	0	22.59	0	0	0	49.12	9.7	17.0	7.2
442	7/31/2007	1800.0	80.35	0	22.98	0	22.03	0	0	0	45.01	9.3	16.6	7.3
443	8/1/2007	1730.0	75.71	0	19.72	0	21.49	0	0	0	41.21	8.8	16.2	7.4
444	8/2/2007	1710.0	73.73	0	19.08	0	21.23	0	0	0	40.31	8.7	16.0	7.2

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
445	8/3/2007	1690.0	73.15	0	20.34	0	20.18	0	0	0	40.52	8.9	16.0	7.2
446	8/4/2007	1680.0	72.74	0	20.84	0	19.69	0	0	0	40.53	8.9	16.1	7.1
447	8/5/2007	1680.0	72.99	0	21.17	0	19.56	0	0	0	40.73	9.0	16.1	7.1
448	8/6/2007	1710.0	76.85	0	25.02	0	18.89	0	0	0	43.91	9.5	16.7	7.1
449	8/7/2007	1740.0	78.42	0	22.98	0	20.44	0	0	0	43.42	9.3	16.7	7.5
450	8/8/2007	1730.0	77.74	0	24.81	0	19.48	0	0	0	44.29	9.5	16.7	7.2
451	8/9/2007	1610.0	69.34	0	19.63	0	18.37	0	0	0	38	8.8	16.0	7.2
452	8/10/2007	1580.0	68.84	0	19.76	0	17.55	0	0	0	37.31	8.8	16.2	7.4
453	8/11/2007	1550.0	66.19	0	18.83	0	17.18	0	0	0	36.01	8.6	15.8	7.2
454	8/12/2007	1580.0	68.27	0	19.46	0	17.67	0	0	0	37.13	8.7	16.0	7.3
455	8/13/2007	1780.0	79.95	0	28.19	0	19.59	0	0	0	47.78	10.0	16.7	6.7
456	8/14/2007	1810.0	81.95	0	28.03	0	20.44	0	0	0	48.47	9.9	16.8	6.9
457	8/15/2007	1820.0	84.89	0	31.17	0	19.63	0	0	0	50.8	10.3	17.3	6.9
458	8/16/2007	1830.0	87.37	0	34.4	0	18.89	0	0	0	53.29	10.8	17.7	6.9
459	8/17/2007	1780.0	83.68	0	33.73	0	17.8	0	0	0	51.53	10.7	17.4	6.7
460	8/18/2007	1700.0	76.41	0	29.91	0	16.96	0	0	0	46.87	10.2	16.7	6.4
461	8/19/2007	1630.0	72.16	0	26.53	0	16.32	0	0	0	42.85	9.7	16.4	6.7
462	8/20/2007	1600.0	69.69	0	26.61	0	15.54	0	0	0	42.15	9.8	16.2	6.4
463	8/21/2007	1510.0	65.37	0	21.91	0	14.97	0	0	0	36.88	9.1	16.1	7.0
464	8/22/2007	1500.0	64.28	0	22.1	0	14.66	0	0	0	36.76	9.1	15.9	6.8
465	8/23/2007	1450.0	61.92	0	20.01	0	14.22	0	0	0	34.23	8.8	15.8	7.1
466	8/24/2007	1430.0	60.28	0	19.95	0	13.75	0	0	0	33.7	8.7	15.6	6.9
467	8/25/2007	1290.0	44.83	0	5.08	0	13.69	0	0	0	18.77	5.4	12.9	7.5
468	8/26/2007	1220.0	39.7	0	1.34	0	13.42	0	0	0	14.76	4.5	12.1	7.6
469	8/27/2007	1250.0	40.45	0	4.07	0	12.98	0	0	0	17.05	5.1	12.0	6.9
470	8/28/2007	1400.0	57.38	0	20.07	0	12.99	0	0	0	33.06	8.8	15.2	6.4
471	8/29/2007	1340.0	53.23	0	16.05	0	13.16	0	0	0	29.21	8.1	14.7	6.6
472	8/30/2007	1410.0	57.74	0	19.95	0	13.28	0	0	0	33.23	8.7	15.2	6.4
473	8/31/2007	1380.0	56.96	0	18.35	0	13.17	0	0	0	31.52	8.5	15.3	6.8
474	9/1/2007	1420.0	58.94	0	21.56	0	12.92	0	0	0	34.48	9.0	15.4	6.4
475	9/2/2007	1400.0	57.29	0	20.21	0	12.93	0	0	0	33.14	8.8	15.2	6.4
476	9/3/2007	1420.0	58.69	0	21.43	0	12.98	0	0	0	34.41	9.0	15.3	6.3
477	9/4/2007	1500.0	63.06	0	24.09	0	13.95	0	0	0	38.04	9.4	15.6	6.2
478	9/5/2007	1530.0	63.98	0	26.4	0	13.9	0	0	0	40.3	9.8	15.5	5.7
479	9/6/2007	1530.0	65.24	0	28.35	0	13.28	0	0	0	41.63	10.1	15.8	5.7
480	9/7/2007	1480.0	63.22	0	27.06	0	12.51	0	0	0	39.57	9.9	15.8	5.9
481	9/8/2007	1360.0	55.68	0	20.16	0	12.03	0	0	0	32.19	8.8	15.2	6.4
482	9/9/2007	1380.0	57.2	0	21.72	0	11.93	0	0	0	33.65	9.0	15.4	6.3
483	9/10/2007	1340.0	53.43	0	19.72	0	11.73	0	0	0	31.45	8.7	14.8	6.1
484	9/11/2007	1350.0	54.84	0	21.43	0	11.34	0	0	0	32.77	9.0	15.1	6.1
485	9/12/2007	1340.0	54.39	0	21.52	0	11.08	0	0	0	32.6	9.0	15.1	6.0
486	9/13/2007	1290.0	50.54	0	17.99	0	11.23	0	0	0	29.22	8.4	14.5	6.1
487	9/14/2007	1340.0	53.7	0	21.3	0	11.14	0	0	0	32.44	9.0	14.9	5.9
488	9/15/2007	1330.0	52.93	0	21.17	0	10.97	0	0	0	32.14	9.0	14.8	5.8
489	9/16/2007	1330.0	53.76	0	21.91	0	10.71	0	0	0	32.62	9.1	15.0	5.9
490	9/17/2007	1300.0	52.24	0	20.91	0	10.37	0	0	0	31.28	8.9	14.9	6.0

At xsect 361.66 - closest to CFR above Missoula Gage

JUNE 15 START - RADIAL RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

												Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
491	9/18/2007	1290.0	51.41	0	20.6	0	10.27	0	0	0	30.87	8.9	14.8	5.9
492	9/19/2007	1260.0	48.35	0	18.83	0	10.21	0	0	0	29.04	8.5	14.2	5.7
493	9/20/2007	1290.0	51.6	0	20.66	0	10.24	0	0	0	30.9	8.9	14.8	6.0
494	9/21/2007	1300.0	52.39	0	21.63	0	10.12	0	0	0	31.75	9.1	14.9	5.9
495	9/22/2007	1260.0	48.82	0	19.76	0	9.89	0	0	0	29.65	8.7	14.4	5.6
496	9/23/2007	1250.0	47.4	0	19.63	0	9.71	0	0	0	29.34	8.7	14.1	5.4
497	9/24/2007	1190.0	43.89	0	16.73	0	9.45	0	0	0	26.18	8.2	13.7	5.5
498	9/25/2007	1200.0	44.52	0	17.16	0	9.5	0	0	0	26.66	8.2	13.8	5.5
499	9/26/2007	1240.0	48.3	0	18.71	0	9.82	0	0	0	28.53	8.5	14.4	5.9
500	9/27/2007	1280.0	49.35	0	20.6	0	10.04	0	0	0	30.64	8.9	14.3	5.4
501	9/28/2007	1290.0	50.28	0	20.8	0	10.21	0	0	0	31.01	8.9	14.5	5.5
502	9/29/2007	1290.0	49.98	0	21.25	0	10.04	0	0	0	31.29	9.0	14.4	5.4
503	9/30/2007	1320.0	52.48	0	23.27	0	10.04	0	0	0	33.31	9.4	14.7	5.4
504	10/1/2007	1460.0	66.06	0	37.08	0	9.25	0	0	0	46.33	11.8	16.8	5.0
505	10/2/2007	1500.0	72.23	0	40.05	0	9.4	0	0	0	49.45	12.2	17.9	5.6
506	10/3/2007	1540.0	73.83	0	42.4	0	9.73	0	0	0	52.13	12.6	17.8	5.2
507	10/4/2007	1570.0	77.8	0	45.17	0	9.74	0	0	0	54.91	13.0	18.4	5.4
508	10/5/2007	1600.0	78.8	0	48.6	0	9.66	0	0	0	58.26	13.5	18.3	4.8
509	10/6/2007	1580.0	123.62	0	46.76	0	9.61	0	0	0	56.37	13.2	29.0	15.8
510	10/7/2007	1570.0	133.26	0	46.38	0	9.49	0	0	0	55.87	13.2	31.5	18.3
511	10/8/2007	1560.0	134.98	0	45.39	0	9.49	0	0	0	54.88	13.0	32.1	19.0
512	10/9/2007	1560.0	91.07	0	45.48	0	9.45	0	0	0	54.93	13.1	21.6	8.6
513	10/10/2007	1600.0	88.63	0	48.07	0	9.76	0	0	0	57.83	13.4	20.5	7.1
514	10/11/2007	1690.0	95.12	0	54.38	0	10.44	0	0	0	64.82	14.2	20.9	6.6
515	10/12/2007	1710.0	97.74	0	56.12	0	10.53	0	0	0	66.65	14.5	21.2	6.7
516	10/13/2007	1670.0	92.01	0	53.52	0	10.18	0	0	0	63.7	14.1	20.4	6.3
517	10/14/2007	1680.0	89.79	0	54.6	0	10.18	0	0	0	64.78	14.3	19.8	5.5
518	10/15/2007	1670.0	86.28	0	53.52	0	10.18	0	0	0	63.7	14.1	19.2	5.0
519	10/16/2007	1680.0	88.95	0	55.25	0	10.04	0	0	0	65.29	14.4	19.6	5.2
520	10/17/2007	1680.0	84.18	0	56	0	9.89	0	0	0	65.89	14.5	18.6	4.0
521	10/18/2007	1670.0	84.61	0	55.02	0	9.87	0	0	0	64.89	14.4	18.8	4.4
522	10/19/2007	1640.0	78.21	0	52.45	0	9.73	0	0	0	62.18	14.1	17.7	3.6
523	10/20/2007	1620.0	78.06	0	50.86	0	9.61	0	0	0	60.47	13.8	17.9	4.0
524	10/21/2007	1610.0	74.59	0	50.03	0	9.58	0	0	0	59.61	13.7	17.2	3.5
525	10/22/2007	1610.0	76.28	0	49.72	0	9.64	0	0	0	59.36	13.7	17.6	3.9
526	10/23/2007	1600.0	72.6	0	48.81	0	9.61	0	0	0	58.42	13.5	16.8	3.3
527	10/24/2007	1610.0	75.25	0	49.82	0	9.61	0	0	0	59.43	13.7	17.3	3.6
528	10/25/2007	1600.0	71.83	0	48.81	0	9.61	0	0	0	58.42	13.5	16.6	3.1
529	10/26/2007	1590.0	72.1	0	47.77	0	9.61	0	0	0	57.38	13.4	16.8	3.4
530	10/27/2007	1580.0	70.13	0	47.38	0	9.49	0	0	0	56.87	13.3	16.5	3.1
531	10/28/2007	1580.0	71.1	0	47.38	0	9.49	0	0	0	56.87	13.3	16.7	3.3
532	10/29/2007	1570.0	69.55	0	46.47	0	9.45	0	0	0	55.92	13.2	16.4	3.2
533	10/30/2007	1560.0	69.41	0	45.88	0	9.38	0	0	0	55.26	13.1	16.5	3.4
534	10/31/2007	1560.0	68.38	0	46.38	0	9.26	0	0	0	55.64	13.2	16.3	3.0

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
31	7/1/2006	5890.0	593.41	0	224.51	0	273.78	0	0	0	498.29	31.4	37.4	6.0
32	7/2/2006	5900.0	765.38	0	217.73	0	286.95	0	0	0	504.68	31.7	48.1	16.4
33	7/3/2006	5610.0	755.85	0	202.37	0	252.81	0	0	0	455.18	30.1	50.0	19.9
34	7/4/2006	5290.0	904.01	0	181.45	0	229.28	0	0	0	410.73	28.8	63.4	34.6
35	7/5/2006	5030.0	2073.15	0	157.76	0	212.75	0	0	0	370.51	27.3	152.8	125.5
36	7/6/2006	4710.0	2631.37	0	136.28	0	192.7	0	0	0	328.98	25.9	207.2	181.3
37	7/7/2006	4500.0	2027.09	0	126.16	0	171.72	0	0	0	297.88	24.5	167.0	142.5
38	7/8/2006	4290.0	3351.02	0	104.17	0	162.25	0	0	0	266.42	23.0	289.6	266.6
39	7/9/2006	4100.0	2684.71	0	91.19	0	149.24	0	0	0	240.43	21.7	242.8	221.1
40	7/10/2006	3950.0	1617.21	0	87.02	0	134.47	0	0	0	221.49	20.8	151.8	131.0
41	7/11/2006	3710.0	1746.42	0	71.17	0	120.55	0	0	0	191.72	19.2	174.5	155.4
42	7/12/2006	3540.0	1676.59	0	62.71	0	109.6	0	0	0	172.31	18.0	175.6	157.6
43	7/13/2006	3430.0	1069.43	0	61.54	0	99.24	0	0	0	160.78	17.4	115.6	98.2
44	7/14/2006	3290.0	1427.61	0	57.01	0	89.45	0	0	0	146.46	16.5	160.9	144.4
45	7/15/2006	3120.0	411.28	0	49.52	0	80.16	0	0	0	129.68	15.4	48.9	33.5
46	7/16/2006	3020.0	1260.17	0	47.48	0	73.13	0	0	0	120.61	14.8	154.7	139.9
47	7/17/2006	2930.0	1207.68	0	47.48	0	65.64	0	0	0	113.12	14.3	152.8	138.5
48	7/18/2006	2810.0	945.57	0	41.63	0	60.93	0	0	0	102.56	13.5	124.8	111.2
49	7/19/2006	2720.0	1046.26	0	44.51	0	52.07	0	0	0	96.58	13.2	142.6	129.5
50	7/20/2006	2650.0	1083.43	0	44.51	0	47.26	0	0	0	91.77	12.8	151.6	138.8
51	7/21/2006	2530.0	736.15	0	38.88	0	43.38	0	0	0	82.26	12.1	107.9	95.8
52	7/22/2006	2530.0	787.92	0	44.51	0	39.65	0	0	0	84.16	12.3	115.5	103.1
53	7/23/2006	2410.0	782.1	0	39.78	0	35.32	0	0	0	75.1	11.6	120.3	108.8
54	7/24/2006	2250.0	1023.19	0	31.99	0	32.15	0	0	0	64.14	10.6	168.6	158.1
55	7/25/2006	2260.0	844.27	0	36.2	0	30.65	0	0	0	66.85	11.0	138.5	127.6
56	7/26/2006	2200.0	1268.67	0	35.33	0	28.97	0	0	0	64.3	10.8	213.8	203.0
57	7/27/2006	2110.0	1216.29	0	32.81	0	27.11	0	0	0	59.92	10.5	213.7	203.2
58	7/28/2006	2010.0	805.96	0	29.58	0	25.37	0	0	0	54.95	10.1	148.7	138.5
59	7/29/2006	1940.0	1600.43	0	28.03	0	23.94	0	0	0	51.97	9.9	305.9	296.0
60	7/30/2006	1870.0	1131.52	0	26.53	0	22.59	0	0	0	49.12	9.7	224.4	214.6
61	7/31/2006	1800.0	1132.7	0	22.98	0	22.03	0	0	0	45.01	9.3	233.3	224.1
62	8/1/2006	1730.0	1301.45	0	19.72	0	21.49	0	0	0	41.21	8.8	278.9	270.1
63	8/2/2006	1710.0	1820.84	0	19.08	0	21.23	0	0	0	40.31	8.7	394.8	386.1
64	8/3/2006	1690.0	1923.25	0	20.34	0	20.18	0	0	0	40.52	8.9	422.0	413.1
65	8/4/2006	1680.0	1480.09	0	20.84	0	19.69	0	0	0	40.53	8.9	326.7	317.7
66	8/5/2006	1680.0	1038.29	0	21.17	0	19.56	0	0	0	40.73	9.0	229.2	220.2
67	8/6/2006	1710.0	1519.34	0	25.02	0	18.89	0	0	0	43.91	9.5	329.5	319.9
68	8/7/2006	1740.0	930.75	0	22.98	0	20.44	0	0	0	43.42	9.3	198.3	189.1
69	8/8/2006	1730.0	848.27	0	24.81	0	19.48	0	0	0	44.29	9.5	181.8	172.3
70	8/9/2006	1610.0	917	0	19.63	0	18.37	0	0	0	38	8.8	211.2	202.4
71	8/10/2006	1580.0	732.57	0	19.76	0	17.55	0	0	0	37.31	8.8	171.9	163.2
72	8/11/2006	1550.0	646.42	0	18.83	0	17.18	0	0	0	36.01	8.6	154.6	146.0
73	8/12/2006	1580.0	870.43	0	19.46	0	17.67	0	0	0	37.13	8.7	204.3	195.6
74	8/13/2006	1780.0	849.16	0	28.19	0	19.59	0	0	0	47.78	10.0	176.9	166.9
75	8/14/2006	1810.0	1073.31	0	28.03	0	20.44	0	0	0	48.47	9.9	219.9	210.0
76	8/15/2006	1820.0	1523.74	0	31.17	0	19.63	0	0	0	50.8	10.3	310.4	300.1

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

												Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
77	8/16/2006	1830.0	1089.79	0	34.4	0	18.89	0	0	0	53.29	10.8	220.8	210.0
78	8/17/2006	1780.0	822.74	0	33.73	0	17.8	0	0	0	51.53	10.7	171.4	160.7
79	8/18/2006	1700.0	685.87	0	29.91	0	16.96	0	0	0	46.87	10.2	149.6	139.4
80	8/19/2006	1630.0	893.03	0	26.53	0	16.32	0	0	0	42.85	9.7	203.2	193.4
81	8/20/2006	1600.0	541.46	0	26.61	0	15.54	0	0	0	42.15	9.8	125.5	115.7
82	8/21/2006	1510.0	670.72	0	21.91	0	14.97	0	0	0	36.88	9.1	164.7	155.6
83	8/22/2006	1500.0	649.7	0	22.1	0	14.66	0	0	0	36.76	9.1	160.6	151.5
84	8/23/2006	1450.0	1001.36	0	20.01	0	14.22	0	0	0	34.23	8.8	256.1	247.3
85	8/24/2006	1430.0	1248.8	0	19.95	0	13.75	0	0	0	33.7	8.7	323.8	315.1
86	8/25/2006	1290.0	395.78	0	5.08	0	13.69	0	0	0	18.77	5.4	113.8	108.4
87	8/26/2006	1220.0	891.54	0	1.34	0	13.42	0	0	0	14.76	4.5	271.0	266.5
88	8/27/2006	1250.0	430.29	0	4.07	0	12.98	0	0	0	17.05	5.1	127.6	122.6
89	8/28/2006	1400.0	643.14	0	20.07	0	12.99	0	0	0	33.06	8.8	170.3	161.6
90	8/29/2006	1340.0	1041.36	0	16.05	0	13.16	0	0	0	29.21	8.1	288.2	280.1
91	8/30/2006	1410.0	1081.93	0	19.95	0	13.28	0	0	0	33.23	8.7	284.5	275.8
92	8/31/2006	1380.0	863.69	0	18.35	0	13.17	0	0	0	31.52	8.5	232.1	223.6
93	9/1/2006	1420.0	786.63	0	21.56	0	12.92	0	0	0	34.48	9.0	205.4	196.4
94	9/2/2006	1400.0	1697.17	0	20.21	0	12.93	0	0	0	33.14	8.8	449.5	440.7
95	9/3/2006	1420.0	1053.27	0	21.43	0	12.98	0	0	0	34.41	9.0	275.0	266.1
96	9/4/2006	1500.0	1592.48	0	24.09	0	13.95	0	0	0	38.04	9.4	393.7	384.3
97	9/5/2006	1530.0	1016.26	0	26.4	0	13.9	0	0	0	40.3	9.8	246.3	236.5
98	9/6/2006	1530.0	1213.95	0	28.35	0	13.28	0	0	0	41.63	10.1	294.2	284.1
99	9/7/2006	1480.0	761.61	0	27.06	0	12.51	0	0	0	39.57	9.9	190.8	180.9
100	9/8/2006	1360.0	555.99	0	20.16	0	12.03	0	0	0	32.19	8.8	151.6	142.8
101	9/9/2006	1380.0	439.17	0	21.72	0	11.93	0	0	0	33.65	9.0	118.0	109.0
102	9/10/2006	1340.0	710.71	0	19.72	0	11.73	0	0	0	31.45	8.7	196.7	188.0
103	9/11/2006	1350.0	1168.59	0	21.43	0	11.34	0	0	0	32.77	9.0	321.0	312.0
104	9/12/2006	1340.0	440.88	0	21.52	0	11.08	0	0	0	32.6	9.0	122.0	113.0
105	9/13/2006	1290.0	397.02	0	17.99	0	11.23	0	0	0	29.22	8.4	114.1	105.7
106	9/14/2006	1340.0	559.06	0	21.3	0	11.14	0	0	0	32.44	9.0	154.7	145.7
107	9/15/2006	1330.0	1190.83	0	21.17	0	10.97	0	0	0	32.14	9.0	332.0	323.0
108	9/16/2006	1330.0	1152.76	0	21.91	0	10.71	0	0	0	32.62	9.1	321.4	312.3
109	9/17/2006	1300.0	696.32	0	20.91	0	10.37	0	0	0	31.28	8.9	198.6	189.7
110	9/18/2006	1290.0	585.24	0	20.6	0	10.27	0	0	0	30.87	8.9	168.2	159.3
111	9/19/2006	1260.0	539.15	0	18.83	0	10.21	0	0	0	29.04	8.5	158.7	150.1
112	9/20/2006	1290.0	577.09	0	20.66	0	10.24	0	0	0	30.9	8.9	165.9	157.0
113	9/21/2006	1300.0	818.75	0	21.63	0	10.12	0	0	0	31.75	9.1	233.5	224.5
114	9/22/2006	1260.0	907.3	0	19.76	0	9.89	0	0	0	29.65	8.7	267.0	258.3
115	9/23/2006	1250.0	885.91	0	19.63	0	9.71	0	0	0	29.34	8.7	262.8	254.1
116	9/24/2006	1190.0	552.65	0	16.73	0	9.45	0	0	0	26.18	8.2	172.2	164.0
117	9/25/2006	1200.0	948.23	0	17.16	0	9.5	0	0	0	26.66	8.2	293.0	284.8
118	9/26/2006	1240.0	946.66	0	18.71	0	9.82	0	0	0	28.53	8.5	283.1	274.6
119	9/27/2006	1280.0	659.96	0	20.6	0	10.04	0	0	0	30.64	8.9	191.2	182.3
120	9/28/2006	1290.0	783.78	0	20.8	0	10.21	0	0	0	31.01	8.9	225.3	216.4
121	9/29/2006	1290.0	370.64	0	21.25	0	10.04	0	0	0	31.29	9.0	106.5	97.5
122	9/30/2006	1320.0	352.17	0	23.27	0	10.04	0	0	0	33.31	9.4	98.9	89.6

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
123	10/1/2006	1460.0	378.95	0	37.08	0	9.25	0	0	0	46.33	11.8	96.2	84.5
124	10/2/2006	1500.0	382.95	0	40.05	0	9.4	0	0	0	49.45	12.2	94.7	82.4
125	10/3/2006	1540.0	354.57	0	42.4	0	9.73	0	0	0	52.13	12.6	85.4	72.8
126	10/4/2006	1570.0	733.42	0	45.17	0	9.74	0	0	0	54.91	13.0	173.2	160.2
127	10/5/2006	1600.0	333.62	0	48.6	0	9.66	0	0	0	58.26	13.5	77.3	63.8
128	10/6/2006	1580.0	204.17	0	46.76	0	9.61	0	0	0	56.37	13.2	47.9	34.7
129	10/7/2006	1570.0	123.36	0	46.38	0	9.49	0	0	0	55.87	13.2	29.1	15.9
130	10/8/2006	1560.0	133.33	0	45.39	0	9.49	0	0	0	54.88	13.0	31.7	18.6
131	10/9/2006	1560.0	111.1	0	45.48	0	9.45	0	0	0	54.93	13.1	26.4	13.4
132	10/10/2006	1600.0	91.77	0	48.07	0	9.76	0	0	0	57.83	13.4	21.3	7.9
133	10/11/2006	1690.0	197.63	0	54.38	0	10.44	0	0	0	64.82	14.2	43.4	29.1
134	10/12/2006	1710.0	192.92	0	56.12	0	10.53	0	0	0	66.65	14.5	41.8	27.4
135	10/13/2006	1670.0	152.89	0	53.52	0	10.18	0	0	0	63.7	14.1	33.9	19.8
136	10/14/2006	1680.0	107	0	54.6	0	10.18	0	0	0	64.78	14.3	23.6	9.3
137	10/15/2006	1670.0	861.43	0	53.52	0	10.18	0	0	0	63.7	14.1	191.3	177.1
138	10/16/2006	1680.0	911.33	0	55.25	0	10.04	0	0	0	65.29	14.4	201.1	186.7
139	10/17/2006	1680.0	523.05	0	56	0	9.89	0	0	0	65.89	14.5	115.4	100.9
140	10/18/2006	1670.0	350.31	0	55.02	0	9.87	0	0	0	64.89	14.4	77.8	63.4
141	10/19/2006	1640.0	316.35	0	52.45	0	9.73	0	0	0	62.18	14.1	71.5	57.5
142	10/20/2006	1620.0	159.01	0	50.86	0	9.61	0	0	0	60.47	13.8	36.4	22.6
143	10/21/2006	1610.0	127.76	0	50.03	0	9.58	0	0	0	59.61	13.7	29.4	15.7
144	10/22/2006	1610.0	116.3	0	49.72	0	9.64	0	0	0	59.36	13.7	26.8	13.1
145	10/23/2006	1600.0	92.41	0	48.81	0	9.61	0	0	0	58.42	13.5	21.4	7.9
146	10/24/2006	1610.0	82.28	0	49.82	0	9.61	0	0	0	59.43	13.7	18.9	5.3
147	10/25/2006	1600.0	74.9	0	48.81	0	9.61	0	0	0	58.42	13.5	17.4	3.8
148	10/26/2006	1590.0	256.76	0	47.77	0	9.61	0	0	0	57.38	13.4	59.9	46.5
149	10/27/2006	1580.0	129.41	0	47.38	0	9.49	0	0	0	56.87	13.3	30.4	17.0
150	10/28/2006	1580.0	110.83	0	47.38	0	9.49	0	0	0	56.87	13.3	26.0	12.7
151	10/29/2006	1570.0	97.57	0	46.47	0	9.45	0	0	0	55.92	13.2	23.0	9.8
152	10/30/2006	1560.0	77.55	0	45.88	0	9.38	0	0	0	55.26	13.1	18.4	5.3
153	10/31/2006	1560.0	111.57	0	46.38	0	9.26	0	0	0	55.64	13.2	26.5	13.3
154	11/1/2006	1540.0	96.22	0	44.6	0	9.22	0	0	0	53.82	13.0	23.2	10.2
155	11/2/2006	1540.0	83.33	0	44.21	0	9.29	0	0	0	53.5	12.9	20.1	7.2
156	11/3/2006	1560.0	78.44	0	46.67	0	9.2	0	0	0	55.87	13.3	18.6	5.4
157	11/4/2006	1550.0	75.44	0	46.18	0	9.1	0	0	0	55.28	13.2	18.0	4.8
158	11/5/2006	1530.0	216.16	0	44.12	0	9.11	0	0	0	53.23	12.9	52.4	39.5
159	11/6/2006	1560.0	344.19	0	46.58	0	9.22	0	0	0	55.8	13.3	81.8	68.5
160	11/7/2006	1560.0	94.28	0	47.17	0	9.1	0	0	0	56.27	13.4	22.4	9.0
161	11/8/2006	1580.0	174.59	0	48.81	0	9.17	0	0	0	57.98	13.6	41.0	27.4
162	11/9/2006	1570.0	138.76	0	48.48	0	9.03	0	0	0	57.51	13.6	32.8	19.2
163	11/10/2006	1540.0	86.72	0	46.98	0	8.7	0	0	0	55.68	13.4	20.9	7.5
164	11/11/2006	1560.0	89.68	0	48.07	0	8.9	0	0	0	56.97	13.5	21.3	7.8
165	11/12/2006	1520.0	86.2	0	44.01	0	8.91	0	0	0	52.92	12.9	21.0	8.1
166	11/13/2006	1580.0	110.81	0	48.18	0	9.29	0	0	0	57.47	13.5	26.0	12.5
167	11/14/2006	1700.0	155.31	0	51.39	0	11.31	0	0	0	62.7	13.7	33.9	20.2
168	11/15/2006	1780.0	280.58	0	54.05	0	12.58	0	0	0	66.63	13.9	58.4	44.6

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
169	11/16/2006	1780.0	319.86	0	57.25	0	11.91	0	0	0	69.16	14.4	66.6	52.2
170	11/17/2006	1730.0	160.54	0	55.02	0	11.23	0	0	0	66.25	14.2	34.4	20.2
171	11/18/2006	1720.0	136.59	0	55.02	0	10.99	0	0	0	66.01	14.2	29.4	15.2
172	11/19/2006	1680.0	115.82	0	52.54	0	10.61	0	0	0	63.15	13.9	25.6	11.6
173	11/20/2006	1660.0	131.86	0	51.92	0	10.28	0	0	0	62.2	13.9	29.5	15.6
174	11/21/2006	1660.0	118.35	0	49.82	0	10.74	0	0	0	60.56	13.5	26.4	12.9
175	11/22/2006	1880.0	363.02	0	66.26	0	12.43	0	0	0	78.69	15.5	71.6	56.1
176	11/23/2006	1940.0	337.24	0	71.42	0	12.85	0	0	0	84.27	16.1	64.5	48.4
177	11/24/2006	1920.0	205.53	0	66.87	0	13.25	0	0	0	80.12	15.5	39.7	24.2
178	11/25/2006	1850.0	156.38	0	62.35	0	12.51	0	0	0	74.86	15.0	31.3	16.3
179	11/26/2006	1800.0	136.64	0	59.36	0	11.93	0	0	0	71.29	14.7	28.1	13.5
180	11/27/2006	1780.0	129.95	0	57.25	0	11.91	0	0	0	69.16	14.4	27.1	12.7
181	11/28/2006	1820.0	146.34	0	59.14	0	12.45	0	0	0	71.59	14.6	29.8	15.2
182	11/29/2006	1830.0	152.53	0	59.48	0	12.62	0	0	0	72.1	14.6	30.9	16.3
183	11/30/2006	1790.0	142.83	0	57.56	0	12.07	0	0	0	69.63	14.4	29.6	15.2
184	12/1/2006	1770.0	135.66	0	56	0	11.93	0	0	0	67.93	14.2	28.4	14.2
185	12/2/2006	1790.0	145.62	0	57.01	0	12.2	0	0	0	69.21	14.3	30.2	15.8
186	12/3/2006	1850.0	160.88	0	60.73	0	12.82	0	0	0	73.55	14.7	32.2	17.5
187	12/4/2006	1830.0	187.63	0	60.27	0	12.45	0	0	0	72.72	14.7	38.0	23.3
188	12/5/2006	1760.0	425.7	0	56.89	0	11.51	0	0	0	68.4	14.4	89.7	75.3
189	12/6/2006	1590.0	476.14	0	46.18	0	9.97	0	0	0	56.15	13.1	111.0	97.9
190	12/7/2006	1550.0	201.01	0	40.89	0	10.31	0	0	0	51.2	12.2	48.1	35.8
191	12/8/2006	1560.0	723.5	0	40.98	0	10.52	0	0	0	51.5	12.2	172.0	159.7
192	12/9/2006	1520.0	446.2	0	39.87	0	9.89	0	0	0	49.76	12.1	108.8	96.7
193	12/10/2006	1420.0	614.06	0	31.91	0	9.71	0	0	0	41.62	10.9	160.3	149.5
194	12/11/2006	1430.0	738.12	0	31.1	0	10.16	0	0	0	41.26	10.7	191.4	180.7
195	12/12/2006	1560.0	623.91	0	43.34	0	9.95	0	0	0	53.29	12.7	148.3	135.6
196	12/13/2006	1570.0	1275.67	0	44.99	0	9.8	0	0	0	54.79	12.9	301.3	288.3
197	12/14/2006	1570.0	1198.39	0	45.69	0	9.64	0	0	0	55.33	13.1	283.0	270.0
198	12/15/2006	1550.0	1027.26	0	44.99	0	9.35	0	0	0	54.34	13.0	245.7	232.7
199	12/16/2006	1500.0	500.81	0	40.32	0	9.34	0	0	0	49.66	12.3	123.8	111.5
200	12/17/2006	1530.0	787.94	0	42.2	0	9.56	0	0	0	51.76	12.5	191.0	178.4
201	12/18/2006	1520.0	741.16	0	43.06	0	9.14	0	0	0	52.2	12.7	180.8	168.1
202	12/19/2006	1050.0	221.72	0	17.32	0	6.28	0	0	0	23.6	8.3	78.3	70.0
203	12/20/2006	600.0	447.35	0	0	0	4.02	0	0	0	4.02	2.5	276.5	274.0
204	12/21/2006	500.0	138.44	0	0	0	3.14	0	0	0	3.14	2.3	102.7	100.3
205	12/22/2006	450.0	60.05	0	0	0	3.48	0	0	0	3.48	2.9	49.5	46.6
206	12/23/2006	550.0	74.56	0	0	0	4.02	0	0	0	4.02	2.7	50.3	47.6
207	12/24/2006	700.0	82.87	0	0.03	0	4.95	0	0	0	4.98	2.6	43.9	41.3
208	12/25/2006	900.0	854.52	0	2.24	0	5.9	0	0	0	8.14	3.4	352.1	348.7
209	12/26/2006	1100.0	239.46	0	17.27	0	7.32	0	0	0	24.59	8.3	80.7	72.4
210	12/27/2006	1300.0	160.55	0	27.29	0	8.38	0	0	0	35.67	10.2	45.8	35.6
211	12/28/2006	1400.0	240.05	0	34.47	0	8.58	0	0	0	43.05	11.4	63.6	52.2
212	12/29/2006	1600.0	371.38	0	51.59	0	9.03	0	0	0	60.62	14.0	86.1	72.0
213	12/30/2006	1700.0	319.56	0	59.27	0	9.69	0	0	0	68.96	15.0	69.7	54.7
214	12/31/2006	1800.0	335.66	0	68.7	0	10.12	0	0	0	78.82	16.2	69.1	52.9

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
215	1/1/2007	1900.0	324.56	0	81.55	0	10.12	0	0	0	91.67	17.9	63.3	45.5
216	1/2/2007	1800.0	527.28	0	71.17	0	9.69	0	0	0	80.86	16.7	108.6	92.0
217	1/3/2007	1610.0	406.06	0	50.54	0	9.45	0	0	0	59.99	13.8	93.5	79.7
218	1/4/2007	1520.0	189.29	0	41.63	0	9.45	0	0	0	51.08	12.5	46.2	33.7
219	1/5/2007	1570.0	191.27	0	45.48	0	9.69	0	0	0	55.17	13.0	45.2	32.1
220	1/6/2007	1630.0	170.64	0	49.52	0	10.12	0	0	0	59.64	13.6	38.8	25.3
221	1/7/2007	1670.0	236.96	0	55.91	0	9.69	0	0	0	65.6	14.6	52.6	38.0
222	1/8/2007	1610.0	170.16	0	50.54	0	9.45	0	0	0	59.99	13.8	39.2	25.4
223	1/9/2007	1590.0	153.42	0	47.48	0	9.69	0	0	0	57.17	13.3	35.8	22.4
224	1/10/2007	1570.0	165.79	0	43.25	0	10.21	0	0	0	53.46	12.6	39.2	26.5
225	1/11/2007	1690.0	167.89	0	51.72	0	11.01	0	0	0	62.73	13.8	36.8	23.1
226	1/12/2007	1680.0	151.52	0	49.19	0	11.34	0	0	0	60.53	13.4	33.4	20.1
227	1/13/2007	1650.0	148.2	0	45.69	0	11.44	0	0	0	57.13	12.8	33.3	20.5
228	1/14/2007	1620.0	138.4	0	44.6	0	11.01	0	0	0	55.61	12.7	31.7	18.9
229	1/15/2007	1640.0	152.03	0	44.89	0	11.4	0	0	0	56.29	12.7	34.4	21.6
230	1/16/2007	1680.0	160.95	0	48.4	0	11.51	0	0	0	59.91	13.2	35.5	22.3
231	1/17/2007	1660.0	175.03	0	46.88	0	11.4	0	0	0	58.28	13.0	39.1	26.1
232	1/18/2007	1600.0	462.11	0	43.34	0	10.85	0	0	0	54.19	12.6	107.1	94.5
233	1/19/2007	1550.0	263.07	0	40.81	0	10.33	0	0	0	51.14	12.2	62.9	50.7
234	1/20/2007	1540.0	226.13	0	40.89	0	10.07	0	0	0	50.96	12.3	54.4	42.2
235	1/21/2007	1520.0	186.76	0	39.97	0	9.87	0	0	0	49.84	12.2	45.6	33.4
236	1/22/2007	1470.0	907.22	0	36.2	0	9.69	0	0	0	45.89	11.6	228.8	217.3
237	1/23/2007	1460.0	130.18	0	36.72	0	9.34	0	0	0	46.06	11.7	33.1	21.4
238	1/24/2007	1350.0	138.55	0	33.81	0	7.71	0	0	0	41.52	11.4	38.1	26.7
239	1/25/2007	1180.0	317.61	0	26.18	0	6.2	0	0	0	32.38	10.2	99.8	89.6
240	1/26/2007	1190.0	269.45	0	22.38	0	7.51	0	0	0	29.89	9.3	84.0	74.6
241	1/27/2007	1330.0	238.76	0	25.59	0	9.53	0	0	0	35.12	9.8	66.6	56.8
242	1/28/2007	1450.0	207.87	0	35.52	0	9.41	0	0	0	44.93	11.5	53.2	41.7
243	1/29/2007	1430.0	181.96	0	33.47	0	9.5	0	0	0	42.97	11.1	47.2	36.0
244	1/30/2007	1550.0	256.42	0	42	0	10.04	0	0	0	52.04	12.4	61.3	48.9
245	1/31/2007	1430.0	344.92	0	27.29	0	11.27	0	0	0	38.56	10.0	89.4	79.4
246	2/1/2007	1430.0	266.85	0	27.58	0	11.18	0	0	0	38.76	10.1	69.2	59.1
247	2/2/2007	1380.0	221.34	0	30.05	0	9.34	0	0	0	39.39	10.6	59.5	48.9
248	2/3/2007	1370.0	148.55	0	31.49	0	8.72	0	0	0	40.21	10.9	40.2	29.3
249	2/4/2007	1370.0	223.26	0	32.65	0	8.42	0	0	0	41.07	11.1	60.4	49.3
250	2/5/2007	1370.0	115.78	0	33.21	0	8.28	0	0	0	41.49	11.2	31.3	20.1
251	2/6/2007	1330.0	98.19	0	30.22	0	8.2	0	0	0	38.42	10.7	27.4	16.7
252	2/7/2007	1380.0	112.75	0	33.39	0	8.43	0	0	0	41.82	11.2	30.3	19.1
253	2/8/2007	1350.0	98	0	32.4	0	8.06	0	0	0	40.46	11.1	26.9	15.8
254	2/9/2007	1350.0	95.8	0	31.82	0	8.2	0	0	0	40.02	11.0	26.3	15.3
255	2/10/2007	1350.0	93	0	31.91	0	8.18	0	0	0	40.09	11.0	25.5	14.5
256	2/11/2007	1300.0	88.38	0	29.11	0	7.86	0	0	0	36.97	10.5	25.2	14.7
257	2/12/2007	1170.0	69.85	0	21.82	0	7.26	0	0	0	29.08	9.2	22.1	12.9
258	2/13/2007	1210.0	66.38	0	23.74	0	7.51	0	0	0	31.25	9.6	20.3	10.8
259	2/14/2007	1340.0	83.48	0	29.99	0	8.48	0	0	0	38.47	10.6	23.1	12.5
260	2/15/2007	1340.0	217.12	0	30.45	0	8.35	0	0	0	38.8	10.7	60.1	49.3

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

												Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
261	2/16/2007	1300.0	72	0	27.52	0	8.32	0	0	0	35.84	10.2	20.5	10.3
262	2/17/2007	1340.0	245.48	0	31.57	0	8.06	0	0	0	39.63	11.0	67.9	57.0
263	2/18/2007	1320.0	195.44	0	30.22	0	7.98	0	0	0	38.2	10.7	54.9	44.2
264	2/19/2007	1310.0	916.76	0	29.34	0	8.01	0	0	0	37.35	10.6	259.5	248.9
265	2/20/2007	1320.0	1077.82	0	30.94	0	7.81	0	0	0	38.75	10.9	302.8	291.9
266	2/21/2007	1300.0	370.35	0	29.52	0	7.75	0	0	0	37.27	10.6	105.6	95.0
267	2/22/2007	1310.0	158.53	0	30.22	0	7.78	0	0	0	38	10.8	44.9	34.1
268	2/23/2007	1360.0	195.65	0	32.89	0	8.13	0	0	0	41.02	11.2	53.3	42.2
269	2/24/2007	1330.0	173.68	0	29.74	0	8.33	0	0	0	38.07	10.6	48.4	37.8
270	2/25/2007	1470.0	629.27	0	40.89	0	8.54	0	0	0	49.43	12.5	158.7	146.3
271	2/26/2007	1550.0	220.58	0	48.48	0	8.58	0	0	0	57.06	13.7	52.8	39.1
272	2/27/2007	1460.0	132.2	0	41.08	0	8.29	0	0	0	49.37	12.5	33.6	21.0
273	2/28/2007	1500.0	100.58	0	40.81	0	9.22	0	0	0	50.03	12.4	24.9	12.5
274	3/1/2007	1940.0	484.18	0	88.98	0	9.82	0	0	0	98.8	18.9	92.5	73.7
275	3/2/2007	1890.0	143.36	0	82.23	0	9.8	0	0	0	92.03	18.1	28.1	10.1
276	3/3/2007	1750.0	133.71	0	60.27	0	10.61	0	0	0	70.88	15.0	28.3	13.3
277	3/4/2007	1680.0	131.51	0	55.25	0	10.04	0	0	0	65.29	14.4	29.0	14.6
278	3/5/2007	1510.0	112.56	0	40.98	0	9.4	0	0	0	50.38	12.4	27.6	15.3
279	3/6/2007	1460.0	280.23	0	39.52	0	8.65	0	0	0	48.17	12.2	71.2	58.9
280	3/7/2007	1410.0	78.44	0	35.7	0	8.52	0	0	0	44.22	11.6	20.6	9.0
281	3/8/2007	1450.0	89.85	0	38.69	0	8.64	0	0	0	47.33	12.1	23.0	10.9
282	3/9/2007	1420.0	81.25	0	35.76	0	8.7	0	0	0	44.46	11.6	21.2	9.6
283	3/10/2007	1430.0	92.07	0	37.17	0	8.57	0	0	0	45.74	11.9	23.9	12.0
284	3/11/2007	1440.0	107.31	0	38.05	0	8.57	0	0	0	46.62	12.0	27.6	15.6
285	3/12/2007	1430.0	92.2	0	37.27	0	8.54	0	0	0	45.81	11.9	23.9	12.0
286	3/13/2007	1420.0	83.34	0	36.12	0	8.62	0	0	0	44.74	11.7	21.8	10.1
287	3/14/2007	1500.0	94.53	0	40.81	0	9.22	0	0	0	50.03	12.4	23.4	11.0
288	3/15/2007	1690.0	133.14	0	52.66	0	10.81	0	0	0	63.47	13.9	29.2	15.3
289	3/16/2007	2000.0	174.9	0	69.69	0	14.63	0	0	0	84.32	15.6	32.4	16.8
290	3/17/2007	2280.0	208.32	0	94.56	0	16.96	0	0	0	111.52	18.1	33.9	15.7
291	3/18/2007	1940.0	154.39	0	64.94	0	14.12	0	0	0	79.06	15.1	29.5	14.4
292	3/19/2007	1900.0	140.19	0	60.05	0	14.17	0	0	0	74.22	14.5	27.4	12.9
293	3/20/2007	2120.0	153.37	0	69.55	0	17.65	0	0	0	87.2	15.3	26.8	11.6
294	3/21/2007	2650.0	237.9	0	113.33	0	23.39	0	0	0	136.72	19.1	33.3	14.2
295	3/22/2007	3150.0	298.34	0	148.6	0	32.57	0	0	0	181.17	21.3	35.1	13.8
296	3/23/2007	3330.0	391.21	0	177.41	0	34.8	0	0	0	212.21	23.6	43.6	19.9
297	3/24/2007	3210.0	263.04	0	154.06	0	33.86	0	0	0	187.92	21.7	30.4	8.7
298	3/25/2007	3230.0	257.03	0	148.6	0	36.44	0	0	0	185.04	21.2	29.5	8.3
299	3/26/2007	3630.0	347.66	0	187.61	0	50.67	0	0	0	238.28	24.3	35.5	11.2
300	3/27/2007	3720.0	376.74	0	200.24	0	52.78	0	0	0	253.02	25.2	37.6	12.3
301	3/28/2007	3390.0	292.52	0	150.42	0	45.96	0	0	0	196.38	21.5	32.0	10.5
302	3/29/2007	3190.0	211.21	0	127.84	0	41.48	0	0	0	169.32	19.7	24.6	4.9
303	3/30/2007	3050.0	186.28	0	113.33	0	38.35	0	0	0	151.68	18.4	22.6	4.2
304	3/31/2007	2970.0	172.53	0	107.17	0	35.88	0	0	0	143.05	17.9	21.5	3.7
305	4/1/2007	2810.0	154.81	0	96.83	0	31.76	0	0	0	128.59	17.0	20.4	3.5
306	4/2/2007	2620.0	134.83	0	81.55	0	28.97	0	0	0	110.52	15.6	19.1	3.4

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
307	4/3/2007	2570.0	154.97	0	80.21	0	27.71	0	0	0	107.92	15.6	22.4	6.8
308	4/4/2007	2510.0	150.95	0	74.98	0	27.11	0	0	0	102.09	15.1	22.3	7.2
309	4/5/2007	2430.0	160.08	0	71.17	0	25.64	0	0	0	96.81	14.8	24.4	9.7
310	4/6/2007	2340.0	111.2	0	63.88	0	24.79	0	0	0	88.67	14.1	17.6	3.6
311	4/7/2007	2350.0	110.07	0	62.71	0	25.37	0	0	0	88.08	13.9	17.4	3.5
312	4/8/2007	2370.0	200.94	0	59.27	0	26.81	0	0	0	86.08	13.5	31.4	18.0
313	4/9/2007	2470.0	171.87	0	65.06	0	28.34	0	0	0	93.4	14.0	25.8	11.8
314	4/10/2007	2430.0	194.53	0	65.06	0	27.11	0	0	0	92.17	14.1	29.7	15.6
315	4/11/2007	2320.0	373.16	0	55.91	0	26.21	0	0	0	82.12	13.1	59.6	46.5
316	4/12/2007	2380.0	317.48	0	61.54	0	26.52	0	0	0	88.06	13.7	49.5	35.7
317	4/13/2007	2450.0	213.33	0	61.54	0	28.65	0	0	0	90.19	13.6	32.3	18.6
318	4/14/2007	2570.0	184.48	0	66.26	0	31.39	0	0	0	97.65	14.1	26.6	12.5
319	4/15/2007	2650.0	469.56	0	72.44	0	32.57	0	0	0	105.01	14.7	65.7	51.0
320	4/16/2007	2640.0	158.66	0	67.48	0	33.86	0	0	0	101.34	14.2	22.3	8.1
321	4/17/2007	2760.0	169.62	0	73.72	0	37.67	0	0	0	111.39	15.0	22.8	7.8
322	4/18/2007	3015.0	271.77	0	91.19	0	45.63	0	0	0	136.82	16.8	33.4	16.6
323	4/19/2007	3520.0	516.77	0	92.57	0	84.74	0	0	0	177.31	18.7	54.4	35.8
324	4/20/2007	4420.0	1524.68	0	143.24	0	148	0	0	0	291.24	24.4	127.9	103.5
325	4/21/2007	4940.0	2084.56	0	187.61	0	190.12	0	0	0	377.73	28.4	156.5	128.1
326	4/22/2007	4900.0	1424.45	0	179.42	0	190.12	0	0	0	369.54	28.0	107.8	79.8
327	4/23/2007	4720.0	1166.49	0	159.65	0	175.86	0	0	0	335.51	26.4	91.6	65.3
328	4/24/2007	4610.0	1067.63	0	141.5	0	174.47	0	0	0	315.97	25.4	85.9	60.5
329	4/25/2007	4710.0	1283.92	0	132.87	0	194.66	0	0	0	327.53	25.8	101.1	75.3
330	4/26/2007	5120.0	1616.36	0	148.6	0	227.2	0	0	0	375.8	27.2	117.1	89.8
331	4/27/2007	5710.0	1757.52	0	191.76	0	269.51	0	0	0	461.27	30.0	114.1	84.2
332	4/28/2007	6110.0	2340.06	0	238.39	0	311.5	0	0	0	549.89	33.4	142.0	108.6
333	4/29/2007	5970.0	2136.58	0	229.1	0	292.18	0	0	0	521.28	32.4	132.7	100.3
334	4/30/2007	5600.0	1378.96	0	200.24	0	252.81	0	0	0	453.05	30.0	91.3	61.3
335	5/1/2007	5340.0	1189.22	0	177.41	0	236.69	0	0	0	414.1	28.8	82.6	53.8
336	5/2/2007	5340.0	1420.17	0	179.42	0	235.64	0	0	0	415.06	28.8	98.6	69.8
337	5/3/2007	5460.0	1279.95	0	202.37	0	236.69	0	0	0	439.06	29.8	86.9	57.1
338	5/4/2007	5430.0	1247.37	0	202.37	0	233.5	0	0	0	435.87	29.8	85.2	55.4
339	5/5/2007	5250.0	1231.83	0	187.61	0	222	0	0	0	409.61	28.9	87.0	58.1
340	5/6/2007	4950.0	1417.83	0	157.76	0	204.64	0	0	0	362.4	27.1	106.2	79.1
341	5/7/2007	4860.0	1500.57	0	146.81	0	201.63	0	0	0	348.44	26.6	114.5	87.9
342	5/8/2007	4880.0	1686.19	0	152.22	0	200.61	0	0	0	352.83	26.8	128.1	101.3
343	5/9/2007	4900.0	1648.21	0	152.22	0	202.63	0	0	0	354.85	26.9	124.7	97.9
344	5/10/2007	4890.0	1486.2	0	155.9	0	199.62	0	0	0	355.52	27.0	112.7	85.7
345	5/11/2007	4790.0	1249.33	0	154.06	0	190.12	0	0	0	344.18	26.6	96.7	70.1
346	5/12/2007	4640.0	979.3	0	145.03	0	175.86	0	0	0	320.89	25.6	78.3	52.6
347	5/13/2007	4560.0	949.06	0	146.81	0	163.59	0	0	0	310.4	25.2	77.2	51.9
348	5/14/2007	4380.0	937.97	0	131.18	0	151.81	0	0	0	282.99	24.0	79.4	55.4
349	5/15/2007	4210.0	796.81	0	114.88	0	143	0	0	0	257.88	22.7	70.2	47.5
350	5/16/2007	4150.0	586.91	0	107.17	0	141.76	0	0	0	248.93	22.2	52.4	30.2
351	5/17/2007	4160.0	659.82	0	105.68	0	144.22	0	0	0	249.9	22.3	58.8	36.5
352	5/18/2007	4330.0	904.01	0	110.23	0	162.25	0	0	0	272.48	23.3	77.4	54.1

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
353	5/19/2007	4840.0	1094.82	0	129.49	0	209.67	0	0	0	339.16	26.0	83.9	57.9
354	5/20/2007	5540.0	915.79	0	179.42	0	257.15	0	0	0	436.57	29.2	61.3	32.1
355	5/21/2007	6210.0	1469.04	0	208.91	0	359.75	0	0	0	568.66	34.0	87.7	53.8
356	5/22/2007	7200.0	1950	0	280.04	0	542.15	0	0	0	822.19	42.3	100.4	58.1
357	5/23/2007	7960.0	1871.57	0	362.26	0	702.94	0	0	0	1065.2	49.6	87.2	37.6
358	5/24/2007	9020.0	2381.61	0.01	556.09	0	813.73	0	0	0	1369.82	56.3	97.9	41.6
359	5/25/2007	10800.0	3975.35	0.04	606.55	0	1344.22	0	0	0	1950.77	67.0	136.5	69.5
360	5/26/2007	13000.0	11555.08	0.08	957.04	168.89	2111.46	0	0	0	3068.5	87.5	329.6	242.1
361	5/27/2007	13500.0	7692.97	0.09	1127.11	198.9	2343.35	0	0	0	3470.46	95.3	211.3	116.0
362	5/28/2007	13100.0	6743.03	0.09	1111.53	196.15	1955.4	0	0	0	3066.93	86.8	190.9	104.1
363	5/29/2007	13000.0	6210.67	0.09	1127.11	198.9	1872.84	0	0	0	2999.95	85.6	177.1	91.6
364	5/30/2007	13500.0	4912.41	0.1	1574.86	277.92	1707.99	0	0	0	3282.85	90.2	134.9	44.8
365	5/31/2007	12700.0	5276.85	0.08	1500.67	264.83	1366.33	0	0	0	2867	83.7	154.1	70.4
366	6/1/2007	11500.0	4968.22	0.06	1142.85	201.68	1135.95	0	0	0	2278.8	73.5	160.2	86.7
367	6/2/2007	11200.0	5224.5	0.05	1137.6	200.75	1036.02	0	0	0	2173.62	72.0	173.0	101.0
368	6/3/2007	11900.0	5341.78	0.06	1289.78	227.6	1184.39	0	0	0	2474.17	77.1	166.4	89.4
369	6/4/2007	14000.0	6599.77	0.13	2122.27	374.52	1547.58	0	0	0	3669.85	97.2	174.8	77.6
370	6/5/2007	14400.0	5971.74	0.13	2227.62	393.11	1685.69	0	0	0	3913.31	100.8	153.8	53.0
371	6/6/2007	13500.0	4425.14	0.11	1857.11	327.73	1482.92	0	0	0	3340.03	91.7	121.5	29.8
372	6/7/2007	12300.0	3964.24	0.09	1488.51	262.68	1207.54	0	0	0	2696.05	81.3	119.5	38.2
373	6/8/2007	11100.0	3362.59	0.06	1190.77	210.13	973.35	0	0	0	2164.12	72.3	112.3	40.0
374	6/9/2007	10300.0	2865.78	0.04	1045.23	184.45	832.66	0	0	0	1877.89	67.6	103.2	35.6
375	6/10/2007	9300.0	2327.74	0.02	823.79	145.37	657.48	0	0	0	1481.27	59.1	92.8	33.7
376	6/11/2007	8400.0	2713.64	0	635.98	0	514.7	0	0	0	1150.68	50.8	119.8	69.0
377	6/12/2007	7790.0	1970.78	0	537.03	0	436.68	0	0	0	973.71	46.3	93.8	47.5
378	6/13/2007	7560.0	1650.89	0	494.25	0	421.31	0	0	0	915.56	44.9	81.0	36.1
379	6/14/2007	7870.0	1883.69	0	506.35	0	491.31	0	0	0	997.66	47.0	88.8	41.7
380	6/15/2007	8760.0	1843.36	0.01	561.72	0	722.69	0	0	0	1284.41	54.4	78.0	23.7
381	6/16/2007	9530.0	1857.84	0.02	642.78	0	870.07	0	0	0	1512.85	58.9	72.3	13.4
382	6/17/2007	10400.0	2316.72	0.04	832.63	146.93	982.44	0	0	0	1815.07	64.7	82.6	17.9
383	6/18/2007	10500.0	2560.55	0.05	823.79	145.37	1019.88	0	0	0	1843.67	65.1	90.4	25.3
384	6/19/2007	10400.0	2342.03	0.04	797.56	140.75	1007.19	0	0	0	1804.75	64.3	83.5	19.2
385	6/20/2007	10200.0	2722.01	0.04	776.07	136.95	961.41	0	0	0	1737.48	63.2	99.0	35.8
386	6/21/2007	9510.0	2351.56	0.02	656.73	0	854.82	0	0	0	1511.55	58.9	91.7	32.8
387	6/22/2007	8940.0	2196.63	0.02	588.06	0	759.44	0	0	0	1347.5	55.9	91.1	35.2
388	6/23/2007	8590.0	2033.95	0	558.9	0	661.18	0	0	0	1220.08	52.7	87.8	35.1
389	6/24/2007	7910.0	1742.26	0	480.26	0	535.97	0	0	0	1016.23	47.6	81.7	34.0
390	6/25/2007	7770.0	1721.39	0	445.3	0	542.15	0	0	0	987.45	47.1	82.1	35.0
391	6/26/2007	7650.0	1526.48	0	437.04	0	517.71	0	0	0	954.75	46.3	74.0	27.7
392	6/27/2007	6900.0	1047.59	0	350.64	0	389.55	0	0	0	740.19	39.8	56.3	16.5
393	6/28/2007	6270.0	784.47	0	285.19	0	305.6	0	0	0	590.79	34.9	46.4	11.5
394	6/29/2007	5820.0	747.28	0	240.75	0	257.15	0	0	0	497.9	31.7	47.6	15.9
395	6/30/2007	5620.0	702.34	0	213.28	0	248.45	0	0	0	461.73	30.5	46.3	15.9
396	7/1/2007	5890.0	1069.8	0	224.51	0	273.78	0	0	0	498.29	31.4	67.3	36.0
397	7/2/2007	5900.0	1249.61	0	217.73	0	286.95	0	0	0	504.68	31.7	78.5	46.8
398	7/3/2007	5610.0	1184.83	0	202.37	0	252.81	0	0	0	455.18	30.1	78.3	48.2

At xsect 361.66 - closest to CFR above Missoula Gage

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399	7/4/2007	5290.0	676.89	0	181.45	0	229.28	0	0	0	410.73	28.8	47.4	18.7
400	7/5/2007	5030.0	609.26	0	157.76	0	212.75	0	0	0	370.51	27.3	44.9	17.6
401	7/6/2007	4710.0	558.66	0	136.28	0	192.7	0	0	0	328.98	25.9	44.0	18.1
402	7/7/2007	4500.0	484.27	0	126.16	0	171.72	0	0	0	297.88	24.5	39.9	15.4
403	7/8/2007	4290.0	446.01	0	104.17	0	162.25	0	0	0	266.42	23.0	38.6	15.5
404	7/9/2007	4100.0	388.19	0	91.19	0	149.24	0	0	0	240.43	21.7	35.1	13.4
405	7/10/2007	3950.0	364.7	0	87.02	0	134.47	0	0	0	221.49	20.8	34.2	13.4
406	7/11/2007	3710.0	308.91	0	71.17	0	120.55	0	0	0	191.72	19.2	30.9	11.7
407	7/12/2007	3540.0	275.48	0	62.71	0	109.6	0	0	0	172.31	18.0	28.9	10.8
408	7/13/2007	3430.0	232.77	0	61.54	0	99.24	0	0	0	160.78	17.4	25.2	7.8
409	7/14/2007	3290.0	203.58	0	57.01	0	89.45	0	0	0	146.46	16.5	22.9	6.4
410	7/15/2007	3120.0	177.61	0	49.52	0	80.16	0	0	0	129.68	15.4	21.1	5.7
411	7/16/2007	3020.0	164.97	0	47.48	0	73.13	0	0	0	120.61	14.8	20.3	5.4
412	7/17/2007	2930.0	156.75	0	47.48	0	65.64	0	0	0	113.12	14.3	19.8	5.5
413	7/18/2007	2810.0	140.44	0	41.63	0	60.93	0	0	0	102.56	13.5	18.5	5.0
414	7/19/2007	2720.0	133.31	0	44.51	0	52.07	0	0	0	96.58	13.2	18.2	5.0
415	7/20/2007	2650.0	126.25	0	44.51	0	47.26	0	0	0	91.77	12.8	17.7	4.8
416	7/21/2007	2530.0	114.46	0	38.88	0	43.38	0	0	0	82.26	12.1	16.8	4.7
417	7/22/2007	2530.0	114.89	0	44.51	0	39.65	0	0	0	84.16	12.3	16.8	4.5
418	7/23/2007	2410.0	106.29	0	39.78	0	35.32	0	0	0	75.1	11.6	16.4	4.8
419	7/24/2007	2250.0	93.78	0	31.99	0	32.15	0	0	0	64.14	10.6	15.5	4.9
420	7/25/2007	2260.0	98.34	0	36.2	0	30.65	0	0	0	66.85	11.0	16.1	5.2
421	7/26/2007	2200.0	91.44	0	35.33	0	28.97	0	0	0	64.3	10.8	15.4	4.6
422	7/27/2007	2110.0	86.55	0	32.81	0	27.11	0	0	0	59.92	10.5	15.2	4.7
423	7/28/2007	2010.0	78.54	0	29.58	0	25.37	0	0	0	54.95	10.1	14.5	4.4
424	7/29/2007	1940.0	78.68	0	28.03	0	23.94	0	0	0	51.97	9.9	15.0	5.1
425	7/30/2007	1870.0	72.51	0	26.53	0	22.59	0	0	0	49.12	9.7	14.4	4.6
426	7/31/2007	1800.0	68.9	0	22.98	0	22.03	0	0	0	45.01	9.3	14.2	4.9
427	8/1/2007	1730.0	64.14	0	19.72	0	21.49	0	0	0	41.21	8.8	13.7	4.9
428	8/2/2007	1710.0	62.42	0	19.08	0	21.23	0	0	0	40.31	8.7	13.5	4.8
429	8/3/2007	1690.0	68.23	0	20.34	0	20.18	0	0	0	40.52	8.9	15.0	6.1
430	8/4/2007	1680.0	61.51	0	20.84	0	19.69	0	0	0	40.53	8.9	13.6	4.6
431	8/5/2007	1680.0	61.29	0	21.17	0	19.56	0	0	0	40.73	9.0	13.5	4.5
432	8/6/2007	1710.0	96.68	0	25.02	0	18.89	0	0	0	43.91	9.5	21.0	11.4
433	8/7/2007	1740.0	66.28	0	22.98	0	20.44	0	0	0	43.42	9.3	14.1	4.9
434	8/8/2007	1730.0	66.89	0	24.81	0	19.48	0	0	0	44.29	9.5	14.3	4.8
435	8/9/2007	1610.0	57.75	0	19.63	0	18.37	0	0	0	38	8.8	13.3	4.5
436	8/10/2007	1580.0	57.88	0	19.76	0	17.55	0	0	0	37.31	8.8	13.6	4.8
437	8/11/2007	1550.0	54.97	0	18.83	0	17.18	0	0	0	36.01	8.6	13.2	4.5
438	8/12/2007	1580.0	57.01	0	19.46	0	17.67	0	0	0	37.13	8.7	13.4	4.7
439	8/13/2007	1780.0	67.96	0	28.19	0	19.59	0	0	0	47.78	10.0	14.2	4.2
440	8/14/2007	1810.0	70.07	0	28.03	0	20.44	0	0	0	48.47	9.9	14.4	4.4
441	8/15/2007	1820.0	71.58	0	31.17	0	19.63	0	0	0	50.8	10.3	14.6	4.2
442	8/16/2007	1830.0	74.85	0	34.4	0	18.89	0	0	0	53.29	10.8	15.2	4.4
443	8/17/2007	1780.0	70.69	0	33.73	0	17.8	0	0	0	51.53	10.7	14.7	4.0
444	8/18/2007	1700.0	65.88	0	29.91	0	16.96	0	0	0	46.87	10.2	14.4	4.1

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
445	8/19/2007	1630.0	60.84	0	26.53	0	16.32	0	0	0	42.85	9.7	13.8	4.1
446	8/20/2007	1600.0	59.27	0	26.61	0	15.54	0	0	0	42.15	9.8	13.7	4.0
447	8/21/2007	1510.0	54.71	0	21.91	0	14.97	0	0	0	36.88	9.1	13.4	4.4
448	8/22/2007	1500.0	54.06	0	22.1	0	14.66	0	0	0	36.76	9.1	13.4	4.3
449	8/23/2007	1450.0	51.5	0	20.01	0	14.22	0	0	0	34.23	8.8	13.2	4.4
450	8/24/2007	1430.0	50.41	0	19.95	0	13.75	0	0	0	33.7	8.7	13.1	4.3
451	8/25/2007	1290.0	35.13	0	5.08	0	13.69	0	0	0	18.77	5.4	10.1	4.7
452	8/26/2007	1220.0	30.38	0	1.34	0	13.42	0	0	0	14.76	4.5	9.2	4.7
453	8/27/2007	1250.0	31.82	0	4.07	0	12.98	0	0	0	17.05	5.1	9.4	4.4
454	8/28/2007	1400.0	49.04	0	20.07	0	12.99	0	0	0	33.06	8.8	13.0	4.2
455	8/29/2007	1340.0	45.23	0	16.05	0	13.16	0	0	0	29.21	8.1	12.5	4.4
456	8/30/2007	1410.0	49.28	0	19.95	0	13.28	0	0	0	33.23	8.7	13.0	4.2
457	8/31/2007	1380.0	48.34	0	18.35	0	13.17	0	0	0	31.52	8.5	13.0	4.5
458	9/1/2007	1420.0	51.08	0	21.56	0	12.92	0	0	0	34.48	9.0	13.3	4.3
459	9/2/2007	1400.0	48.9	0	20.21	0	12.93	0	0	0	33.14	8.8	13.0	4.2
460	9/3/2007	1420.0	50.38	0	21.43	0	12.98	0	0	0	34.41	9.0	13.2	4.2
461	9/4/2007	1500.0	54.29	0	24.09	0	13.95	0	0	0	38.04	9.4	13.4	4.0
462	9/5/2007	1530.0	55.89	0	26.4	0	13.9	0	0	0	40.3	9.8	13.5	3.8
463	9/6/2007	1530.0	57.59	0	28.35	0	13.28	0	0	0	41.63	10.1	14.0	3.9
464	9/7/2007	1480.0	55.29	0	27.06	0	12.51	0	0	0	39.57	9.9	13.9	3.9
465	9/8/2007	1360.0	48.17	0	20.16	0	12.03	0	0	0	32.19	8.8	13.1	4.4
466	9/9/2007	1380.0	49.84	0	21.72	0	11.93	0	0	0	33.65	9.0	13.4	4.4
467	9/10/2007	1340.0	46.76	0	19.72	0	11.73	0	0	0	31.45	8.7	12.9	4.2
468	9/11/2007	1350.0	48.33	0	21.43	0	11.34	0	0	0	32.77	9.0	13.3	4.3
469	9/12/2007	1340.0	54.73	0	21.52	0	11.08	0	0	0	32.6	9.0	15.1	6.1
470	9/13/2007	1290.0	50.5	0	17.99	0	11.23	0	0	0	29.22	8.4	14.5	6.1
471	9/14/2007	1340.0	58.27	0	21.3	0	11.14	0	0	0	32.44	9.0	16.1	7.1
472	9/15/2007	1330.0	50.57	0	21.17	0	10.97	0	0	0	32.14	9.0	14.1	5.1
473	9/16/2007	1330.0	54.27	0	21.91	0	10.71	0	0	0	32.62	9.1	15.1	6.0
474	9/17/2007	1300.0	48.66	0	20.91	0	10.37	0	0	0	31.28	8.9	13.9	5.0
475	9/18/2007	1290.0	49.54	0	20.6	0	10.27	0	0	0	30.87	8.9	14.2	5.4
476	9/19/2007	1260.0	43.64	0	18.83	0	10.21	0	0	0	29.04	8.5	12.8	4.3
477	9/20/2007	1290.0	47.12	0	20.66	0	10.24	0	0	0	30.9	8.9	13.5	4.7
478	9/21/2007	1300.0	47.76	0	21.63	0	10.12	0	0	0	31.75	9.1	13.6	4.6
479	9/22/2007	1260.0	44.99	0	19.76	0	9.89	0	0	0	29.65	8.7	13.2	4.5
480	9/23/2007	1250.0	43.52	0	19.63	0	9.71	0	0	0	29.34	8.7	12.9	4.2
481	9/24/2007	1190.0	40.33	0	16.73	0	9.45	0	0	0	26.18	8.2	12.6	4.4
482	9/25/2007	1200.0	41.01	0	17.16	0	9.5	0	0	0	26.66	8.2	12.7	4.4
483	9/26/2007	1240.0	44.53	0	18.71	0	9.82	0	0	0	28.53	8.5	13.3	4.8
484	9/27/2007	1280.0	45.78	0	20.6	0	10.04	0	0	0	30.64	8.9	13.3	4.4
485	9/28/2007	1290.0	59.64	0	20.8	0	10.21	0	0	0	31.01	8.9	17.1	8.2
486	9/29/2007	1290.0	127.19	0	21.25	0	10.04	0	0	0	31.29	9.0	36.6	27.6
487	9/30/2007	1320.0	131.61	0	23.27	0	10.04	0	0	0	33.31	9.4	37.0	27.6
488	10/1/2007	1460.0	81.04	0	37.08	0	9.25	0	0	0	46.33	11.8	20.6	8.8
489	10/2/2007	1500.0	87.57	0	40.05	0	9.4	0	0	0	49.45	12.2	21.6	9.4
490	10/3/2007	1540.0	82.55	0	42.4	0	9.73	0	0	0	52.13	12.6	19.9	7.3

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 1 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

												Concentrations		
TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
491	10/4/2007	1570.0	86.29	0	45.17	0	9.74	0	0	0	54.91	13.0	20.4	7.4
492	10/5/2007	1600.0	83.3	0	48.6	0	9.66	0	0	0	58.26	13.5	19.3	5.8
493	10/6/2007	1580.0	79.58	0	46.76	0	9.61	0	0	0	56.37	13.2	18.7	5.4
494	10/7/2007	1570.0	77.61	0	46.38	0	9.49	0	0	0	55.87	13.2	18.3	5.1
495	10/8/2007	1560.0	74.07	0	45.39	0	9.49	0	0	0	54.88	13.0	17.6	4.6
496	10/9/2007	1560.0	73.88	0	45.48	0	9.45	0	0	0	54.93	13.1	17.6	4.5
497	10/10/2007	1600.0	73.51	0	48.07	0	9.76	0	0	0	57.83	13.4	17.0	3.6
498	10/11/2007	1690.0	82.91	0	54.38	0	10.44	0	0	0	64.82	14.2	18.2	4.0
499	10/12/2007	1710.0	82.12	0	56.12	0	10.53	0	0	0	66.65	14.5	17.8	3.4
500	10/13/2007	1670.0	82.23	0	53.52	0	10.18	0	0	0	63.7	14.1	18.3	4.1
501	10/14/2007	1680.0	80.74	0	54.6	0	10.18	0	0	0	64.78	14.3	17.8	3.5
502	10/15/2007	1670.0	82.78	0	53.52	0	10.18	0	0	0	63.7	14.1	18.4	4.2
503	10/16/2007	1680.0	82.33	0	55.25	0	10.04	0	0	0	65.29	14.4	18.2	3.8
504	10/17/2007	1680.0	87.77	0	56	0	9.89	0	0	0	65.89	14.5	19.4	4.8
505	10/18/2007	1670.0	84.8	0	55.02	0	9.87	0	0	0	64.89	14.4	18.8	4.4
506	10/19/2007	1640.0	86.99	0	52.45	0	9.73	0	0	0	62.18	14.1	19.7	5.6
507	10/20/2007	1620.0	79.94	0	50.86	0	9.61	0	0	0	60.47	13.8	18.3	4.5
508	10/21/2007	1610.0	81.12	0	50.03	0	9.58	0	0	0	59.61	13.7	18.7	5.0
509	10/22/2007	1610.0	78.64	0	49.72	0	9.64	0	0	0	59.36	13.7	18.1	4.4
510	10/23/2007	1600.0	77.34	0	48.81	0	9.61	0	0	0	58.42	13.5	17.9	4.4
511	10/24/2007	1610.0	78.63	0	49.82	0	9.61	0	0	0	59.43	13.7	18.1	4.4
512	10/25/2007	1600.0	76.55	0	48.81	0	9.61	0	0	0	58.42	13.5	17.7	4.2
513	10/26/2007	1590.0	77.9	0	47.77	0	9.61	0	0	0	57.38	13.4	18.2	4.8
514	10/27/2007	1580.0	76.3	0	47.38	0	9.49	0	0	0	56.87	13.3	17.9	4.6
515	10/28/2007	1580.0	76.66	0	47.38	0	9.49	0	0	0	56.87	13.3	18.0	4.6
516	10/29/2007	1570.0	73.91	0	46.47	0	9.45	0	0	0	55.92	13.2	17.5	4.2
517	10/30/2007	1560.0	73.15	0	45.88	0	9.38	0	0	0	55.26	13.1	17.4	4.3
518	10/31/2007	1560.0	71.76	0	46.38	0	9.26	0	0	0	55.64	13.2	17.1	3.8

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
31	7/15/2006	3120.0	153.02	0	49.52	0	80.16	0	0	0	129.68	15.4	18.2	2.8
32	7/16/2006	3020.0	138.97	0	47.48	0	73.13	0	0	0	120.61	14.8	17.1	2.3
33	7/17/2006	2930.0	129.94	0	47.48	0	65.64	0	0	0	113.12	14.3	16.4	2.1
34	7/18/2006	2810.0	120.28	0	41.63	0	60.93	0	0	0	102.56	13.5	15.9	2.3
35	7/19/2006	2720.0	117.65	0	44.51	0	52.07	0	0	0	96.58	13.2	16.0	2.9
36	7/20/2006	2650.0	363.56	0	44.51	0	47.26	0	0	0	91.77	12.8	50.9	38.0
37	7/21/2006	2530.0	640.91	0	38.88	0	43.38	0	0	0	82.26	12.1	93.9	81.9
38	7/22/2006	2530.0	1015.31	0	44.51	0	39.65	0	0	0	84.16	12.3	148.8	136.5
39	7/23/2006	2410.0	1633.3	0	39.78	0	35.32	0	0	0	75.1	11.6	251.3	239.7
40	7/24/2006	2250.0	2629.36	0	31.99	0	32.15	0	0	0	64.14	10.6	433.3	422.7
41	7/25/2006	2260.0	2170.8	0	36.2	0	30.65	0	0	0	66.85	11.0	356.2	345.2
42	7/26/2006	2200.0	1189.67	0	35.33	0	28.97	0	0	0	64.3	10.8	200.5	189.7
43	7/27/2006	2110.0	582.64	0	32.81	0	27.11	0	0	0	59.92	10.5	102.4	91.9
44	7/28/2006	2010.0	1093.74	0	29.58	0	25.37	0	0	0	54.95	10.1	201.8	191.6
45	7/29/2006	1940.0	669.45	0	28.03	0	23.94	0	0	0	51.97	9.9	128.0	118.0
46	7/30/2006	1870.0	1015.41	0	26.53	0	22.59	0	0	0	49.12	9.7	201.3	191.6
47	7/31/2006	1800.0	1085.05	0	22.98	0	22.03	0	0	0	45.01	9.3	223.5	214.2
48	8/1/2006	1730.0	720.64	0	19.72	0	21.49	0	0	0	41.21	8.8	154.5	145.6
49	8/2/2006	1710.0	1232.26	0	19.08	0	21.23	0	0	0	40.31	8.7	267.2	258.5
50	8/3/2006	1690.0	741	0	20.34	0	20.18	0	0	0	40.52	8.9	162.6	153.7
51	8/4/2006	1680.0	812.17	0	20.84	0	19.69	0	0	0	40.53	8.9	179.3	170.3
52	8/5/2006	1680.0	952.24	0	21.17	0	19.56	0	0	0	40.73	9.0	210.2	201.2
53	8/6/2006	1710.0	1151.83	0	25.02	0	18.89	0	0	0	43.91	9.5	249.8	240.2
54	8/7/2006	1740.0	575.11	0	22.98	0	20.44	0	0	0	43.42	9.3	122.6	113.3
55	8/8/2006	1730.0	628.27	0	24.81	0	19.48	0	0	0	44.29	9.5	134.7	125.2
56	8/9/2006	1610.0	818.42	0	19.63	0	18.37	0	0	0	38	8.8	188.5	179.7
57	8/10/2006	1580.0	481.91	0	19.76	0	17.55	0	0	0	37.31	8.8	113.1	104.3
58	8/11/2006	1550.0	458.84	0	18.83	0	17.18	0	0	0	36.01	8.6	109.8	101.2
59	8/12/2006	1580.0	1090.54	0	19.46	0	17.67	0	0	0	37.13	8.7	255.9	247.2
60	8/13/2006	1780.0	1320.54	0	28.19	0	19.59	0	0	0	47.78	10.0	275.1	265.1
61	8/14/2006	1810.0	1083.07	0	28.03	0	20.44	0	0	0	48.47	9.9	221.9	212.0
62	8/15/2006	1820.0	1264.65	0	31.17	0	19.63	0	0	0	50.8	10.3	257.7	247.3
63	8/16/2006	1830.0	1249.59	0	34.4	0	18.89	0	0	0	53.29	10.8	253.2	242.4
64	8/17/2006	1780.0	805.99	0	33.73	0	17.8	0	0	0	51.53	10.7	167.9	157.2
65	8/18/2006	1700.0	845.77	0	29.91	0	16.96	0	0	0	46.87	10.2	184.5	174.3
66	8/19/2006	1630.0	582.41	0	26.53	0	16.32	0	0	0	42.85	9.7	132.5	122.7
67	8/20/2006	1600.0	680.35	0	26.61	0	15.54	0	0	0	42.15	9.8	157.7	147.9
68	8/21/2006	1510.0	1058.48	0	21.91	0	14.97	0	0	0	36.88	9.1	259.9	250.9
69	8/22/2006	1500.0	809.01	0	22.1	0	14.66	0	0	0	36.76	9.1	200.0	190.9
70	8/23/2006	1450.0	590.86	0	20.01	0	14.22	0	0	0	34.23	8.8	151.1	142.3
71	8/24/2006	1430.0	690.95	0	19.95	0	13.75	0	0	0	33.7	8.7	179.2	170.4
72	8/25/2006	1290.0	388.89	0	5.08	0	13.69	0	0	0	18.77	5.4	111.8	106.4
73	8/26/2006	1220.0	245.46	0	1.34	0	13.42	0	0	0	14.76	4.5	74.6	70.1
74	8/27/2006	1250.0	666.88	0	4.07	0	12.98	0	0	0	17.05	5.1	197.8	192.8
75	8/28/2006	1400.0	1455.86	0	20.07	0	12.99	0	0	0	33.06	8.8	385.6	376.8
76	8/29/2006	1340.0	869.76	0	16.05	0	13.16	0	0	0	29.21	8.1	240.7	232.6
77	8/30/2006	1410.0	975.81	0	19.95	0	13.28	0	0	0	33.23	8.7	256.6	247.9
78	8/31/2006	1380.0	695.87	0	18.35	0	13.17	0	0	0	31.52	8.5	187.0	178.5
79	9/1/2006	1420.0	1820.84	0	21.56	0	12.92	0	0	0	34.48	9.0	475.5	466.5
80	9/2/2006	1400.0	1473.18	0	20.21	0	12.93	0	0	0	33.14	8.8	390.2	381.4

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
81	9/3/2006	1420.0	1154.92	0	21.43	0	12.98	0	0	0	34.41	9.0	301.6	292.6
82	9/4/2006	1500.0	806.28	0	24.09	0	13.95	0	0	0	38.04	9.4	199.3	189.9
83	9/5/2006	1530.0	1370.98	0	26.4	0	13.9	0	0	0	40.3	9.8	332.3	322.5
84	9/6/2006	1530.0	1374.61	0	28.35	0	13.28	0	0	0	41.63	10.1	333.1	323.1
85	9/7/2006	1480.0	926.29	0	27.06	0	12.51	0	0	0	39.57	9.9	232.1	222.2
86	9/8/2006	1360.0	1106.81	0	20.16	0	12.03	0	0	0	32.19	8.8	301.8	293.0
87	9/9/2006	1380.0	1120.09	0	21.72	0	11.93	0	0	0	33.65	9.0	301.0	291.9
88	9/10/2006	1340.0	936.03	0	19.72	0	11.73	0	0	0	31.45	8.7	259.0	250.3
89	9/11/2006	1350.0	703.18	0	21.43	0	11.34	0	0	0	32.77	9.0	193.1	184.1
90	9/12/2006	1340.0	654.27	0	21.52	0	11.08	0	0	0	32.6	9.0	181.0	172.0
91	9/13/2006	1290.0	731.28	0	17.99	0	11.23	0	0	0	29.22	8.4	210.2	201.8
92	9/14/2006	1340.0	725.6	0	21.3	0	11.14	0	0	0	32.44	9.0	200.8	191.8
93	9/15/2006	1330.0	629.68	0	21.17	0	10.97	0	0	0	32.14	9.0	175.6	166.6
94	9/16/2006	1330.0	912.97	0	21.91	0	10.71	0	0	0	32.62	9.1	254.5	245.4
95	9/17/2006	1300.0	540.12	0	20.91	0	10.37	0	0	0	31.28	8.9	154.1	145.1
96	9/18/2006	1290.0	896.75	0	20.6	0	10.27	0	0	0	30.87	8.9	257.8	248.9
97	9/19/2006	1260.0	777.09	0	18.83	0	10.21	0	0	0	29.04	8.5	228.7	220.1
98	9/20/2006	1290.0	795.11	0	20.66	0	10.24	0	0	0	30.9	8.9	228.5	219.7
99	9/21/2006	1300.0	636.47	0	21.63	0	10.12	0	0	0	31.75	9.1	181.5	172.5
100	9/22/2006	1260.0	1395.66	0	19.76	0	9.89	0	0	0	29.65	8.7	410.7	402.0
101	9/23/2006	1250.0	580.8	0	19.63	0	9.71	0	0	0	29.34	8.7	172.3	163.6
102	9/24/2006	1190.0	587.31	0	16.73	0	9.45	0	0	0	26.18	8.2	183.0	174.8
103	9/25/2006	1200.0	532.39	0	17.16	0	9.5	0	0	0	26.66	8.2	164.5	156.3
104	9/26/2006	1240.0	886.06	0	18.71	0	9.82	0	0	0	28.53	8.5	265.0	256.4
105	9/27/2006	1280.0	867.57	0	20.6	0	10.04	0	0	0	30.64	8.9	251.3	242.4
106	9/28/2006	1290.0	879.56	0	20.8	0	10.21	0	0	0	31.01	8.9	252.8	243.9
107	9/29/2006	1290.0	846.69	0	21.25	0	10.04	0	0	0	31.29	9.0	243.4	234.4
108	9/30/2006	1320.0	1009.54	0	23.27	0	10.04	0	0	0	33.31	9.4	283.6	274.2
109	10/1/2006	1460.0	886.87	0	37.08	0	9.25	0	0	0	46.33	11.8	225.2	213.5
110	10/2/2006	1500.0	827.61	0	40.05	0	9.4	0	0	0	49.45	12.2	204.6	192.4
111	10/3/2006	1540.0	765.05	0	42.4	0	9.73	0	0	0	52.13	12.6	184.2	171.7
112	10/4/2006	1570.0	783.34	0	45.17	0	9.74	0	0	0	54.91	13.0	185.0	172.0
113	10/5/2006	1600.0	822.42	0	48.6	0	9.66	0	0	0	58.26	13.5	190.6	177.1
114	10/6/2006	1580.0	490.72	0	46.76	0	9.61	0	0	0	56.37	13.2	115.2	101.9
115	10/7/2006	1570.0	811.24	0	46.38	0	9.49	0	0	0	55.87	13.2	191.6	178.4
116	10/8/2006	1560.0	465	0	45.39	0	9.49	0	0	0	54.88	13.0	110.5	97.5
117	10/9/2006	1560.0	217.32	0	45.48	0	9.45	0	0	0	54.93	13.1	51.7	38.6
118	10/10/2006	1600.0	128.8	0	48.07	0	9.76	0	0	0	57.83	13.4	29.8	16.4
119	10/11/2006	1690.0	119.94	0	54.38	0	10.44	0	0	0	64.82	14.2	26.3	12.1
120	10/12/2006	1710.0	125.54	0	56.12	0	10.53	0	0	0	66.65	14.5	27.2	12.8
121	10/13/2006	1670.0	342.19	0	53.52	0	10.18	0	0	0	63.7	14.1	76.0	61.8
122	10/14/2006	1680.0	138.17	0	54.6	0	10.18	0	0	0	64.78	14.3	30.5	16.2
123	10/15/2006	1670.0	88.09	0	53.52	0	10.18	0	0	0	63.7	14.1	19.6	5.4
124	10/16/2006	1680.0	206.46	0	55.25	0	10.04	0	0	0	65.29	14.4	45.6	31.2
125	10/17/2006	1680.0	355.12	0	56	0	9.89	0	0	0	65.89	14.5	78.4	63.8
126	10/18/2006	1670.0	880.07	0	55.02	0	9.87	0	0	0	64.89	14.4	195.4	181.0
127	10/19/2006	1640.0	646.18	0	52.45	0	9.73	0	0	0	62.18	14.1	146.1	132.0
128	10/20/2006	1620.0	573.08	0	50.86	0	9.61	0	0	0	60.47	13.8	131.2	117.3
129	10/21/2006	1610.0	233.66	0	50.03	0	9.58	0	0	0	59.61	13.7	53.8	40.1
130	10/22/2006	1610.0	594.86	0	49.72	0	9.64	0	0	0	59.36	13.7	137.0	123.3

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
131	10/23/2006	1600.0	190.89	0	48.81	0	9.61	0	0	0	58.42	13.5	44.2	30.7
132	10/24/2006	1610.0	250.63	0	49.82	0	9.61	0	0	0	59.43	13.7	57.7	44.0
133	10/25/2006	1600.0	111.33	0	48.81	0	9.61	0	0	0	58.42	13.5	25.8	12.3
134	10/26/2006	1590.0	446.49	0	47.77	0	9.61	0	0	0	57.38	13.4	104.1	90.7
135	10/27/2006	1580.0	496.08	0	47.38	0	9.49	0	0	0	56.87	13.3	116.4	103.1
136	10/28/2006	1580.0	361.42	0	47.38	0	9.49	0	0	0	56.87	13.3	84.8	71.5
137	10/29/2006	1570.0	326.03	0	46.47	0	9.45	0	0	0	55.92	13.2	77.0	63.8
138	10/30/2006	1560.0	126.98	0	45.88	0	9.38	0	0	0	55.26	13.1	30.2	17.0
139	10/31/2006	1560.0	81.39	0	46.38	0	9.26	0	0	0	55.64	13.2	19.3	6.1
140	11/1/2006	1540.0	140.42	0	44.6	0	9.22	0	0	0	53.82	13.0	33.8	20.9
141	11/2/2006	1540.0	127.08	0	44.21	0	9.29	0	0	0	53.5	12.9	30.6	17.7
142	11/3/2006	1560.0	130.53	0	46.67	0	9.2	0	0	0	55.87	13.3	31.0	17.7
143	11/4/2006	1550.0	101.11	0	46.18	0	9.1	0	0	0	55.28	13.2	24.2	11.0
144	11/5/2006	1530.0	80.49	0	44.12	0	9.11	0	0	0	53.23	12.9	19.5	6.6
145	11/6/2006	1560.0	93.17	0	46.58	0	9.22	0	0	0	55.8	13.3	22.1	8.9
146	11/7/2006	1560.0	103.16	0	47.17	0	9.1	0	0	0	56.27	13.4	24.5	11.1
147	11/8/2006	1580.0	111.99	0	48.81	0	9.17	0	0	0	57.98	13.6	26.3	12.7
148	11/9/2006	1570.0	440.18	0	48.48	0	9.03	0	0	0	57.51	13.6	104.0	90.4
149	11/10/2006	1540.0	111.12	0	46.98	0	8.7	0	0	0	55.68	13.4	26.8	13.3
150	11/11/2006	1560.0	118.09	0	48.07	0	8.9	0	0	0	56.97	13.5	28.1	14.5
151	11/12/2006	1520.0	103.91	0	44.01	0	8.91	0	0	0	52.92	12.9	25.3	12.4
152	11/13/2006	1580.0	86.75	0	48.18	0	9.29	0	0	0	57.47	13.5	20.4	6.9
153	11/14/2006	1700.0	137.68	0	51.39	0	11.31	0	0	0	62.7	13.7	30.0	16.4
154	11/15/2006	1780.0	320.52	0	54.05	0	12.58	0	0	0	66.63	13.9	66.8	52.9
155	11/16/2006	1780.0	234.99	0	57.25	0	11.91	0	0	0	69.16	14.4	49.0	34.5
156	11/17/2006	1730.0	211.15	0	55.02	0	11.23	0	0	0	66.25	14.2	45.3	31.1
157	11/18/2006	1720.0	381.14	0	55.02	0	10.99	0	0	0	66.01	14.2	82.2	67.9
158	11/19/2006	1680.0	347.42	0	52.54	0	10.61	0	0	0	63.15	13.9	76.7	62.7
159	11/20/2006	1660.0	141.89	0	51.92	0	10.28	0	0	0	62.2	13.9	31.7	17.8
160	11/21/2006	1660.0	121.17	0	49.82	0	10.74	0	0	0	60.56	13.5	27.1	13.5
161	11/22/2006	1880.0	289.22	0	66.26	0	12.43	0	0	0	78.69	15.5	57.0	41.5
162	11/23/2006	1940.0	302.36	0	71.42	0	12.85	0	0	0	84.27	16.1	57.8	41.7
163	11/24/2006	1920.0	195.75	0	66.87	0	13.25	0	0	0	80.12	15.5	37.8	22.3
164	11/25/2006	1850.0	173.7	0	62.35	0	12.51	0	0	0	74.86	15.0	34.8	19.8
165	11/26/2006	1800.0	165.86	0	59.36	0	11.93	0	0	0	71.29	14.7	34.2	19.5
166	11/27/2006	1780.0	158.59	0	57.25	0	11.91	0	0	0	69.16	14.4	33.0	18.6
167	11/28/2006	1820.0	177.92	0	59.14	0	12.45	0	0	0	71.59	14.6	36.2	21.7
168	11/29/2006	1830.0	187.72	0	59.48	0	12.62	0	0	0	72.1	14.6	38.0	23.4
169	11/30/2006	1790.0	168.85	0	57.56	0	12.07	0	0	0	69.63	14.4	35.0	20.6
170	12/1/2006	1770.0	161.78	0	56	0	11.93	0	0	0	67.93	14.2	33.9	19.7
171	12/2/2006	1790.0	172.13	0	57.01	0	12.2	0	0	0	69.21	14.3	35.7	21.3
172	12/3/2006	1850.0	187.95	0	60.73	0	12.82	0	0	0	73.55	14.7	37.7	22.9
173	12/4/2006	1830.0	201.4	0	60.27	0	12.45	0	0	0	72.72	14.7	40.8	26.1
174	12/5/2006	1760.0	163.58	0	56.89	0	11.51	0	0	0	68.4	14.4	34.5	20.1
175	12/6/2006	1590.0	161.7	0	46.18	0	9.97	0	0	0	56.15	13.1	37.7	24.6
176	12/7/2006	1550.0	1059.99	0	40.89	0	10.31	0	0	0	51.2	12.2	253.6	241.3
177	12/8/2006	1560.0	740.16	0	40.98	0	10.52	0	0	0	51.5	12.2	175.9	163.7
178	12/9/2006	1520.0	387.61	0	39.87	0	9.89	0	0	0	49.76	12.1	94.6	82.4
179	12/10/2006	1420.0	616.12	0	31.91	0	9.71	0	0	0	41.62	10.9	160.9	150.0
180	12/11/2006	1430.0	599.74	0	31.1	0	10.16	0	0	0	41.26	10.7	155.5	144.8

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
181	12/12/2006	1560.0	766.02	0	43.34	0	9.95	0	0	0	53.29	12.7	182.1	169.4
182	12/13/2006	1570.0	603.07	0	44.99	0	9.8	0	0	0	54.79	12.9	142.4	129.5
183	12/14/2006	1570.0	514.15	0	45.69	0	9.64	0	0	0	55.33	13.1	121.4	108.4
184	12/15/2006	1550.0	315.71	0	44.99	0	9.35	0	0	0	54.34	13.0	75.5	62.5
185	12/16/2006	1500.0	240.07	0	40.32	0	9.34	0	0	0	49.66	12.3	59.3	47.1
186	12/17/2006	1530.0	248.18	0	42.2	0	9.56	0	0	0	51.76	12.5	60.1	47.6
187	12/18/2006	1520.0	266.04	0	43.06	0	9.14	0	0	0	52.2	12.7	64.9	52.2
188	12/19/2006	1050.0	540.38	0	17.32	0	6.28	0	0	0	23.6	8.3	190.8	182.5
189	12/20/2006	600.0	760.45	0	0	0	4.02	0	0	0	4.02	2.5	470.0	467.5
190	12/21/2006	500.0	290.57	0	0	0	3.14	0	0	0	3.14	2.3	215.5	213.2
191	12/22/2006	450.0	147.89	0	0	0	3.48	0	0	0	3.48	2.9	121.9	119.0
192	12/23/2006	550.0	88.29	0	0	0	4.02	0	0	0	4.02	2.7	59.5	56.8
193	12/24/2006	700.0	307.64	0	0.03	0	4.95	0	0	0	4.98	2.6	163.0	160.3
194	12/25/2006	900.0	453.04	0	2.24	0	5.9	0	0	0	8.14	3.4	186.7	183.3
195	12/26/2006	1100.0	741.32	0	17.27	0	7.32	0	0	0	24.59	8.3	249.9	241.6
196	12/27/2006	1300.0	569.81	0	27.29	0	8.38	0	0	0	35.67	10.2	162.5	152.4
197	12/28/2006	1400.0	471.91	0	34.47	0	8.58	0	0	0	43.05	11.4	125.0	113.6
198	12/29/2006	1600.0	731.58	0	51.59	0	9.03	0	0	0	60.62	14.0	169.5	155.5
199	12/30/2006	1700.0	387.59	0	59.27	0	9.69	0	0	0	68.96	15.0	84.5	69.5
200	12/31/2006	1800.0	404.37	0	68.7	0	10.12	0	0	0	78.82	16.2	83.3	67.1
201	1/1/2007	1900.0	429.59	0	81.55	0	10.12	0	0	0	91.67	17.9	83.8	65.9
202	1/2/2007	1800.0	273.14	0	71.17	0	9.69	0	0	0	80.86	16.7	56.3	39.6
203	1/3/2007	1610.0	147.22	0	50.54	0	9.45	0	0	0	59.99	13.8	33.9	20.1
204	1/4/2007	1520.0	198.77	0	41.63	0	9.45	0	0	0	51.08	12.5	48.5	36.0
205	1/5/2007	1570.0	188.99	0	45.48	0	9.69	0	0	0	55.17	13.0	44.6	31.6
206	1/6/2007	1630.0	121.17	0	49.52	0	10.12	0	0	0	59.64	13.6	27.6	14.0
207	1/7/2007	1670.0	150.76	0	55.91	0	9.69	0	0	0	65.6	14.6	33.5	18.9
208	1/8/2007	1610.0	129.74	0	50.54	0	9.45	0	0	0	59.99	13.8	29.9	16.1
209	1/9/2007	1590.0	311.82	0	47.48	0	9.69	0	0	0	57.17	13.3	72.7	59.4
210	1/10/2007	1570.0	124.63	0	43.25	0	10.21	0	0	0	53.46	12.6	29.4	16.8
211	1/11/2007	1690.0	126.52	0	51.72	0	11.01	0	0	0	62.73	13.8	27.8	14.0
212	1/12/2007	1680.0	173.38	0	49.19	0	11.34	0	0	0	60.53	13.4	38.3	24.9
213	1/13/2007	1650.0	167.62	0	45.69	0	11.44	0	0	0	57.13	12.8	37.7	24.8
214	1/14/2007	1620.0	158.78	0	44.6	0	11.01	0	0	0	55.61	12.7	36.3	23.6
215	1/15/2007	1640.0	183.77	0	44.89	0	11.4	0	0	0	56.29	12.7	41.5	28.8
216	1/16/2007	1680.0	135.73	0	48.4	0	11.51	0	0	0	59.91	13.2	30.0	16.7
217	1/17/2007	1660.0	143.18	0	46.88	0	11.4	0	0	0	58.28	13.0	32.0	19.0
218	1/18/2007	1600.0	123.11	0	43.34	0	10.85	0	0	0	54.19	12.6	28.5	16.0
219	1/19/2007	1550.0	124.47	0	40.81	0	10.33	0	0	0	51.14	12.2	29.8	17.5
220	1/20/2007	1540.0	121.84	0	40.89	0	10.07	0	0	0	50.96	12.3	29.3	17.1
221	1/21/2007	1520.0	136.48	0	39.97	0	9.87	0	0	0	49.84	12.2	33.3	21.1
222	1/22/2007	1470.0	767.25	0	36.2	0	9.69	0	0	0	45.89	11.6	193.5	182.0
223	1/23/2007	1460.0	130.15	0	36.72	0	9.34	0	0	0	46.06	11.7	33.1	21.4
224	1/24/2007	1350.0	151.25	0	33.81	0	7.71	0	0	0	41.52	11.4	41.5	30.1
225	1/25/2007	1180.0	96.76	0	26.18	0	6.2	0	0	0	32.38	10.2	30.4	20.2
226	1/26/2007	1190.0	97.01	0	22.38	0	7.51	0	0	0	29.89	9.3	30.2	20.9
227	1/27/2007	1330.0	166.17	0	25.59	0	9.53	0	0	0	35.12	9.8	46.3	36.5
228	1/28/2007	1450.0	207.68	0	35.52	0	9.41	0	0	0	44.93	11.5	53.1	41.6
229	1/29/2007	1430.0	158.52	0	33.47	0	9.5	0	0	0	42.97	11.1	41.1	30.0
230	1/30/2007	1550.0	280.96	0	42	0	10.04	0	0	0	52.04	12.4	67.2	54.8

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Concentrations: Total Suspended Sediment Conc.	Concentrations: Suspended Sediment Conc. To due scour
231	1/31/2007	1430.0	408.1	0	27.29	0	11.27	0	0	0	38.56	10.0	105.8	95.8
232	2/1/2007	1430.0	115.8	0	27.58	0	11.18	0	0	0	38.76	10.1	30.0	20.0
233	2/2/2007	1380.0	179.41	0	30.05	0	9.34	0	0	0	39.39	10.6	48.2	37.6
234	2/3/2007	1370.0	145.73	0	31.49	0	8.72	0	0	0	40.21	10.9	39.4	28.6
235	2/4/2007	1370.0	184.49	0	32.65	0	8.42	0	0	0	41.07	11.1	49.9	38.8
236	2/5/2007	1370.0	148.61	0	33.21	0	8.28	0	0	0	41.49	11.2	40.2	29.0
237	2/6/2007	1330.0	88.87	0	30.22	0	8.2	0	0	0	38.42	10.7	24.8	14.1
238	2/7/2007	1380.0	244.61	0	33.39	0	8.43	0	0	0	41.82	11.2	65.7	54.5
239	2/8/2007	1350.0	369.11	0	32.4	0	8.06	0	0	0	40.46	11.1	101.4	90.3
240	2/9/2007	1350.0	233.68	0	31.82	0	8.2	0	0	0	40.02	11.0	64.2	53.2
241	2/10/2007	1350.0	173.77	0	31.91	0	8.18	0	0	0	40.09	11.0	47.7	36.7
242	2/11/2007	1300.0	122.16	0	29.11	0	7.86	0	0	0	36.97	10.5	34.8	24.3
243	2/12/2007	1170.0	107.68	0	21.82	0	7.26	0	0	0	29.08	9.2	34.1	24.9
244	2/13/2007	1210.0	102.85	0	23.74	0	7.51	0	0	0	31.25	9.6	31.5	21.9
245	2/14/2007	1340.0	260.05	0	29.99	0	8.48	0	0	0	38.47	10.6	72.0	61.3
246	2/15/2007	1340.0	195.59	0	30.45	0	8.35	0	0	0	38.8	10.7	54.1	43.4
247	2/16/2007	1300.0	101.63	0	27.52	0	8.32	0	0	0	35.84	10.2	29.0	18.8
248	2/17/2007	1340.0	223.44	0	31.57	0	8.06	0	0	0	39.63	11.0	61.8	50.9
249	2/18/2007	1320.0	112.85	0	30.22	0	7.98	0	0	0	38.2	10.7	31.7	21.0
250	2/19/2007	1310.0	102.45	0	29.34	0	8.01	0	0	0	37.35	10.6	29.0	18.4
251	2/20/2007	1320.0	133.86	0	30.94	0	7.81	0	0	0	38.75	10.9	37.6	26.7
252	2/21/2007	1300.0	935.52	0	29.52	0	7.75	0	0	0	37.27	10.6	266.8	256.2
253	2/22/2007	1310.0	521.9	0	30.22	0	7.78	0	0	0	38	10.8	147.7	137.0
254	2/23/2007	1360.0	210.84	0	32.89	0	8.13	0	0	0	41.02	11.2	57.5	46.3
255	2/24/2007	1330.0	93.9	0	29.74	0	8.33	0	0	0	38.07	10.6	26.2	15.6
256	2/25/2007	1470.0	518.78	0	40.89	0	8.54	0	0	0	49.43	12.5	130.9	118.4
257	2/26/2007	1550.0	379.41	0	48.48	0	8.58	0	0	0	57.06	13.7	90.8	77.1
258	2/27/2007	1460.0	176.92	0	41.08	0	8.29	0	0	0	49.37	12.5	44.9	32.4
259	2/28/2007	1500.0	142.77	0	40.81	0	9.22	0	0	0	50.03	12.4	35.3	22.9
260	3/1/2007	1940.0	256.65	0	88.98	0	9.82	0	0	0	98.8	18.9	49.1	30.2
261	3/2/2007	1890.0	340.53	0	82.23	0	9.8	0	0	0	92.03	18.1	66.8	48.8
262	3/3/2007	1750.0	150.42	0	60.27	0	10.61	0	0	0	70.88	15.0	31.9	16.9
263	3/4/2007	1680.0	134.53	0	55.25	0	10.04	0	0	0	65.29	14.4	29.7	15.3
264	3/5/2007	1510.0	496.96	0	40.98	0	9.4	0	0	0	50.38	12.4	122.0	109.7
265	3/6/2007	1460.0	373.25	0	39.52	0	8.65	0	0	0	48.17	12.2	94.8	82.6
266	3/7/2007	1410.0	210.99	0	35.7	0	8.52	0	0	0	44.22	11.6	55.5	43.9
267	3/8/2007	1450.0	88.07	0	38.69	0	8.64	0	0	0	47.33	12.1	22.5	10.4
268	3/9/2007	1420.0	80.4	0	35.76	0	8.7	0	0	0	44.46	11.6	21.0	9.4
269	3/10/2007	1430.0	84.94	0	37.17	0	8.57	0	0	0	45.74	11.9	22.0	10.2
270	3/11/2007	1440.0	88.82	0	38.05	0	8.57	0	0	0	46.62	12.0	22.9	10.9
271	3/12/2007	1430.0	86.73	0	37.27	0	8.54	0	0	0	45.81	11.9	22.5	10.6
272	3/13/2007	1420.0	119.26	0	36.12	0	8.62	0	0	0	44.74	11.7	31.1	19.5
273	3/14/2007	1500.0	118.53	0	40.81	0	9.22	0	0	0	50.03	12.4	29.3	16.9
274	3/15/2007	1690.0	122.22	0	52.66	0	10.81	0	0	0	63.47	13.9	26.8	12.9
275	3/16/2007	2000.0	250.4	0	69.69	0	14.63	0	0	0	84.32	15.6	46.4	30.8
276	3/17/2007	2280.0	361.4	0	94.56	0	16.96	0	0	0	111.52	18.1	58.8	40.6
277	3/18/2007	1940.0	178.56	0	64.94	0	14.12	0	0	0	79.06	15.1	34.1	19.0
278	3/19/2007	1900.0	139.87	0	60.05	0	14.17	0	0	0	74.22	14.5	27.3	12.8
279	3/20/2007	2120.0	158	0	69.55	0	17.65	0	0	0	87.2	15.3	27.6	12.4
280	3/21/2007	2650.0	1446.13	0	113.33	0	23.39	0	0	0	136.72	19.1	202.3	183.2

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
281	3/22/2007	3150.0	301.25	0	148.6	0	32.57	0	0	0	181.17	21.3	35.5	14.1
282	3/23/2007	3330.0	446.56	0	177.41	0	34.8	0	0	0	212.21	23.6	49.7	26.1
283	3/24/2007	3210.0	273.43	0	154.06	0	33.86	0	0	0	187.92	21.7	31.6	9.9
284	3/25/2007	3230.0	269.04	0	148.6	0	36.44	0	0	0	185.04	21.2	30.9	9.6
285	3/26/2007	3630.0	367.23	0	187.61	0	50.67	0	0	0	238.28	24.3	37.5	13.2
286	3/27/2007	3720.0	825.33	0	200.24	0	52.78	0	0	0	253.02	25.2	82.3	57.0
287	3/28/2007	3390.0	511.14	0	150.42	0	45.96	0	0	0	196.38	21.5	55.9	34.4
288	3/29/2007	3190.0	290.73	0	127.84	0	41.48	0	0	0	169.32	19.7	33.8	14.1
289	3/30/2007	3050.0	222.24	0	113.33	0	38.35	0	0	0	151.68	18.4	27.0	8.6
290	3/31/2007	2970.0	203.74	0	107.17	0	35.88	0	0	0	143.05	17.9	25.4	7.6
291	4/1/2007	2810.0	181.43	0	96.83	0	31.76	0	0	0	128.59	17.0	23.9	7.0
292	4/2/2007	2620.0	320.6	0	81.55	0	28.97	0	0	0	110.52	15.6	45.4	29.7
293	4/3/2007	2570.0	223.76	0	80.21	0	27.71	0	0	0	107.92	15.6	32.3	16.7
294	4/4/2007	2510.0	708.71	0	74.98	0	27.11	0	0	0	102.09	15.1	104.7	89.6
295	4/5/2007	2430.0	343.54	0	71.17	0	25.64	0	0	0	96.81	14.8	52.4	37.6
296	4/6/2007	2340.0	570.9	0	63.88	0	24.79	0	0	0	88.67	14.1	90.5	76.4
297	4/7/2007	2350.0	428.14	0	62.71	0	25.37	0	0	0	88.08	13.9	67.6	53.7
298	4/8/2007	2370.0	192.74	0	59.27	0	26.81	0	0	0	86.08	13.5	30.2	16.7
299	4/9/2007	2470.0	143.32	0	65.06	0	28.34	0	0	0	93.4	14.0	21.5	7.5
300	4/10/2007	2430.0	140.89	0	65.06	0	27.11	0	0	0	92.17	14.1	21.5	7.4
301	4/11/2007	2320.0	235.14	0	55.91	0	26.21	0	0	0	82.12	13.1	37.6	24.5
302	4/12/2007	2380.0	242.3	0	61.54	0	26.52	0	0	0	88.06	13.7	37.7	24.0
303	4/13/2007	2450.0	270.08	0	61.54	0	28.65	0	0	0	90.19	13.6	40.9	27.2
304	4/14/2007	2570.0	214.39	0	66.26	0	31.39	0	0	0	97.65	14.1	30.9	16.8
305	4/15/2007	2650.0	350.45	0	72.44	0	32.57	0	0	0	105.01	14.7	49.0	34.3
306	4/16/2007	2640.0	226.01	0	67.48	0	33.86	0	0	0	101.34	14.2	31.7	17.5
307	4/17/2007	2760.0	279.06	0	73.72	0	37.67	0	0	0	111.39	15.0	37.5	22.5
308	4/18/2007	3015.0	327.47	0	91.19	0	45.63	0	0	0	136.82	16.8	40.3	23.4
309	4/19/2007	3520.0	1007.7	0	92.57	0	84.74	0	0	0	177.31	18.7	106.2	87.5
310	4/20/2007	4420.0	2534.81	0	143.24	0	148	0	0	0	291.24	24.4	212.6	188.2
311	4/21/2007	4940.0	2936.48	0	187.61	0	190.12	0	0	0	377.73	28.4	220.4	192.1
312	4/22/2007	4900.0	2199.43	0	179.42	0	190.12	0	0	0	369.54	28.0	166.4	138.5
313	4/23/2007	4720.0	1417.6	0	159.65	0	175.86	0	0	0	335.51	26.4	111.4	85.0
314	4/24/2007	4610.0	1385.06	0	141.5	0	174.47	0	0	0	315.97	25.4	111.4	86.0
315	4/25/2007	4710.0	2261.35	0	132.87	0	194.66	0	0	0	327.53	25.8	178.0	152.2
316	4/26/2007	5120.0	2481.65	0	148.6	0	227.2	0	0	0	375.8	27.2	179.7	152.5
317	4/27/2007	5710.0	2279.84	0	191.76	0	269.51	0	0	0	461.27	30.0	148.0	118.1
318	4/28/2007	6110.0	3259.76	0	238.39	0	311.5	0	0	0	549.89	33.4	197.8	164.5
319	4/29/2007	5970.0	1923.67	0	229.1	0	292.18	0	0	0	521.28	32.4	119.5	87.1
320	4/30/2007	5600.0	1610.71	0	200.24	0	252.81	0	0	0	453.05	30.0	106.7	76.7
321	5/1/2007	5340.0	1802.53	0	177.41	0	236.69	0	0	0	414.1	28.8	125.2	96.4
322	5/2/2007	5340.0	1025.02	0	179.42	0	235.64	0	0	0	415.06	28.8	71.2	42.4
323	5/3/2007	5460.0	716.4	0	202.37	0	236.69	0	0	0	439.06	29.8	48.7	18.8
324	5/4/2007	5430.0	729.9	0	202.37	0	233.5	0	0	0	435.87	29.8	49.8	20.1
325	5/5/2007	5250.0	1029.11	0	187.61	0	222	0	0	0	409.61	28.9	72.7	43.8
326	5/6/2007	4950.0	1006.76	0	157.76	0	204.64	0	0	0	362.4	27.1	75.4	48.3
327	5/7/2007	4860.0	939.76	0	146.81	0	201.63	0	0	0	348.44	26.6	71.7	45.1
328	5/8/2007	4880.0	1471.33	0	152.22	0	200.61	0	0	0	352.83	26.8	111.8	85.0
329	5/9/2007	4900.0	1519.63	0	152.22	0	202.63	0	0	0	354.85	26.9	115.0	88.1
330	5/10/2007	4890.0	1199.68	0	155.9	0	199.62	0	0	0	355.52	27.0	91.0	64.0

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
331	5/11/2007	4790.0	1115.17	0	154.06	0	190.12	0	0	0	344.18	26.6	86.3	59.7
332	5/12/2007	4640.0	1145.88	0	145.03	0	175.86	0	0	0	320.89	25.6	91.6	65.9
333	5/13/2007	4560.0	771.88	0	146.81	0	163.59	0	0	0	310.4	25.2	62.8	37.5
334	5/14/2007	4380.0	597.02	0	131.18	0	151.81	0	0	0	282.99	24.0	50.5	26.6
335	5/15/2007	4210.0	503.42	0	114.88	0	143	0	0	0	257.88	22.7	44.3	21.6
336	5/16/2007	4150.0	473.74	0	107.17	0	141.76	0	0	0	248.93	22.2	42.3	20.1
337	5/17/2007	4160.0	473.93	0	105.68	0	144.22	0	0	0	249.9	22.3	42.2	20.0
338	5/18/2007	4330.0	697.98	0	110.23	0	162.25	0	0	0	272.48	23.3	59.8	36.4
339	5/19/2007	4840.0	1049.03	0	129.49	0	209.67	0	0	0	339.16	26.0	80.4	54.4
340	5/20/2007	5540.0	980.47	0	179.42	0	257.15	0	0	0	436.57	29.2	65.6	36.4
341	5/21/2007	6210.0	1243.83	0	208.91	0	359.75	0	0	0	568.66	34.0	74.3	40.3
342	5/22/2007	7200.0	1602.14	0	280.04	0	542.15	0	0	0	822.19	42.3	82.5	40.2
343	5/23/2007	7960.0	1910.95	0	362.26	0	702.94	0	0	0	1065.2	49.6	89.0	39.4
344	5/24/2007	9020.0	2199.25	0.01	556.09	0	813.73	0	0	0	1369.82	56.3	90.4	34.1
345	5/25/2007	10800.0	3432.36	0.04	606.55	0	1344.22	0	0	0	1950.77	67.0	117.8	50.9
346	5/26/2007	13000.0	8018.69	0.08	957.04	168.89	2111.46	0	0	0	3068.5	87.5	228.7	141.2
347	5/27/2007	13500.0	6606.08	0.1	1127.11	198.9	2343.35	0	0	0	3470.46	95.3	181.4	86.1
348	5/28/2007	13100.0	6524.76	0.09	1111.53	196.15	1955.4	0	0	0	3066.93	86.8	184.7	97.9
349	5/29/2007	13000.0	6066.26	0.08	1127.11	198.9	1872.84	0	0	0	2999.95	85.6	173.0	87.5
350	5/30/2007	13500.0	5752.22	0.09	1574.86	277.92	1707.99	0	0	0	3282.85	90.2	158.0	67.8
351	5/31/2007	12700.0	4181.3	0.07	1500.67	264.83	1366.33	0	0	0	2867	83.7	122.1	38.4
352	6/1/2007	11500.0	4249.14	0.05	1142.85	201.68	1135.95	0	0	0	2278.8	73.5	137.0	63.5
353	6/2/2007	11200.0	3234.35	0.04	1137.6	200.75	1036.02	0	0	0	2173.62	72.0	107.1	35.1
354	6/3/2007	11900.0	4363.61	0.05	1289.78	227.6	1184.39	0	0	0	2474.17	77.1	136.0	58.9
355	6/4/2007	14000.0	5945.5	0.11	2122.27	374.52	1547.58	0	0	0	3669.85	97.2	157.5	60.3
356	6/5/2007	14400.0	6177.41	0.11	2227.62	393.11	1685.69	0	0	0	3913.31	100.8	159.1	58.3
357	6/6/2007	13500.0	5159.08	0.09	1857.11	327.73	1482.92	0	0	0	3340.03	91.7	141.7	50.0
358	6/7/2007	12300.0	4673.82	0.07	1488.51	262.68	1207.54	0	0	0	2696.05	81.3	140.9	59.6
359	6/8/2007	11100.0	3810.02	0.05	1190.77	210.13	973.35	0	0	0	2164.12	72.3	127.3	55.0
360	6/9/2007	10300.0	3650.31	0.03	1045.23	184.45	832.66	0	0	0	1877.89	67.6	131.4	63.8
361	6/10/2007	9300.0	2812.19	0.01	823.79	145.37	657.48	0	0	0	1481.27	59.1	112.1	53.1
362	6/11/2007	8400.0	2382.85	0	635.98	0	514.7	0	0	0	1150.68	50.8	105.2	54.4
363	6/12/2007	7790.0	2191.27	0	537.03	0	436.68	0	0	0	973.71	46.3	104.3	58.0
364	6/13/2007	7560.0	1858.28	0	494.25	0	421.31	0	0	0	915.56	44.9	91.1	46.2
365	6/14/2007	7870.0	1683.38	0	506.35	0	491.31	0	0	0	997.66	47.0	79.3	32.3
366	6/15/2007	8760.0	2171.69	0.01	561.72	0	722.69	0	0	0	1284.41	54.4	91.9	37.6
367	6/16/2007	9530.0	2113.21	0.01	642.78	0	870.07	0	0	0	1512.85	58.9	82.2	23.4
368	6/17/2007	10400.0	2232.31	0.03	832.63	146.93	982.44	0	0	0	1815.07	64.7	79.6	14.9
369	6/18/2007	10500.0	2729.33	0.04	823.79	145.37	1019.88	0	0	0	1843.67	65.1	96.4	31.3
370	6/19/2007	10400.0	2374.53	0.03	797.56	140.75	1007.19	0	0	0	1804.75	64.3	84.7	20.3
371	6/20/2007	10200.0	2458.46	0.03	776.07	136.95	961.41	0	0	0	1737.48	63.2	89.4	26.2
372	6/21/2007	9510.0	2358.84	0.01	656.73	0	854.82	0	0	0	1511.55	58.9	92.0	33.0
373	6/22/2007	8940.0	1669.04	0.01	588.06	0	759.44	0	0	0	1347.5	55.9	69.2	13.3
374	6/23/2007	8590.0	1809.18	0	558.9	0	661.18	0	0	0	1220.08	52.7	78.1	25.4
375	6/24/2007	7910.0	1183.73	0	480.26	0	535.97	0	0	0	1016.23	47.6	55.5	7.9
376	6/25/2007	7770.0	1559.16	0	445.3	0	542.15	0	0	0	987.45	47.1	74.4	27.3
377	6/26/2007	7650.0	1330.78	0	437.04	0	517.71	0	0	0	954.75	46.3	64.5	18.2
378	6/27/2007	6900.0	1174.96	0	350.64	0	389.55	0	0	0	740.19	39.8	63.1	23.4
379	6/28/2007	6270.0	940.8	0	285.19	0	305.6	0	0	0	590.79	34.9	55.6	20.7
380	6/29/2007	5820.0	1138.22	0	240.75	0	257.15	0	0	0	497.9	31.7	72.5	40.8

At xsect 361.66 - closest to CFR above Missoula Gage
JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
381	6/30/2007	5620.0	1416.87	0	213.28	0	248.45	0	0	0	461.73	30.5	93.5	63.0
382	7/1/2007	5890.0	1124.12	0	224.51	0	273.78	0	0	0	498.29	31.4	70.8	39.4
383	7/2/2007	5900.0	1092.59	0	217.73	0	286.95	0	0	0	504.68	31.7	68.7	36.9
384	7/3/2007	5610.0	1138.5	0	202.37	0	252.81	0	0	0	455.18	30.1	75.3	45.2
385	7/4/2007	5290.0	1031.53	0	181.45	0	229.28	0	0	0	410.73	28.8	72.3	43.5
386	7/5/2007	5030.0	784.86	0	157.76	0	212.75	0	0	0	370.51	27.3	57.9	30.5
387	7/6/2007	4710.0	521.68	0	136.28	0	192.7	0	0	0	328.98	25.9	41.1	15.2
388	7/7/2007	4500.0	480.95	0	126.16	0	171.72	0	0	0	297.88	24.5	39.6	15.1
389	7/8/2007	4290.0	418.5	0	104.17	0	162.25	0	0	0	266.42	23.0	36.2	13.1
390	7/9/2007	4100.0	380.86	0	91.19	0	149.24	0	0	0	240.43	21.7	34.4	12.7
391	7/10/2007	3950.0	353.8	0	87.02	0	134.47	0	0	0	221.49	20.8	33.2	12.4
392	7/11/2007	3710.0	317.68	0	71.17	0	120.55	0	0	0	191.72	19.2	31.8	12.6
393	7/12/2007	3540.0	292.04	0	62.71	0	109.6	0	0	0	172.31	18.0	30.6	12.5
394	7/13/2007	3430.0	276.56	0	61.54	0	99.24	0	0	0	160.78	17.4	29.9	12.5
395	7/14/2007	3290.0	299.78	0	57.01	0	89.45	0	0	0	146.46	16.5	33.8	17.3
396	7/15/2007	3120.0	529.3	0	49.52	0	80.16	0	0	0	129.68	15.4	62.9	47.5
397	7/16/2007	3020.0	573.99	0	47.48	0	73.13	0	0	0	120.61	14.8	70.5	55.7
398	7/17/2007	2930.0	489.87	0	47.48	0	65.64	0	0	0	113.12	14.3	62.0	47.7
399	7/18/2007	2810.0	219.77	0	41.63	0	60.93	0	0	0	102.56	13.5	29.0	15.5
400	7/19/2007	2720.0	212.86	0	44.51	0	52.07	0	0	0	96.58	13.2	29.0	15.9
401	7/20/2007	2650.0	214.83	0	44.51	0	47.26	0	0	0	91.77	12.8	30.1	17.2
402	7/21/2007	2530.0	196.43	0	38.88	0	43.38	0	0	0	82.26	12.1	28.8	16.7
403	7/22/2007	2530.0	202.52	0	44.51	0	39.65	0	0	0	84.16	12.3	29.7	17.3
404	7/23/2007	2410.0	183.96	0	39.78	0	35.32	0	0	0	75.1	11.6	28.3	16.7
405	7/24/2007	2250.0	174.63	0	31.99	0	32.15	0	0	0	64.14	10.6	28.8	18.2
406	7/25/2007	2260.0	175.49	0	36.2	0	30.65	0	0	0	66.85	11.0	28.8	17.8
407	7/26/2007	2200.0	150.19	0	35.33	0	28.97	0	0	0	64.3	10.8	25.3	14.5
408	7/27/2007	2110.0	125.28	0	32.81	0	27.11	0	0	0	59.92	10.5	22.0	11.5
409	7/28/2007	2010.0	116.07	0	29.58	0	25.37	0	0	0	54.95	10.1	21.4	11.3
410	7/29/2007	1940.0	111.62	0	28.03	0	23.94	0	0	0	51.97	9.9	21.3	11.4
411	7/30/2007	1870.0	107.86	0	26.53	0	22.59	0	0	0	49.12	9.7	21.4	11.6
412	7/31/2007	1800.0	102.79	0	22.98	0	22.03	0	0	0	45.01	9.3	21.2	11.9
413	8/1/2007	1730.0	98.47	0	19.72	0	21.49	0	0	0	41.21	8.8	21.1	12.3
414	8/2/2007	1710.0	94.13	0	19.08	0	21.23	0	0	0	40.31	8.7	20.4	11.7
415	8/3/2007	1690.0	92.28	0	20.34	0	20.18	0	0	0	40.52	8.9	20.2	11.4
416	8/4/2007	1680.0	89.3	0	20.84	0	19.69	0	0	0	40.53	8.9	19.7	10.8
417	8/5/2007	1680.0	92.06	0	21.17	0	19.56	0	0	0	40.73	9.0	20.3	11.3
418	8/6/2007	1710.0	95.78	0	25.02	0	18.89	0	0	0	43.91	9.5	20.8	11.2
419	8/7/2007	1740.0	100.81	0	22.98	0	20.44	0	0	0	43.42	9.3	21.5	12.2
420	8/8/2007	1730.0	98.87	0	24.81	0	19.48	0	0	0	44.29	9.5	21.2	11.7
421	8/9/2007	1610.0	87.22	0	19.63	0	18.37	0	0	0	38	8.8	20.1	11.3
422	8/10/2007	1580.0	87.07	0	19.76	0	17.55	0	0	0	37.31	8.8	20.4	11.7
423	8/11/2007	1550.0	81.54	0	18.83	0	17.18	0	0	0	36.01	8.6	19.5	10.9
424	8/12/2007	1580.0	87.29	0	19.46	0	17.67	0	0	0	37.13	8.7	20.5	11.8
425	8/13/2007	1780.0	101.16	0	28.19	0	19.59	0	0	0	47.78	10.0	21.1	11.1
426	8/14/2007	1810.0	105.86	0	28.03	0	20.44	0	0	0	48.47	9.9	21.7	11.8
427	8/15/2007	1820.0	109.52	0	31.17	0	19.63	0	0	0	50.8	10.3	22.3	12.0
428	8/16/2007	1830.0	112.19	0	34.4	0	18.89	0	0	0	53.29	10.8	22.7	11.9
429	8/17/2007	1780.0	102.52	0	33.73	0	17.8	0	0	0	51.53	10.7	21.4	10.6
430	8/18/2007	1700.0	94.49	0	29.91	0	16.96	0	0	0	46.87	10.2	20.6	10.4

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
431	8/19/2007	1630.0	89.33	0	26.53	0	16.32	0	0	0	42.85	9.7	20.3	10.6
432	8/20/2007	1600.0	84.94	0	26.61	0	15.54	0	0	0	42.15	9.8	19.7	9.9
433	8/21/2007	1510.0	83.27	0	21.91	0	14.97	0	0	0	36.88	9.1	20.4	11.4
434	8/22/2007	1500.0	81.12	0	22.1	0	14.66	0	0	0	36.76	9.1	20.1	11.0
435	8/23/2007	1450.0	79.42	0	20.01	0	14.22	0	0	0	34.23	8.8	20.3	11.6
436	8/24/2007	1430.0	75.82	0	19.95	0	13.75	0	0	0	33.7	8.7	19.7	10.9
437	8/25/2007	1290.0	59.96	0	5.08	0	13.69	0	0	0	18.77	5.4	17.2	11.8
438	8/26/2007	1220.0	55.03	0	1.34	0	13.42	0	0	0	14.76	4.5	16.7	12.2
439	8/27/2007	1250.0	55.12	0	4.07	0	12.98	0	0	0	17.05	5.1	16.4	11.3
440	8/28/2007	1400.0	72.94	0	20.07	0	12.99	0	0	0	33.06	8.8	19.3	10.6
441	8/29/2007	1340.0	68.6	0	16.05	0	13.16	0	0	0	29.21	8.1	19.0	10.9
442	8/30/2007	1410.0	73.62	0	19.95	0	13.28	0	0	0	33.23	8.7	19.4	10.6
443	8/31/2007	1380.0	74.27	0	18.35	0	13.17	0	0	0	31.52	8.5	20.0	11.5
444	9/1/2007	1420.0	75.01	0	21.56	0	12.92	0	0	0	34.48	9.0	19.6	10.6
445	9/2/2007	1400.0	72.14	0	20.21	0	12.93	0	0	0	33.14	8.8	19.1	10.3
446	9/3/2007	1420.0	74.61	0	21.43	0	12.98	0	0	0	34.41	9.0	19.5	10.5
447	9/4/2007	1500.0	80.93	0	24.09	0	13.95	0	0	0	38.04	9.4	20.0	10.6
448	9/5/2007	1530.0	80.15	0	26.4	0	13.9	0	0	0	40.3	9.8	19.4	9.7
449	9/6/2007	1530.0	81.23	0	28.35	0	13.28	0	0	0	41.63	10.1	19.7	9.6
450	9/7/2007	1480.0	79.33	0	27.06	0	12.51	0	0	0	39.57	9.9	19.9	10.0
451	9/8/2007	1360.0	146.88	0	20.16	0	12.03	0	0	0	32.19	8.8	40.0	31.3
452	9/9/2007	1380.0	175.4	0	21.72	0	11.93	0	0	0	33.65	9.0	47.1	38.1
453	9/10/2007	1340.0	93.81	0	19.72	0	11.73	0	0	0	31.45	8.7	26.0	17.3
454	9/11/2007	1350.0	96.01	0	21.43	0	11.34	0	0	0	32.77	9.0	26.4	17.4
455	9/12/2007	1340.0	92.93	0	21.52	0	11.08	0	0	0	32.6	9.0	25.7	16.7
456	9/13/2007	1290.0	86.91	0	17.99	0	11.23	0	0	0	29.22	8.4	25.0	16.6
457	9/14/2007	1340.0	78.47	0	21.3	0	11.14	0	0	0	32.44	9.0	21.7	12.7
458	9/15/2007	1330.0	68.27	0	21.17	0	10.97	0	0	0	32.14	9.0	19.0	10.1
459	9/16/2007	1330.0	67.55	0	21.91	0	10.71	0	0	0	32.62	9.1	18.8	9.7
460	9/17/2007	1300.0	67.4	0	20.91	0	10.37	0	0	0	31.28	8.9	19.2	10.3
461	9/18/2007	1290.0	66.12	0	20.6	0	10.27	0	0	0	30.87	8.9	19.0	10.1
462	9/19/2007	1260.0	62.19	0	18.83	0	10.21	0	0	0	29.04	8.5	18.3	9.8
463	9/20/2007	1290.0	66.07	0	20.66	0	10.24	0	0	0	30.9	8.9	19.0	10.1
464	9/21/2007	1300.0	67.56	0	21.63	0	10.12	0	0	0	31.75	9.1	19.3	10.2
465	9/22/2007	1260.0	62.5	0	19.76	0	9.89	0	0	0	29.65	8.7	18.4	9.7
466	9/23/2007	1250.0	61.36	0	19.63	0	9.71	0	0	0	29.34	8.7	18.2	9.5
467	9/24/2007	1190.0	57.44	0	16.73	0	9.45	0	0	0	26.18	8.2	17.9	9.7
468	9/25/2007	1200.0	58.63	0	17.16	0	9.5	0	0	0	26.66	8.2	18.1	9.9
469	9/26/2007	1240.0	63.91	0	18.71	0	9.82	0	0	0	28.53	8.5	19.1	10.6
470	9/27/2007	1280.0	64.68	0	20.6	0	10.04	0	0	0	30.64	8.9	18.7	9.9
471	9/28/2007	1290.0	65.52	0	20.8	0	10.21	0	0	0	31.01	8.9	18.8	9.9
472	9/29/2007	1290.0	65.7	0	21.25	0	10.04	0	0	0	31.29	9.0	18.9	9.9
473	9/30/2007	1320.0	66.04	0	23.27	0	10.04	0	0	0	33.31	9.4	18.6	9.2
474	10/1/2007	1460.0	80.06	0	37.08	0	9.25	0	0	0	46.33	11.8	20.3	8.6
475	10/2/2007	1500.0	84.45	0	40.05	0	9.4	0	0	0	49.45	12.2	20.9	8.7
476	10/3/2007	1540.0	85.83	0	42.4	0	9.73	0	0	0	52.13	12.6	20.7	8.1
477	10/4/2007	1570.0	90.92	0	45.17	0	9.74	0	0	0	54.91	13.0	21.5	8.5
478	10/5/2007	1600.0	91.86	0	48.6	0	9.66	0	0	0	58.26	13.5	21.3	7.8
479	10/6/2007	1580.0	93.25	0	46.76	0	9.61	0	0	0	56.37	13.2	21.9	8.7
480	10/7/2007	1570.0	91.69	0	46.38	0	9.49	0	0	0	55.87	13.2	21.7	8.5

At xsect 361.66 - closest to CFR above Missoula Gage

JULY 15 START - RADIAL GATE OPEN, STANCHIONS IN, AVG FLOWS

TS	Date	Total Q	Outflowing Suspended Sediment Tons	Outflowing Bed Load Tons	Inflowing Suspended Sediment CFR Tons	Inflowing Bed Load CFR Tons	Inflowing Suspended Sediment BFR Tons	Inflowing Bed Load BFR Tons	Inflowing Suspended Sediment Bypass Tons	Inflowing Bed Load Bypass Tons	Total Inflowing Suspended Sediment Tons	Concentrations: Inflowing Suspended Sediment Conc.	Total Suspended Sediment Conc.	Suspended Sediment Conc. To due scour
481	10/8/2007	1560.0	89.04	0	45.39	0	9.49	0	0	0	54.88	13.0	21.2	8.1
482	10/9/2007	1560.0	89.98	0	45.48	0	9.45	0	0	0	54.93	13.1	21.4	8.3
483	10/10/2007	1600.0	91.02	0	48.07	0	9.76	0	0	0	57.83	13.4	21.1	7.7
484	10/11/2007	1690.0	99.33	0	54.38	0	10.44	0	0	0	64.82	14.2	21.8	7.6
485	10/12/2007	1710.0	102.91	0	56.12	0	10.53	0	0	0	66.65	14.5	22.3	7.9
486	10/13/2007	1670.0	102.8	0	53.52	0	10.18	0	0	0	63.7	14.1	22.8	8.7
487	10/14/2007	1680.0	98.12	0	54.6	0	10.18	0	0	0	64.78	14.3	21.7	7.4
488	10/15/2007	1670.0	102.29	0	53.52	0	10.18	0	0	0	63.7	14.1	22.7	8.6
489	10/16/2007	1680.0	98.49	0	55.25	0	10.04	0	0	0	65.29	14.4	21.7	7.3
490	10/17/2007	1680.0	99.41	0	56	0	9.89	0	0	0	65.89	14.5	21.9	7.4
491	10/18/2007	1670.0	102.17	0	55.02	0	9.87	0	0	0	64.89	14.4	22.7	8.3
492	10/19/2007	1640.0	96.67	0	52.45	0	9.73	0	0	0	62.18	14.1	21.9	7.8
493	10/20/2007	1620.0	94	0	50.86	0	9.61	0	0	0	60.47	13.8	21.5	7.7
494	10/21/2007	1610.0	93.13	0	50.03	0	9.58	0	0	0	59.61	13.7	21.4	7.7
495	10/22/2007	1610.0	92.21	0	49.72	0	9.64	0	0	0	59.36	13.7	21.2	7.6
496	10/23/2007	1600.0	91.14	0	48.81	0	9.61	0	0	0	58.42	13.5	21.1	7.6
497	10/24/2007	1610.0	91.67	0	49.82	0	9.61	0	0	0	59.43	13.7	21.1	7.4
498	10/25/2007	1600.0	90.56	0	48.81	0	9.61	0	0	0	58.42	13.5	21.0	7.4
499	10/26/2007	1590.0	90.15	0	47.77	0	9.61	0	0	0	57.38	13.4	21.0	7.6
500	10/27/2007	1580.0	89.43	0	47.38	0	9.49	0	0	0	56.87	13.3	21.0	7.6
501	10/28/2007	1580.0	88.81	0	47.38	0	9.49	0	0	0	56.87	13.3	20.8	7.5
502	10/29/2007	1570.0	87.87	0	46.47	0	9.45	0	0	0	55.92	13.2	20.8	7.5
503	10/30/2007	1560.0	88.85	0	45.88	0	9.38	0	0	0	55.26	13.1	21.1	8.0
504	10/31/2007	1560.0	90.85	0	46.38	0	9.26	0	0	0	55.64	13.2	21.6	8.4

APPENDIX B

Milltown Dam General Maintenance, Monitoring and Operational Requirements During Stage 1 Drawdown

Appendix B

Milltown Dam General Maintenance, Monitoring and Operational Requirements During Stage 1 Drawdown

The following monitoring and maintenance and other operational requirements associated with Milltown Dam will be completed by NorthWestern Energy (NOR) during the Stage 1 drawdown:

Alignment Surveying (Monitoring) (18 CFR Part 12.41): The Milltown Alignment Survey Program includes biannual monitoring of: the vertical and horizontal movement of the panel gate spillway crest, toe, and bridge bents; and, the vertical movement of the dividing block and radial gate bay. Monitoring will be conducted biannually, as appropriate considering coordination with the RD/RA work and river flow conditions. Access to the panel gate spillway crest monitoring points may be restricted due to spillway operations required by the RD/RA work. In addition, access to the spillway toe monitoring points may be restricted due to spillway operations required by the RD/RA work or elevated tail water. An Annual Alignment Survey Data Report will be submitted by January 31 of each year summarizing the previous year's survey results.

Radial Gate and Standby Power Operation and Testing (18 CFR Part 12.44): The radial gate will be load-tested annually. This activity involves raising and lowering the radial gate and will be coordinated with the RD/RA work. An annual Radial Gate Operation Certificate will be submitted by December 31 of each year. Regular testing of the emergency standby power system used for radial gate operation will also be conducted. Certification of standby generator operation and testing is included on the Radial Gate Operation Certificate.

Panel Gate Spillway Crest Monitoring Wells: Water levels in the 5 monitoring wells located in the crest of the panel gate spillway will be recorded bi-monthly to monitor water levels in the panel gate spillway structure. These levels will be recorded at the stated frequency unless the crest is inaccessible due to water flow or ice or due to coordination with RD/RA work. Plotted water level data will be included in the Annual Alignment Survey Data Report.

Penstock Inspection: Annual visual inspection of penstocks and intake wall. Inspections will be compared to previous year inspections. Visual inspection monitoring logs will be submitted annually with the Annual Alignment Survey Data Report.

Monthly Visual Safety Inspections: Walk through visual safety inspections by qualified operations personnel will be conducted at least monthly. Problems noted during the inspection will be immediately communicated to NOR engineering personnel and appropriate action taken.

Emergency Action Plan (EAP) Testing and Updating (18 CFR Subpart C): Drills testing the EAP notification procedures for alerting emergency response agencies, regulatory agencies and key NOR personnel will be conducted annually. A critique of the drill, including suggested improvements to the EAP, if any, will be submitted within 30 days following the date of the drill. The EAP will also be updated annually as appropriate. Annual updates will be sent to plan holders by January 31 of each year. Current EAP emergency notification flowcharts will be posted at the Milltown Project.

Protection, Mitigation & Enhancement (PM&E) Funding:
As required in paragraph 23.c of the Consent Decree (CD), NOR shall continue to make annual payments to the PM&E Fund in the manner directed by the Milltown Technical Advisory Committee until Milltown Dam has been removed as required by the CD and the Statement of Work (SOW). The 2006 payment is to be $97,187, and annual payments subsequent to the 2006 payment will include a 3% annual increase.

Bull Trout Conservation Funding: As required in paragraph 23.b of the Consent Decree (CD), NOR shall continue to provide $250,000 per year to the Bull Trout Technical Advisory Committee's Bull Trout Conservation Fund until Milltown Dam has been removed as required by the CD and the Statement of Work (SOW). Payment of this money will be made in the manner directed by the Bull Trout Subcommittee of the Milltown Technical Advisory Committee.

Reporting of Dam Safety-Related Incidents or Conditions (18 CFR Part 12.10): Dam safety related incidents or conditions will be reported as outlined in 18 CFR Part 12.10 except that reports will be made to EPA or its designee.

Endangered Species Act Reporting: Dam operations personnel will report dead, injured or sick bull trout within 24 hours of discovery to the USFWS Montana Field Office at 406-449-5225. This is term and condition 9 (TC 9) in the incidental take statement for the Biological Opinion dated December 17, 2004.

APPENDIX C

Milltown Project Emergency Action Plan

(Note: Emergency Notification Flowchart is currently being updated to reflect RA contact information)

EMERGENCY ACTION PLAN

MILLTOWN DEVELOPMENT

FERC Project No. 2543

The Clark Fork and Blackfoot, LLC
40 East Broadway
Butte Montana 59701

January 2005

TABLE OF CONTENTS

I. WARNING FLOWCHARTS

The purpose of the Emergency Action Plan (EAP) is to establish a system of response and to eliminate any guesswork of who is responsible for notifications in case the integrity of the Milltown Hydroelectric Project is at risk. Primary components of the EAP include detailed descriptions and notification flow charts for the following three emergency classifications:

- Failure is Imminent or Has Occurred;
- Potentially Hazardous Situation is Developing; and,
- Non-Failure Flooding Warning.

MILLTOWN DEVELOPMENT –
WARNING FLOWCHART/NOTIFICATION FLOWCHART
FERC PROJECT NO. 2543

A. FAILURE IS IMMINENT OR HAS OCCURRED

THIS PROCEDURE TO BE IMPLEMENTED WHEN FAILURE IS IMMINENT OR HAS OCCURRED

CFB RADIO

CHANNEL F1 - FREQUENCY 158.25 MHz
CHANNEL F2 – FREQUENCY 158.13 MHz
CHANNEL F3 - FREQUENCY 158.16 MHz
CHANNEL F4 – FREQUENCY 158.22 MHz

OBSERVER/PLANT OPERATOR
PLANT: (406) 258-6348

MILLTOWN PLANT FOREMAN
BILL SCARBROUGH
PLANT: (406) 258-6348
HOME: (406) 829-1922
CELL: (406) 240-2298
RADIO CALL WPFG 573

BYPASS IF MILLTOWN PLANT FOREMAN IS NOT AVAILABLE.

(3) **STIMSON LUMBER**
(406) 258-2100 (24 HR.) OFFICE
DICK SHIMER CENTRAL SERVICES MANAGER
OFFICE: (406) 258-2217
HOME: (406) 721-1960
CELL: (406) 544-5890

DEPENDING ON THE SEVERITY OF THE EMERGENCY, THE FOREMAN/OPERATOR SHALL HAVE THE OPTION OF INITIALLY CONTACTING THE MISSOULA COUNTY SHERIFF AND THEN CONTACTING THE EAP COORDINATOR

(1) **EAP COORDINATOR**
BILL THOMPSON
OFFICE: (406) 497-3912
CELL: (406) 490-1498
HOME: (406) 494-5923

NOTE TO NWE SOCC DISPATCHER:
IF PLANT OPERATOR DOES NOT ACKNOWLEDGE A PAGE TO AN OFF-HOUR PLANT ALARM AND CANNOT BE CONTACTED, CONTACT THE NWE MISSOULA DIVISION OPERATIONS DIRECTOR OR SUPERVISOR-ON-CALL.

(2) **NWE SYSTEMS DISPATCHER**
SOCC CENTER (24 HR.)
(406) 494-4131
(406) 497-4252
(406) 497-4161

PPLM HYDRO OPERATIONS
PPLM Hydro Supervisor-On-Call
(Refer to current call-out schedule supplied by PPLM)

If no answer or current call-out schedule is not available contact:
Bob Covington, Manager Hydro Region I
Office: (406) 533-3415
Cell: (406) 490-0931
Home: (406) 797-3212

MISSOULA COUNTY OFFICE of EMERGENCY SERVICES
JANE ELLIS
Office: (406) 523-4758
Pager: (406) 523-7413

MISSOULA CITY-COUNTY HEALTH DEPARTMENT
(Note: The 911 Center notifies all County departments.)

Dial 911Center and Page On-Call Public Health Officer
Local: 911
Out of Town: (406) 728-0911 (24 HR) or (406) 523-4760

(1) **MISSOULA COUNTY SHERIFF**
MICHAEL MCMEEKIN

DIAL THE MISSOULA COUNTY 911CENTER
LOCAL: 911
OUT OF TOWN: (406) 728-0911 (24 HR) Or (406) 523-4760

BACKUP: MISSOULA COUNTY SHERIFF'S OFFICE
(406) 523-4810 (24 hr) OR (406) 721-5700 ext. 3323
RADIO CALL: WNXL 396
FREQUENCY: 154.7400 MHz

(2) **FERC - PORTLAND**
DEPUTY REGIONAL ENGINEER
PATRICK REGAN
OFFICE: (503) 552-2741
HOME: (503) 534-2621
CELL: (503) 706-8733
OR CALL
REGIONAL ENGINEER
HARRY T. HALL
OFFICE: (503) 552-2700
HOME: (503) 636-1111
CELL: (503) 706-8842

GOVERNOR'S OFFICE
STATE OF MONTANA
OFFICE: (406) 444-3111

(3) **MONTANA DISASTER & EMERGENCY SERVICES**
(406) 841-3911 (24 Hour)
(MDES notifies the Montana Department of Environmental Quality Duty Officer)

(4) **NATIONAL WEATHER SERVICE**
MISSOULA, MONTANA
(800) 676-6975 (24 HR.)
OR (406) 329-4840

NOTE:
SHERIFF AND DES SHALL BE RESPONSIBLE FOR PROVIDING EMERGENCY SERVICES TO NOTIFY AND EVACUATE AFFECTED RESIDENTS WITHIN THEIR JURISCIDTIONAL AREA.

(5) **NWE MISSOULA DIVISION OPERATIONS DIRECTOR**
JIM KRUSEMARK
OFFICE: (406) 542-5922
CELL: (406) 544-2220
MISSOULA SERVICE CENTER: (406) 542-5943

If no answer contact the Supervisor-On-Call
(406) 240-2808

(6) **NWE CORPORATE COMMUNICATION**
CLAUDIA RAPKOCH
OFFICE: (406) 497-2841
HOME: (406) 782-8541
CELL: (406) 490-0043

NOTE:
FOR VOICE MAIL OR ANSWERING MACHINE MESSAGES, REFER TO SECTION V. B NOTIFICATION PROCEDURES

→ *(1), ETC. INDICATES ORDER OF CALLS*

THIS DIAGRAM IS CURRENT FOR 2005

Revised 1/05

MILLTOWN DEVELOPMENT –
WARNING FLOWCHART/NOTIFICATION FLOWCHART

FERC PROJECT NO. 2543

B. POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING

THIS PROCEDURE IS IMPLEMENTED WHEN A HAZARDOUS SITUATION IS DEVELOPING

OBSERVER/PLANT OPERATOR
PLANT: (406) 258-6348

BYPASS IF MILLTOWN PLANT FOREMAN IS NOT AVAILABLE

MILLTOWN PLANT FOREMAN
BILL SCARBROUGH
PLANT: (406) 258-6348
HOME: (406) 829-1922
CELL: (406) 240-2298
RADIO CALL WPFG 573

(1)

EAP COORDINATOR

BILL THOMPSON

OFFICE: (406) 497-3912
CELL: (406) 490-1498
HOME: (406) 494-5923

(2)

STIMSON LUMBER
(406) 258-2100 (**24 HR**) OFFICE
DICK SHIMER, CENTRAL SERVICES MANAGER
OFFICE: (406) 258-2217
HOME: (406) 721-1960
CELL: (406) 544-5890

(1)

MISSOULA AREA ENVIRONMENTAL & PUBLIC HEALTH AGENCIES

MISSOULA COUNTY OFFICE of EMERGENCY SERVICES
JANE ELLIS
Office: (406) 523-4758
Pager: (406) 523-7413
AND
MISSOULA CITY-COUNTY HEALTH DEPARTMENT
Dial 911 Center and Page On-Call Public Health Officer
Local: 911 **Out of Town**: (406) 728-0911 or (406) 523-4760

(2)

FERC - PORTLAND
DEPUTY REGIONAL ENGINEER
PATRICK REGAN
OFFICE: (503) 552-2741
HOME: (503) 534-2621
CELL: (503) 706-8733
OR CALL
REGIONAL ENGINEER
HARRY T. HALL
OFFICE: (503) 552-2700
HOME: (503) 636-1111
CELL: (503) 706-8842

NOTE:
FOR VOICE MAIL OR ANSWERING MACHINE MESSAGES, REFER TO NOTIFICATION PROCEDURES SECTION V.B.

NOTE:
AN ASSESSMENT OF THE SITUATION WILL DETERMINE WHETHER A COORDINATED DRAFT OF DOWNSTREAM RESERVOIRS IS REQUIRED, AND/OR IF EMERGENCY OFFICIALS SHOULD BE NOTIFIED.

NOTE:
IF THE SITUATION WERE TO DEVELOP INTO A CASE WHERE "FAILURE IS IMMINENT OR HAS OCCURRED," THE "WARNING FLOWCHART" FOR AN IMMINENT OR ACTUAL FAILURE SHOULD BE IMPLEMENTED

THIS DIAGRAM IS CURRENT FOR 2005

Revised 1/05

→ ***(1), ETC. - INDICATES ORDER OF CALLS***

MILLTOWN DEVELOPMENT –
WARNING FLOWCHART/NOTIFICATION FLOWCHART

FERC PROJECT NO. 2543

C. NON-FAILURE FLOOD WARNING

*THIS PROCEDURE IS TO BE IMPLEMENTED WHEN **NON-FAILURE** FLOODING WILL OCCUR DOWNSTREAM BECAUSE OF FACILITY OPERATING PROCEDURES DURING RIVER LEVELS THAT ARE AT OR NEAR FLOOD STAGE*

NOTE:
NON-FAILURE FLOOD WARNING FLOWCHART IS FOR AN INFORMATION CALL ONLY, AND IS NOT AN ACTIVATION OF THE EAP.

EAP COORDINATOR

BILL THOMPSON

OFFICE: (406) 497-3912
CELL: (406) 490-1498
HOME: (406) 494-5923

(1)

NATIONAL WEATHER SERVICE
MISSOULA, MONTANA

(800) 676-6975 (**24 HR**)
OR (406) 329-4840

(2)

MISSOULA COUNTY SHERIFF
MICHAEL MCMEEKIN
DIAL THE MISSOULA COUNTY 911CENTER
LOCAL: 911
OUT OF TOWN: (406) 728-0911 (24 HR) or (406) 523-4760

BACKUP: MISSOULA COUNTY SHERIFF'S OFFICE
(406) 523-4810 (24 hr) OR (406) 721-5700 ext. 3323
RADIO CALL: WNXL 369
FREQUENCY: 154.7400 MHz

(1), ETC. - INDICATES ORDER OF CALLS

THIS DIAGRAM IS CURRENT FOR 2005

II. STATEMENT OF PURPOSE

This Emergency Action Plan (EAP) has been prepared in accordance with the requirements of the Federal Energy Regulatory Commission (FERC) Order Number 122, issued on January 21, 1981 (Federal Register/Volume 46, Number 18, January 28, 1981) and revised in accordance with the provisions of Section 12.22(a.)(1), on April 5, 1985 (issued February 22, 1988, with addendum issued September 9, 1988). Since that time, a Federal initiative was developed to provide national consistency in the content of Emergency Action Plans at dams throughout the country. An *ad hoc* Interagency Committee on Dam Safety (ICODS) prepared and approved Federal guidelines for emergency action planning at dams (FEMA, October 1998). As a result of the Federal initiative, the FERC EAP Guidelines were further revised. This EAP is submitted by The Clark Fork and Blackfoot, LLC (CFB) as Licensee for the Milltown Development on the Clark Fork River, which is FERC Licensed Project No. 2543. CFB is a wholly owned subsidiary of NorthWestern Corporation and is supported by personnel from the energy division of NorthWestern Corporation, NorthWestern Energy (NWE).

CFB is committed to ensuring the safety of the Milltown Project. The dam is inspected regularly by NWE operations and engineering personnel, annually by FERC engineers, and at five-year intervals by FERC-approved independent engineering consultants. The purpose of this EAP is to provide maximum early warning to all persons involved in the unlikely event of a failure (catastrophic or otherwise) of the dam or other water retaining structures at the Milltown Development. In addition to providing maximum early warning, CFB's objective is to minimize or eliminate danger to all people and/or property downstream of the project.

Through consideration of both "fair weather" and "major flood" failure modes and their consequences, areas have been identified which may be affected in the event of a failure. The plan is based on notification of residents, property owners, and recreationists through various public safety agencies and authorities.

Special Information Regarding Major Flooding Events

The inflow design flood for the Milltown Project is called the "probable maximum flood" which is typically referred to as the "PMF." For the drainage basins leading to the Milltown Project, the PMF event has been calculated to result in a peak inflow of approximately 238,000 cubic feet per second (cfs). Clark Fork River flows have been recorded continuously since 1930 (i.e., the period of record) at a gage located approximately 2.8 miles downstream from the Milltown Project. The historical maximum recorded flow at the gage is 32,300 cfs. Outside of the period of record (i.e., before the river gage was installed), the historical maximum flood at the Milltown Project was estimated to be 48,000 cfs and occurred in June of 1908. Flood (over bank) flow at the river gage location is approximately 17,500 cfs.

The spillways at Milltown Dam do not have the capacity to pass the probable maximum flood (238,000 cfs) without overtopping the non-overflow sections of the dam. Structural stability analyses indicate that all sections of the dam would be stable under flood levels up to the PMF; however, the right abutment embankment is vulnerable to erosion and a possible breach if sustained over topping of this area occurs during a major flood event. The right abutment area is located to the right (looking downstream) of the powerhouse. A 2001 study indicated the right abutment would be overtopped starting at about 66,000 cfs. Figure 2 on page 8 indicates the various sections of the dam and the probable flowpath of water during a severe flood event that results in water overtopping the right abutment area. A FERC assessment concluded the probability of overtopping the right abutment area is about 1 in 20,000 years.

FERC has required remediation of the right abutment in order to prevent a possible breach due to overtopping in this area during extreme flood events. However, since Milltown Dam may be removed soon (within the next 10 years) as part of the Superfund cleanup of Milltown Reservoir, and due to the low probability of a flood large enough to result in sustained overtopping of the right abutment area of the dam (66,000 cfs or greater), FERC has approved a delay to the design and construction of a remedy for the right abutment. In the meantime, FERC required this EAP to include specific information and actions necessary to notify emergency management agencies well in advance of any flood flow events that could overtop the right abutment embankment (66,000 cfs or greater). The information above is intended to alert emergency management agencies of the overtopping potential during extreme flood events. Additional information regarding necessary actions is included in section V.B.2.

III. DESCRIPTION OF MILLTOWN HYDROELECTRIC PROJECT

The Milltown Hydroelectric Project shown below consists of the following basic components: a right abutment concrete gravity wall dam, a concrete gravity intake dam, a dividing block, a radial gate bay, an overflow concrete –faced spillway, and a powerhouse that contains five generating units. The project was originally constructed in 1906-1907 by others as a rock-filled timber crib structure, but has been considerably altered and upgraded over the years. It is located in Missoula County, Montana about five miles east of the city of Missoula. The dam is built across the westerly flowing Clark Fork River, immediately downstream of its confluence with the Blackfoot River. The project is a run-of-river plant, with virtually no storage.

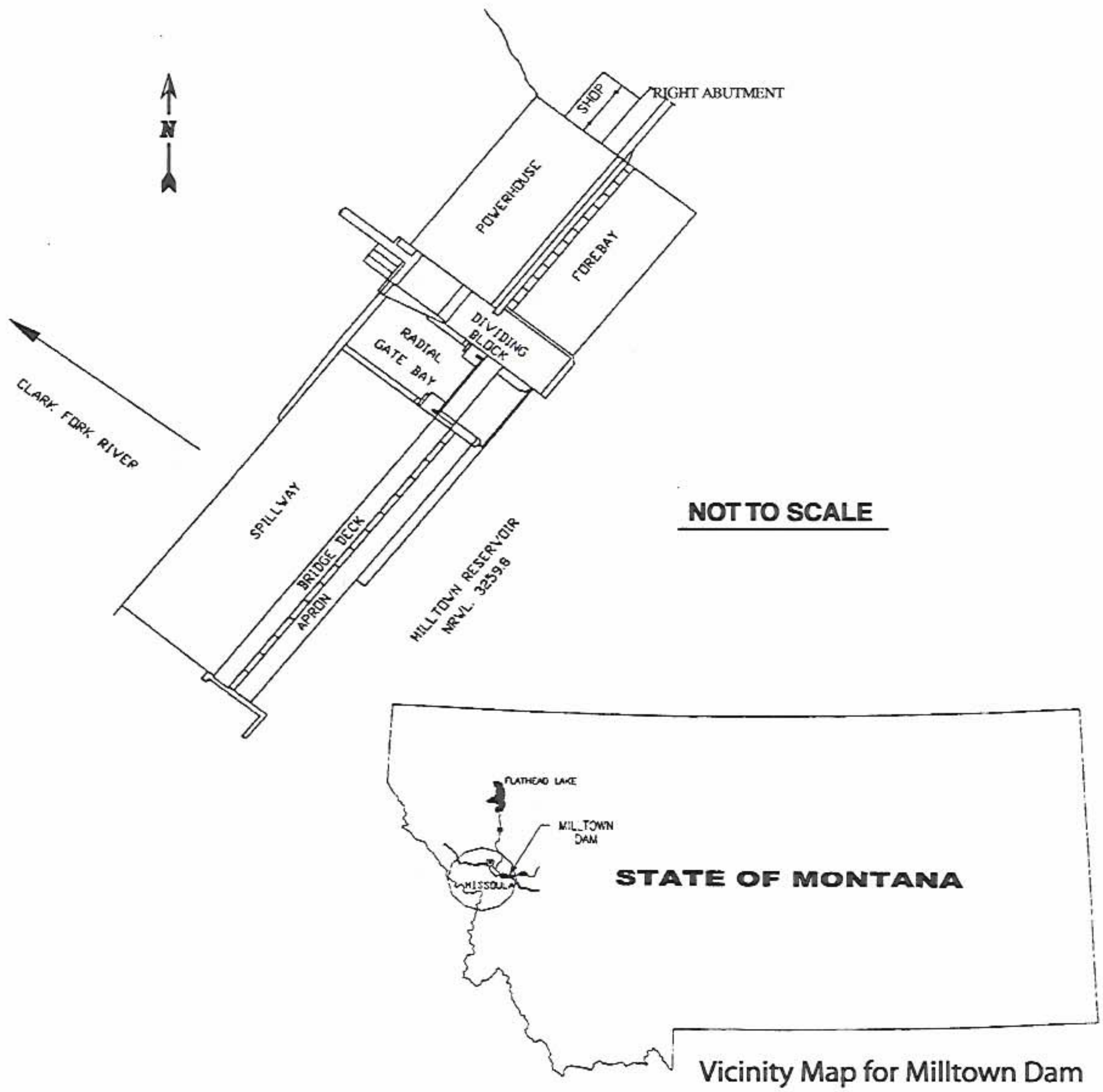


Figure 1

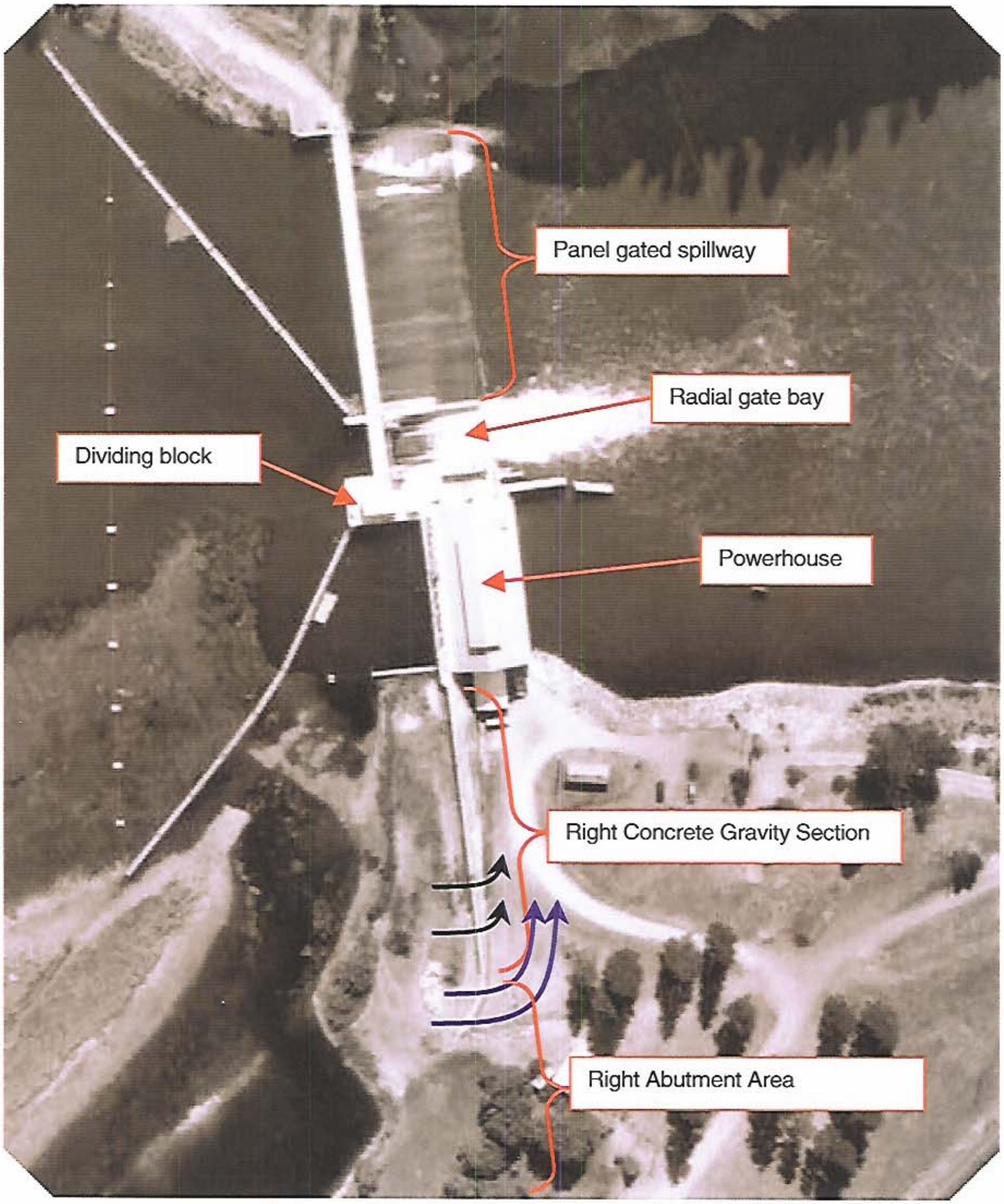


Figure 2

The blue arrows indicate the probable flowpath of water over the right abutment around the right end of the concrete gravity section of the dam during a major flood event starting at about 66,000 cfs. The black arrows indicate overtopping of the concrete gravity section starting at about 67,000 cfs. As currently configured, the right abutment embankment material and the fill material on the downstream side of the right concrete gravity section could be eroded if sustained overtopping of this part of the dam occurs during a major flood event.

A. Dam

There are five sections to the dam:

1) On the right side of the powerhouse there is a 244-foot long concrete gravity wall constructed in front of the original rock crib wall in 1930.
2) The next section, behind and forming the back wall of the powerhouse, is a concrete gravity section, 126.3 feet long, 67 feet high, and four feet at the top. Through this wall pass five, ten-foot diameter steel penstocks and two exciter penstocks.
3) Between the powerhouse and the radial gate bay there is a concrete gravity dividing block measuring 26 feet along the dam axis.
4) Adjacent to the left of the dividing block there is a radial gate bay 52 feet long. There is a single 42.5 feet wide by 16 feet high radial gate located in this section.
5) The remainder of the dam consists of a 220-foot long, concrete-faced, panel gated spillway. On top of this section are 44 steel framed, wooden drop panels measuring five feet wide by eight feet high. The reinforced concrete spillway and steel flashboard structure were constructed in 1986-1987 using the rock-filled timber crib structure as a foundation.

B. Powerhouse

The powerhouse has a concrete floor, structural steel frame and brick walls, except for the back wall, which is an integral part of the dam. It is 126.3 feet long, 65.6 feet wide and contains five Francis runner, horizontal turbine-generator units and their associated components. The generators have a total installed capacity of 3,200 kW.

C. Description of Upstream and Downstream Areas and Topography

The reservoir is small, extending only short distances up the Blackfoot and Clark Fork Rivers, and impounding approximately 820 acre-feet at the normal operating level. Just over one mile upstream of Milltown Dam at Bonner, there is a small timber dam across the Blackfoot River. That dam raises the Blackfoot River about 15 feet above the reservoir behind Milltown Dam. Milltown Reservoir extends approximately two miles upstream of the dam along the Clark Fork River. Upstream of the dam, the Clark Fork River flows through a valley for 50 miles below Drummond, Montana, where Flint Creek flows into the Clark Fork River and the valley becomes wider.

Downstream of Milltown Dam, the Clark Fork River follows a well-defined channel for approximately six river miles before it exits the Hellgate Canyon at the city of Missoula. The community of East Missoula is located about three miles downstream. In this first six miles, the river channel is well defined with benched areas adjacent to the river banks. There are numerous dwellings located in subdivisions between the dam and the city of Missoula.

The river passes through developed areas in East Missoula and Missoula until its confluence with the Bitterroot River. Due to the storage capacity characteristics of the river channel, the down stream flow volume would be expected to reduce to naturally occurring levels following a "fair weather" dam break.

IV. EMERGENCY DETECTION, EVALUATION AND CLASSIFICATION

A. Detection

Observations by the Operator to Assist in Detecting a Potentially Hazardous Situation is Developing

1. Cracks, offsets, settlement or other indications of movement in the concrete sections of the dam. Alignment of handrails or crane rails to indicate horizontal or vertical movement. Disturbances in the normal pattern of flow over the concrete panels, which might indicate offsets between panels.
2. Significant changes in flow at drain holes in the spillways.
3. Large rock falls or other evidence of movement indicating instability of the cliff directly above the left abutment.
4. Any noticeable increase or changes in the appearance of the leakage and seepage conditions.

The dam and appurtenant structures are inspected at regular intervals, but at a minimum, plant personnel conduct a visual walk-through inspection daily. There is no formal checklist, however, the following items are visually checked:

1. Handrail and dam walkway alignment.
2. Slide panel position and condition.
3. Abnormal leakage.
4. Significant change in flow through spillway drain holes.
5. Debris against the dam and trash boom .
6. Trash boom configuration and dam anchorage.
7. Boat restraint condition.
8. Radial gate position and condition.
9. Stanchion position and condition.
10. Rock falls or evidence of movement.
11. Abnormalities upstream and downstream of the dams.
12. Security, storm damage, vandalism.
13. Forebay intake screens:
    - Condition.
    - Debris.
14. Once a month the deck boom on the dam is operated if it has been idle for the period.

The plant personnel making the inspections will indicate any abnormalities under the "NOTES" section of the Plant Daily Operating Log Sheet located in the operating room and immediately notify the Plant Foreman of the same. If necessary, NWE engineering personnel are contacted. If everything is found to be normal, a notation will be made and the individual who made the inspection will sign the log sheet.

Note: The 30 kW a.c. emergency standby generator for the radial gate, radial gate heat trays, dam lighting, and slide panel hoist storage shed automatically starts at 8:00 a.m. every Wednesday morning and shuts downs after 30 minutes of operation. This is verified and logged by the Plant Operator.

B. Evaluation

As discussed above, plant personnel inspect the dam and appurtenant structures on a regular basis. The dam and appurtenant structures are also inspected periodically by NWE engineering personnel, annually by FERC engineers, and every five years by FERC-approved independent engineering consultants. Any indication of a potentially hazardous situation will be immediately reported and the notification flowchart shown on page 3 for "Potentially Hazardous Situation is Developing," will be initiated. NWE engineering personnel will evaluate the information received from the Milltown Plant Foreman and remedial actions will be taken as soon as possible. NWE engineering personnel will dictate what mitigating actions should be taken and a team of operations and engineering personnel will be dispatched to the site for further investigation if it is deemed necessary. The time factor and means of transportation to the site will depend on the severity of the situation.

Regular inspections of the dam and structures should minimize the time involved from the onset of the emergency to awareness of the emergency in the case of a slowly developing failure. Actual notification times from past annual drills of the Milltown EAP indicate that after the "situation" has been detected, it takes an average of 15 minutes to implement the "Failure is Imminent or Has Occurred" warning flowchart shown on page 2.

C. Classification

Three classifications for potential situations which may occur are defined as follows:

1. **Failure is Imminent or Has Occurred** Failure caused by terrorism, sabotage, major earthquake, etc.

2. **Potentially Hazardous Situation is Developing** A situation where a failure may develop, but preplanned actions taken during certain events (major flood, earthquake, evidence of piping, etc.) may prevent or mitigate failure. Time permits a qualified engineer to inspect the dam and assess the potentially hazardous situation. **Note this situation also includes major floods with the potential to sustain overtopping of the right abutment as described in V.B.2.**

3. **Non-Failure Flooding** A situation where waterways are at or near flood stage and project operations may aggravate downstream flooding. (This situation will NOT activate the EAP.)

V. GENERAL RESPONSIBILITY UNDER THE EAP

A. Licensee Responsibility

It is CFB's responsibility to initiate effective and timely warning to the designated responsible parties according to this plan in the event of dam failure or release of waters that may aggravate flooding. A description of the responsibilities and procedures for each of the three classifications described in Section IV.C follows.

B. Responsibility for Notification

Instructions on Procedures to Follow

These instructions are applicable to hours of daylight and darkness.

1. Failure is Imminent or Has Occurred

a. In the event that failure is imminent or has occurred, the Plant Operator will immediately implement the warning flowchart on page 2 for this failure scenario by contacting the Plant Foreman. For the sake of clarity, a statement such as "this is NOT a test, I repeat, NOT a test" should be used at the beginning of each contact. This will clearly distinguish an actual emergency from a "test" or "drill" situation. Sample communication information is provided on page 13.

The Milltown Plant Foreman will notify the following of the imminent or actual failure (listed in order of priority):

- Milltown EAP Coordinator
- Systems Dispatcher, System Operations Control Center (SOCC) (24 hours).
- Stimson Lumber

In the event that the Plant Foreman is not readily available, the Plant Operator will be responsible for the three contacts above. Depending on the severity of the emergency, the Plant Foreman/Operator shall have the option of making his initial contact with the Missoula County Sheriff immediately downstream and then contacting the Milltown EAP Coordinator.

b. If the Plant Foreman/Operator determines that the failure is developing at a rate which will allow him to isolate and secure power plant and transmission lines, he should do so.

c. The Plant Foreman/Operator shall alert and evacuate all fishermen and tourists, etc., in the vicinity of the powerhouse and dam to the safety of higher ground. Because recreationists downstream of the dam may not be readily visible, the wastegate siren on the dam will be activated along with the airport strobe light above the radial gate if possible. Both of these can be activated and remain activated so the Plant Foreman/Operator can assist in other emergency duties as required.

Evacuation to higher ground shall be by the quickest and most convenient route available depending on the circumstances and left to the good judgment of those involved.

d. The Plant Foreman, or Plant Operator in his absence, must keep local authorities and NWE personnel advised of conditions at the dam during the emergency. The following are guidelines to be followed by the Plant Foreman/Operator:

(1) All evacuation activities will be coordinated by the Missoula County Sheriff. Therefore, the Missoula County Sheriff's Office will be the local contact. The communication system used for this contact depends on the severity of the failure and will be left to the good judgement of those involved. The two systems available are the telephone system and the CFB radio system.

Missoula County Sheriff:

Telephone: Dial the Missoula County 911 Center
Local: 911
Out of Town: (406) 728-0911 (24 HR) Or (406) 523-4760

BACKUP: Missoula County Sheriff's Office
(406) 523-4810 (24 hr) OR (406) 721-5700 ext. 3323

CFB Radio:
Missoula County Call Sign WNXL 396
Channel 6 on radio

(2) The EAP Coordinator is the NWE contact. Again, the mode of communication will depend on the severity of the failure. The CFB radio may have to be used to relay information from the dam, to SOCC, and to the EAP Coordinator.

Milltown EAP Coordinator – Bill Thompson:

Bell:	(406) 497-3912 (Work)
Cell:	(406) 490-1498
Bell:	(406) 494-5923 (Home)

NWE SOCC: (406) 494-4131 - Alternates: (406) 497-4252, (406) 497-4161

NWE Radio: Channel F1 TONE D
Call Sign KOK 258 (SOCC)

Actions to be taken by the individuals notified above are:

Milltown EAP Coordinator

Immediately after being notified of the failure or imminent failure, the Milltown EAP Coordinator will initiate his contacts under the EAP. Those contacts are listed below in order of priority:

1. Missoula County Sheriff via the Missoula County 911 Center
2. FERC Regional Office, Portland
3. Montana Disaster and Emergency Services
4. National Weather Service, Missoula Office
5. NWE Missoula Division Operations
6. NWE Corporate Communications

Missoula County Sheriff/911 Center:

The Missoula County Sheriff/911 Center will contact the Missoula County Office of Emergency Services and the Missoula City-County Health Department.

Montana Disaster and Emergency Services:

The Montana Disaster and Emergency Services (DES) representative will contact the Governor's office and inform them of the situation. They will also stand by and be prepared to offer assistance to local and county officials having disaster and emergency responsibilities.

National Weather Service (NWS):

The NWS has the responsibility for issuing flood warnings and will use its warning system to supplement the notification set in motion by the implementation of the EAP "Failure is Imminent or Has Occurred" warning flowchart shown on page 2. In addition, the EAP Coordinator will maintain communications with the NWS to keep them informed of river flow coordination efforts. This will enable the NWS to monitor the situation and provide additional advanced warning to areas downstream from the break.

NWE Systems Dispatcher:

Immediately after being notified of the failure or imminent failure, the systems dispatcher at SOCC in Butte, Montana, will contact the PPLM Hydro Supervisor-on-Call.

2. Potentially Hazardous Situation is Developing.

In the event there are indications that a potentially hazardous situation may be developing as described in Section IV.C.2, the Plant Operator will immediately notify the Plant Foreman of the situation. The Plant Foreman will then notify the Milltown EAP Coordinator and stand by for further orders. In the event the Plant Foreman is not readily available, the Plant Operator will be responsible for making this contact. The Milltown EAP Coordinator will notify Missoula Area Environmental and Public Health agencies including the Missoula County Office of Emergency Services and Missoula City-County Health Department. In addition, the FERC Portland Regional Office will be notified of the potential problem. The Milltown EAP Coordinator and NWE engineering personnel will promptly respond to assess the situation and take appropriate action. If the assessment indicates the situation represents a potential failure, appropriate action may consist of correcting the problem by use of materials and equipment or notifying the affected disaster and emergency officials to implement their plan for notification and evacuation of downstream inhabitants. In the event the Plant Operator feels a situation is developing such that failure is imminent before NWE personnel can respond, the Plant Foreman, or Plant Operator in his absence, will immediately implement the warning flowchart for a "Failure is Imminent or Has Occurred", shown on page 2.

Special Information Regarding Responsibility During Major Flooding Events

This notification procedure shall also cover major flooding events that could potentially overtop the right abutment area of the Milltown Project. As discussed previously, the spillways at Milltown Dam do not have the capacity to pass the probable maximum flood (238,000 cfs) without overtopping the non-overflow sections of the dam. Currently, the right abutment embankment is vulnerable to erosion and a possible breach if sustained over topping of this area occurs during a major flood event. Overtopping of the right abutment is estimated to begin during severe flood events of 66,000 cfs or greater at the dam.

During flood events and spring runoff, NWE personnel are in continual communication with the Missoula National Weather Service office regarding peak flow forecasts for the Milltown Project area. NWE also monitors the NWS Northwest River Forecast Center (NWRFC) website (http://www.nwrfc.noaa.gov/). The NWRFC office specializes in flood and water resource forecasting, river modeling, and hydrologic system development. The NWRFC uses the National Weather Service River Forecast System (NWSRFS) and the Streamflow Simulation and Reservoir Regulation (SSARR) to simulate soil, snow, stream channel and reservoir conditions. Daily forecasts are made using observations of temperature and precipitation. Forecast of meteorological parameters are included in the river forecast model.

During extreme flooding, if the NWS forecasts flows of 55,000 cfs and increasing for the Milltown Project area, NWE will notify downstream agencies of a potential overtopping situation and implement the warning flowchart for a "Potentially Hazardous Situation is Developing" shown on page 3. This will occur at 55,000 cfs in order to notify emergency management agencies well in advance of a potential overtopping situation, which is predicted to begin at 66,000 cfs.

Should flooding result in sustained overtopping of the right abutment area, and erosion of this area is developing such that a breach may occur, the warning flowchart for a "Failure is Imminent or Has Occurred", shown on page 2, will be implemented.

Throughout the severe flood event, NWE will keep the NWS updated regarding overtopping and erosion conditions at the dam. The NWS will issue downstream river stage forecasts and flood warnings factoring in information supplied by NWE regarding the condition of the right abutment area.

3. Non-Failure Flood Warning

If the waterways below Milltown Dam are at or near flood stage, it may become necessary to operationally increase flow into those waterways that may result in flooding. The Milltown EAP Coordinator will notify first the National Weather Service (NWS) and then the appropriate downstream agencies. It is important to stress to these agencies that this is for their information only, and not an activation of the EAP. The flowchart for Milltown Dam for "Non-Failure Flood Warning" is found on page 4.

4. Notification Procedures to Follow

These instructions are applicable to hours of daylight and darkness.

Sample Communications

In times of emergency, clear and concise exchange of information is essential. Individuals responsible for notifying others of implementation of the EAP for either the "Failure is Imminent or Has Occurred" or "Potentially Hazardous Situation is Developing" conditions should include the following information in their communication message:

- Caller's name, position, and company or agency
- Caller's location
- Initiating (or carrying out) "Failure is Imminent or Has Occurred" or "Potentially Hazardous Situation is Developing" for Milltown Dam EAP
- "This is **NOT** a test! I repeat, This is **NOT** a test!"
- Brief description of the situation or potential problem

- The time of the situation or potential problem
- Intended preventive or follow-up actions to be taken

An example of a communication from a Plant Operator to the Missoula County Sheriff might be as follows:

> "This is John Doe, Plant Operator at Milltown Dam. I am calling to implement the Milltown Dam Emergency Action Plan "Failure is Imminent or Has Occurred" warning flowchart notification procedure on page two of the EAP. This is **NOT** a test! I repeat, this is **NOT** a test!"
>
> "Milltown Dam failed at approximately 6:15 a.m. Immediately prior to the failure, we had a full reservoir and outflows were at 5,000 cubic feet per second, about normal for this time of year. I will try to evacuate any individuals in the proximity of the dam."
>
> **"Do you understand how to carry out your responsibilities according to the EAP?"**

NOTE: In order to be sure that the person you contact understands your message and knows how to proceed with the activation of the EAP, have them repeat your message back to you. It is also important to record dates, times and names for follow-up verification and situation analysis.

If you receive a notification that the EAP is being implemented, and are unsure about the authenticity of the call, call the point of contact back at the phone number listed in the EAP prior to continuing down the "Failure is Imminent or Has Occurred" or "Potentially Hazardous Situation is Developing" warning flowcharts.

When You Receive Voice Mail or an Answering Machine:

a) **Leave a Message** that tells the person you are calling:

   - Your name;
   - You are calling to inform them as part of the EAP notification process (test or actual event);
   - You are going to try and page them through their secretary, receptionist, etc.; and,
   - If you cannot reach them through the page, you intend to contact the next person in the notification flowchart.

b) **Follow the guidance on the person's voice mail message** and attempt to have the person paged as appropriate.

c) If the person is not available or you cannot contact the secretary, receptionist, etc., call the next person identified on the notification flowchart. **Remember - TIME IS OF THE ESSENCE!** The time necessary to carry out all flowchart notifications is typically less than 20 minutes.

d) DO NOT let the EAP notification process fail because of voice mail or an answering machine.

NOTE: In the event an internal contact cannot be made continue down the flowchart until direct contact has been made. Then ensure that all bypassed points of contact are notified.

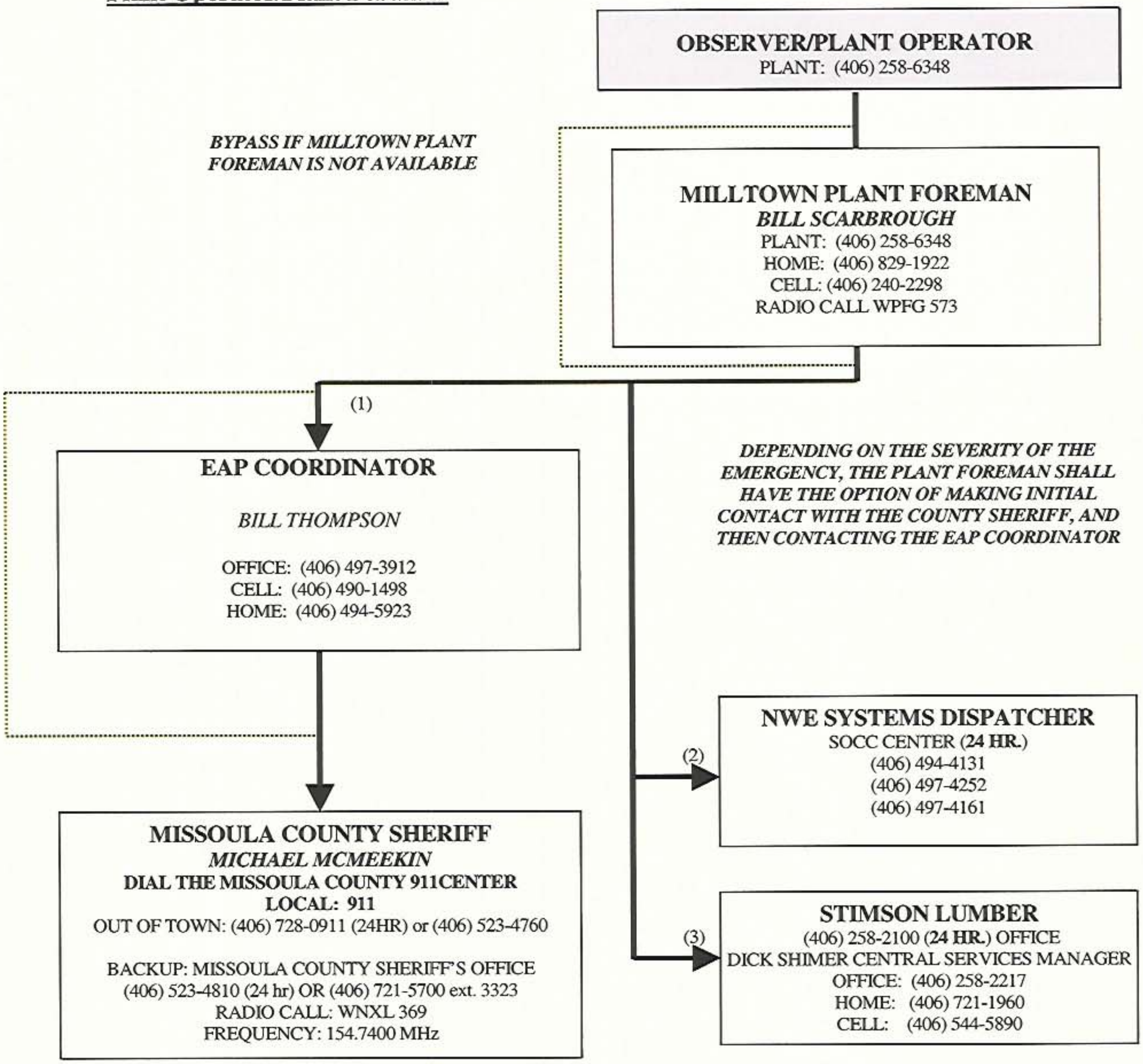
C. Failure is Imminent or Has Occurred - Responsibilities

In the event of a “Failure is Imminent or Has Occurred” situation, the Plant Operator will notify the Plant Foreman. The Plant Foreman, or the Plant Operator in the foreman’s absence, will then notify the Milltown EAP Coordinator. Depending on the severity of the emergency, the Plant Foreman/Operator has the option of making initial contact with the sheriff immediately downstream (Missoula County Sheriff) and then contacting the Milltown EAP Coordinator.

After the Milltown EAP Coordinator has been notified of the failure or imminent failure, the Plant Foreman will notify the systems dispatcher at SOCC in Butte, Montana. This dispatch center is manned 24 hours a day, 365 days a year. In the event that the Plant Foreman is not readily available, the Plant Operator will assume the Plant Foreman’s notification responsibilities. After the Plant Foreman notifies the SOCC dispatcher, he will notify Stimson Lumber.

The portion of the "Failure is Imminent or Has Occurred" warning flowchart on page 2 for this area of notification responsibility follows with pertinent information (e.g., names, position titles, office and home phone numbers, radio call frequency).

Plant Operator/Plant Foreman



After Stimson Lumber has been notified, the Plant Foreman/Operator will alert and evacuate all campers, fishermen and tourists, etc., in the vicinity of the powerhouse to the safety of higher ground. Evacuation to higher ground shall be by the quickest and most convenient route available depending on the circumstances and left to the good judgment of those involved.

Immediately after being notified of the failure or imminent failure, the Milltown EAP Coordinator will notify the Missoula County Sheriff via the Missoula County 911 Center. The Missoula County 911 Center will be accountable for notifying the Missoula County Office of Emergency Services and the Missoula City-County Health Department.

The portion of the "Failure is Imminent or Has Occurred" warning flowchart on page 2 for this area of notification responsibility follows with pertinent information (e.g., names, position titles, phone numbers, radio call frequency).

EAP COORDINATOR/ MISSOULA COUNTY SHERIFF/ MISSOULA COUNTY 911

EAP COORDINATOR

BILL THOMPSON

OFFICE: (406) 497-3912
CELL: (406) 490-1498
HOME: (406) 494-5923

(1)

NOTE: SHERIFF AND DES SHALL BE RESPONSIBLE FOR PROVIDING EMERGENC SERVICES TO NOTIFY AND EVACUATE AFFECTED RESIDENTS WITHIN THEIR JURISDICATIONAL AREA.

MISSOULA COUNTY SHERIFF
MICHAEL MCMEEKIN
DIAL THE MISSOULA COUNTY 911CENTER
LOCAL: 911
OUT OF TOWN: (406) 728-0911 (24 HR) or (406) 523-4760

BACKUP: MISSOULA COUNTY SHERIFF'S OFFICE
(406) 523-4810 (24 hr) OR (406) 721-5700 ext. 3323
RADIO CALL: WNXL 396

THIS POINT OF CONTACT WILL ASSUME RESPONSIBILITY FOR NOTIFYING MISSOULA COUNTY OFFICIALS HAVING DISASTER AND EMERGENCY AND PUBLIC HEALTH RESPONSIBILITIES

MISSOULA COUNTY OFFICE of EMERGENCY SERVICES
JANE ELLIS
Office: (406) 523-4758
Pager: (406) 523-7413

MISSOULA CITY-COUNTY HEALTH DEPARTMENT
(Note: The 911 Center notifies all County departments.)

Dial 911Center and Page On-Call Public Health Officer
Local: 911
Out of Town: (406) 728-0911 (24 HR) or (406) 523-4760

(1), ETC. - INDICATES ORDER OF CAL S

Immediately after being notified of the failure or imminent failure, the systems dispatcher at SOCC in Butte, Montana, will contact the PPLM Hydro Supervisor-On-Call.

The portion of the "Failure is Imminent or Has Occurred" warning flowchart on page 2 for this area notification responsibility follows with pertinent information (i.e., names, position titles, phone numbers, radio call frequency).

NWE System Dispatcher, SOCC Center (24 hours)

NWE SYSTEMS DISPATCHER
SOCC CENTER (24 HR.)
(406) 494-4131
(406) 497-4252
(406) 497-4161

NOTE TO NWE SOCC DISPATCHER: IF PLANT OPERATOR DOES NOT ACKNOWLEDGE A PAGE TO AN OFF-HOUR PLANT ALARM AND CANNOT BE CONTACTED, CONTACT THE NWE MISSOULA DIVISION OPERATIONS DIRECTOR OR SUPERVISOR-ON-CALL.

PPLM HYDRO OPERATIONS
PPLM Hydro Supervisor-On-Call
(Refer to current call-out schedule supplied by PPLM)

If no answer or current call-out schedule is not available contact:
Bob Covington, Manager Hydro Region I
Office: (406) 533-3415
Cell: (406) 490-0931
Home: (406) 797-3212

Revised 1/05

After being notified by the Milltown EAP Coordinator, the Montana Disaster and Emergency Services will notify the Governor's office of the situation.

The portion of the "Failure is Imminent or Has Occurred" warning flowchart on page 2 for this area notification responsibility follows with pertinent information (i.e., names, position titles, phone numbers, radio call frequency).

Montana Disaster and Emergency Services

MONTANA DISASTER & EMERGENCY SERVICES
(406) 841-3911 (24 Hour)
(MDES notifies the Montana Department of Environmental Quality Duty Officer)

↓

GOVERNOR'S OFFICE STATE OF MONTANA
OFFICE: (406) 444-3111

D. Potentially Hazardous Situation is Developing

In the event that there are indications that a potentially hazardous situation may be developing, the Plant Operator will immediately notify the Milltown Plant Foreman. The Milltown Plant Foreman will then notify the Milltown EAP Coordinator and standby for further instructions. In the event that the Plant Foreman is not readily available, the Plant Operator will notify the EAP Coordinator. After notifying the Milltown EAP Coordinator, the Plant Foreman/Operator will notify Stimson Lumber.

The portion of the notification flowchart on page 3 for this area of notification responsibility follows with pertinent information (e.g., names, position titles, office and home phone numbers, etc.

Plant Operator/Plant Foreman

OBSERVER/PLANT OPERATOR
PLANT: (406) 258-6348

BYPASS IF MILLTOWN PLANT FOREMAN IS NOT AVAILABLE

MILLTOWN PLANT FOREMAN
BILL SCARBROUGH
PLANT: (406) 258-6348
HOME: (406) 829-1922
CELL: (406) 240-2298
RADIO CALL WPFG 573

(1)

EAP COORDINATOR

BILL THOMPSON
OFFICE: (406) 497-3912
CELL: (406) 490-1498
HOME: (406) 494-5923

(2)

STIMSON LUMBER
(406) 258-2100 (**24 HR.**) OFFICE
DICK SHIMER CENTRAL SERVICES MANAGER
OFFICE: (406) 258-2217
HOME: (406) 721-1960
CELL: (406) 544-5890

The EAP Coordinator will have the responsibility for notifying Missoula area environmental and public health agencies and the FERC Portland Regional Office.

The portion of the "Potentially Hazardous Situation is Developing" flowchart on page 3 for this area of notification responsibility follows with pertinent information (e.g. names, position titles, phone numbers.

EAP Coordinator

EAP COORDINATOR

BILL THOMPSON

OFFICE: (406) 497-3912
CELL: (406) 490-1498
HOME: (406) 494-5923

(1)

MISSOULA AREA ENVIRONMENTAL & PUBLIC HEALTH AGENCIES

MISSOULA COUNTY OFFICE of EMERGENCY SERVICES
JANE ELLIS
Office: (406) 523-4758
Pager: (406) 523-7413
AND
MISSOULA CITY-COUNTY HEALTH DEPARTMENT
Dial 911 Center and Page On-Call Public Health Officer
Local: 911 **Out of Town**: (406) 728-0911 or (406) 523-4760

(2)

FERC - PORTLAND
DEPUTY REGIONAL ENGINEER
PATRICK REGAN
OFFICE: (503) 552-2741
HOME: (503) 534-2621
CELL: (503) 706-8733
OR CALL
REGIONAL ENGINEER
HARRY T. HALL
OFFICE: (503) 552-2700
HOME: (503) 636-1111
CELL: (503) 706-8842

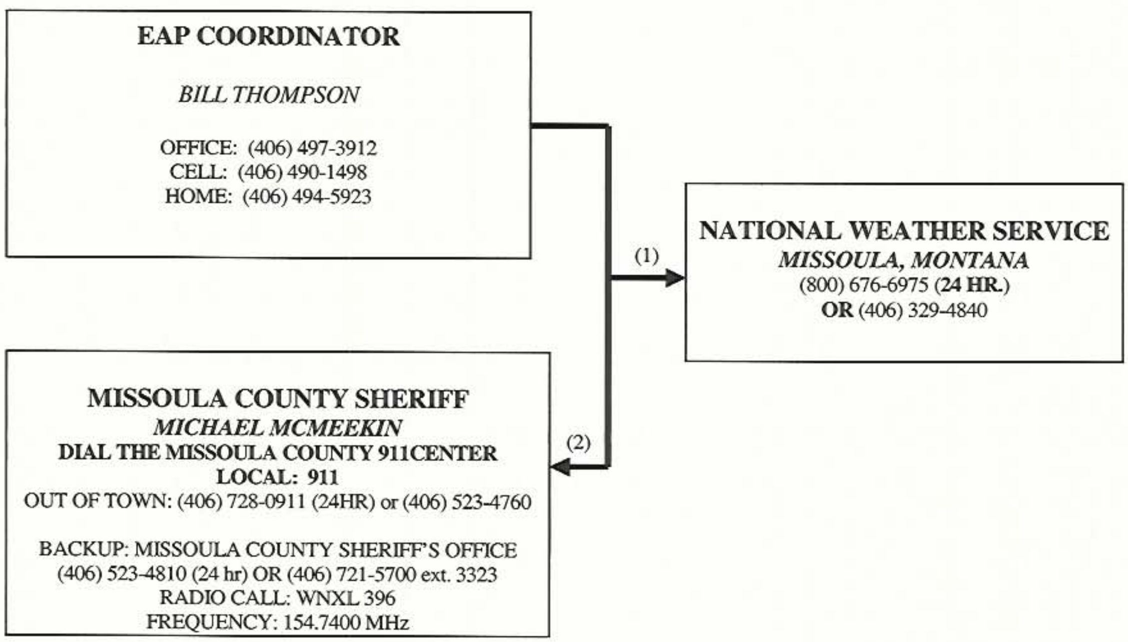
After notification is complete, NWE operations and engineering personnel will promptly respond in assessing the situation and recommending actions to correct the problem. If the use of materials and equipment is required, the Missoula Division service center or the appropriate contractor will be notified and the problem will be corrected.

In the event that the Plant Foreman/Operator feels that the potentially hazardous situation is escalating to a point that failure is imminent before NWE operations and engineering personnel can respond, he will immediately initiate the warning flowchart for an imminent or actual failure. The notification procedures for that failure scenario are discussed in Section V. C.

The Milltown Dam EAP "Failure is Imminent or Has Occurred" and "Potentially Hazardous Situation is Developing" notification flowcharts shown on pages 2 and 3 will be posted in the Milltown Dam operating room and office.

E. Non-Failure Flooding

When waterways below Milltown Dam are <u>at</u> or <u>near</u> flood stage it may become necessary to operationally increase flow into those waterways, which ultimately may cause flooding. The Milltown EAP Coordinator will notify the National Weather Service (NWS) first, then the appropriate downstream agencies. It is important to stress to these agencies that "**this is for their information only**", and not an activation of the EAP. This notification flowchart follows:



F. Responsibility for Evacuation

After performing his initial duties, the operator must then alert and evacuate all fishermen and tourists in the vicinity of the powerhouse and dam to the safety of higher ground. Because recreationists downstream of the dam may not be readily visible, the wastegate siren on the dam will be activated along with the airport strobe light above the radial gate if possible. Both of these can be activated and remain activated so the Plant Foreman/Operator can assist in other emergency duties as required.

Evacuation to higher ground shall be by the quickest and most convenient route available depending on the circumstances and left to the good judgment of those involved. The local

Missoula County Sheriff will coordinate other evacuation activities. The communication system used for this contact depends on the severity of the failure and will be left to the good judgment of those involved. The two systems available are the telephone system and the CFB radio system.

<u>**Missoula County Sheriff**</u>:

Bell : Local (from within Missoula County) 9-1-1 (24 hours)
(406) 721-5700 extension 3323 (24 hr)
(406) 523-4810 (backup)

CFB Radio:
Missoula County Call Sign WNXL 369
Channel 6 on radio

G. Responsibility for Emergency Termination and Follow-Up Evaluation

1) Emergency Termination.

There are two conditions required for a termination of the emergency. The first applies to emergency conditions at the dam and the second is related to the evacuation and disaster response. NWE operations and engineering personnel will be responsible for making the decision that an emergency condition no longer exists at the dam.

Applicable state or local emergency management officials are responsible for termination of the evacuation or disaster response activities. CFB/NWE, state, and local officials should agree on when it is appropriate to terminate an emergency. In addition, a determination will be made regarding the use of a news release to inform the general public, notifying them of termination of the emergency condition.

2) Follow-Up Evaluation

Following an emergency, an evaluation and review will be conducted that will include input from all participants. The following will be discussed and evaluated in the after-action review:

- Events prior to, during, and following the emergency;
- Significant actions taken by each participant, and what improvements would be practicable for future emergencies; and
- All strengths and deficiencies found in procedures, materials, equipment, staffing levels, and leadership.

The results of the after-action review will be documented in an evaluation report, kept on file, and considered when annually revising the EAP.

H. EAP Coordinator Responsibility

The EAP coordinator is responsible for EAP related activities, including notifications as shown above, revising the EAP as needed, and to act as the liaison between federal, state, and local agencies and CFB/NWE.

VI. PREPAREDNESS

A. Surveillance

The Milltown Project is staffed seven days a week. The Plant Foreman and Operator are required to reside within twenty minutes drive of the plant and rotate on-call responsibilities. The project is equipped with intruder alarms and low level and high level pond alarms. If the plant trips off line or an alarm sounds, a transmitter is activated at the plant, which will trigger a pager the employee carries while off duty. The transmitter will also alarm at the SOCC dispatch office in Butte. This dispatch center is staffed 24 hours a day, 365 days a year. If the page is not picked up by the employee, then the SOCC Dispatcher will try to page the employee or phone his residence. This assures there is always someone close to the project if a problem arises.

B. Response During Periods of Darkness

There are ten high-pressure sodium vapor lights on the dam in the following quantities and locations: six on the spillway section, two on the radial gate bay and two on the dividing block. Mercury vapor lights are located in the following quantities and locations: one at the radial gate bay outlet, two in front of the powerhouse, and one on the right gravity wall. Lanterns, flashlights and vehicle headlights can provide light during hours of darkness if power sources for lighting fail.

If for some reason, the entire plant is tripped off line, the generator bus disconnects can be opened to isolate the generators and the low tension bus can then be back fed from the No. 61 circuit from the Bonner substation, thus energizing the station transformers and circuits. This would restore station service to the plant and dam.

The dam is equipped with five foot by eight-foot drop panels for flashboards (44 panels total). These panels are pulled using a gasoline-powered hydraulic crane. If for some reason the crane is inoperable, these spillway panels can be manually operated by tripping stanchions.

There is a 42.5 x 16 foot radial gate incorporated into the dam. The radial gate is power operated from either the powerhouse or the dam – to operate the radial gate from the dam, a keyed control box must be opened. Keys are retained in the powerhouse and in the panel hoist storage shed. If all attempts to restore power to the dam fail for any reason, a 30 kW a.c. emergency standby generator is available on top of the main dam to provide power to operate the radial gate. The rating of the generator is sufficient to operate the radial gate as well as all lighting and heating circuits on the dam. This generator is powered by propane which is supplied by a 120-gallon capacity tank filled once a year. The propane level is checked any time the unit has run for an extended period of time. This unit automatically starts at 8:00 a.m. every Wednesday morning and shuts down after 30 minutes of operation. Upon loss of power for any reason, this standby generator will automatically start and will not shut down until power is restored.

With an employee available at all times and residing near the plant, response time during hours of darkness will be kept to a minimum. Any loss of power at the plant will immediately activate the on shift operator's pager and an alarm at the SOCC in Butte (24 hours).

C. Access to Site

There are two accesses to Milltown Dam.

Main: Exit I-90 at Bonner, turn onto Highway 200 going west. Travel 1 mile to Tamarack Street, turn left toward river and follow road to dam and powerhouse.

Alternative: Turn south off Old Highway 200 at Speedway Avenue. Travel 0.15 mile and turn left onto Deer Creek Road. Follow road for 1.6 miles and turn left just over the railroad tracks. There is a gate that will require a key from the plant personnel, going through the gate, travel 0.7 miles and through the old railroad tunnel. Access to south end of dam is just left as you come out of the tunnel.

D. Response During Weekends and Holidays

The alarm system and callout for weekends and holidays is the same as described in detail under Section VI. A - Preparedness: Surveillance.

E. Response During Periods of Adverse Weather

After any measurable snowfall, the access road to the powerhouse is plowed and sanded by the personnel at Milltown Dam.

The following list of equipment is available at the Milltown Hydro facility:

Four-wheel drive, one-half ton pickup
Ford Tractor with front-end loader

In addition, the Missoula Division Operating Center has an extensive pool of vehicles and equipment that are available if needed.

During periods of adverse weather when flooding could occur (e.g., heavy rainfall, prolonged rainfall, heavy runoff due to snowmelt), the Plant Operator will check the reservoir and dam as part of his routine rounds. If this is not possible, a relief operator will be called out to monitor the dam and reservoir during these periods.

The following types of incidents occurring along or near the reservoir can affect operation, performance and safety of the dam and related structural facilities:

- Large landslides into the reservoir causing high waves with the possibility of overtopping, erosion and other damage at the dam.
- Landslides, rockfalls and avalanches near the dam and structures.
- Large floating debris and ice, which can block spillways and intakes.

During periods of adverse weather, the Plant Operator or relief operator will examine the slopes along the reservoir rim and in the vicinity of the dam and facilities for potential instability including the following:

- Areas with history of previous slides.
- Evidence of incipient slides such as uphill cracks, heaves and dips, and tilted trees.
- Build-up of debris from higher slides or stream overflow above a slope.
- Substantial runoff draining and disappearing into large masses of soil and rock.
- Unfavorable geologic features such as steep dips towards the lake of the dam.

F. Alternative Systems of Communication

Two communication systems exist at Milltown Dam. Telephones are provided at the powerhouse. The Plant staff is familiar with this system and uses it on a regular basis. In addition, the Milltown Plant truck is equipped with a radio that has the following frequencies and use description:

Radio Channel (Mode)	Milltown Dam CFB/NWE Channel/Tone	Description
	153.680 MHz (T) 158.145 MHz (R)*	Milltown Phone Patch
1–Tone D	158.250 MHz (T) 159.435 (R) 127.3 (PL-FREQ)	TV Mountain Repeater
2	158.130 MHz (T) (R)	CFB/NWE
3	158.160 (T) (R)	CFB/NWE
4	158.220 (T) (R)	CFB/NWE
	153.545 MHz (T) 160.125 MHz (R)	Missoula Division Phone Patch
	155.790 MHz (T) (R)	Silver-State Law Enforcement Mutual Aid
	153.905 MHz (T) (R)	Gold – State Common Mutual Aid
	162.400 MHz(R)	National Weather Service

* Note T = Transmit, R = Receive

G. Available Resources

1. Milltown Contractor Designation:

Emergency supplies for emergency use or repair may be necessary even though the processes involved in the destruction of a dam are too powerful to be mitigated. The NWE Missoula Division Service Center has a variety of equipment that can be mobilized to the Milltown Project in the event of an emergency.
The area contractor listed below could also be used in an emergency.

Jensen and Sons
1920 South Third W
Missoula MT 59801
George Jensen
(406) 728-1400 (W)
(406) 543-5268 (W)

This contractor is responsible for notifying their own operators as needed, depending on the type of damage sustained and type of repair required.

2. Advanced Coordination of Flows Based on Weather or Runoff Forecast

CFB/NWE is involved in advanced planning for water resource usage in the Clark Fork drainage. Plant and NWE engineering personnel communicate daily during the runoff season with the National Weather Service (NWS) regarding runoff forecasts. In the event of a slowly developing failure, it may be possible to lower the reservoir if inflow to the reservoir is not excessive.

3. Alternative Sources of Power for Spillway Gate Operations and Other Emergency Uses

Station Service Reliability Options include:

a) Power feedback through the 61 circuit from the Bonner Substation and through the 27 circuit from the No. 1 Substation in Missoula. Circuit 27 requires special-switching operations before it can be used. If problems occur with circuit 61, the emergency generators will be used.
b) 30 kW emergency standby generator located on top the dam for radial gate operation and dam lighting.
c) Portable Miller 200 amp 120/240V gasoline-powered welder/generator set for emergency operation of miscellaneous plant equipment.

The eight-foot drop panels on the dam are pulled by a hydraulic crane that is powered by a gasoline engine. Stanchions can be manually tripped in case of an emergency. The 30 kW emergency generator can provide power to operate the 42.5 x 16 foot radial gate. The radial gate can be operated from either the powerhouse or from the dam. To operate the radial gate from the dam, a keyed control box must be opened. Keys are retained in the powerhouse and in the panel hoist storage shed. The station service reliability options should supply the necessary power under all circumstances. Lanterns and flashlights can provide supplemental light during hours of darkness.

H. Other Actions and Concerns to Mitigate the Extent of Possible Emergencies

No other actions will likely contribute significantly to mitigation of an emergency.

VII. INUNDATION MAPS

The inundation maps contained in map pouches in this section of the plan depict flood wave information for two separate Milltown Dam breach scenarios. Those scenarios are:

1. A "Fair Weather" breach of the dam, wherein "normal" full reservoir elevation and river flow conditions prevail prior to the dam failure. The "normal" channel is portrayed on the inundation maps, and is based on pre-breach base flows of 3,000 cfs in the Clark Fork River.

2. Failure during a Probable Maximum Flood (PMF) condition. A peak antecedent flow of 272,000 cfs into Milltown Reservoir was assumed to have existed prior to the failure. Agencies responsible for emergency preparedness and evacuation requested that the PMF failure be portrayed on the inundation maps as the " Major Flood" failure, which they thought to be a more universally understood terminology.

   The key map (sheet number one of three) includes a map legend, which explains how the two inundation zones are portrayed on the inundation maps. The "fair weather" failure inundation boundary is shown by a yellow overlay outside of the normal riverbank, while the "major flood" failure inundation boundary is shown by a red overlay. In some cases, inundation zones for the two different floods are too close to be shown separately, in which case the inundation boundary is portrayed only by the "major flood" red overlay. Used in conjunction with the elevation contour lines on the maps, the inundation zone boundary lines clearly identify maximum flood wave elevations. A map sheet location index and tables of flood information for key locations are also included on the key map.

   Reproductions of U.S. Geological Survey (USGS) 7.5 minute maps were used as a base maps for the inundation maps. These maps, with contour intervals of 5, 10, 20 or 40 feet, are the best available topographic maps for the affected areas. The USGS maps were reproduced at their original scale of one inch = 2,000 feet, allowing for sufficient identification of potentially inundated areas. Prior to reproduction, the USGS base maps were updated and edited based on recent aerial surveys of potentially inundated areas. Aerial surveys of potentially inundated areas are conducted periodically.

   Caution should be used in interpretation of the inundation maps. Because antecedent flow conditions and breach scenarios can vary widely, actual flood characteristics could be quite different from either of the floods portrayed. Flood levels and flood wave travel times are approximate, and should only be used as a guideline for establishing evacuation zones. Areas inundated would depend on actual failure conditions, and might differ from areas shown on the maps.

"FAIR WEATHER" DAM FAILURE

	LOCATION (MILES DOWNSTREAM OF DAM)		NORMAL RIVER ELEVATION (FEET MSL)	MAXIMUM FLOOD WAVE ELEVATION (FEET MSL)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO RISE OF TWO FEET (HOURS)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO MAXIMUM RISE (HOURS)	APPROXIMATE AVERAGE RATE OF CHANGE IN WATER SURFACE ELEVATION BETWEEN RISE OF 2 FEET AND MAXIMUM RISE
1	1.0	PINEGROVE	3214.5	3225.0	38 MINUTES	1 HR. 12 MIN.	0.25 FT/MIN.
2	2.5	BANDMANN BRIDGE	3201.5	3211.1	1 HR. 7 MIN.	1 HR. 46 MIN.	0.20 FT/MIN.
3	5.6	UNIV. OF MONTANA	3175.2	3181.5	2 HR. 5 MIN.	2 HR. 53 MIN.	5.4 FT/HR
4	6.7	HIGGINS BRIDGE	3166.2	3171.9	2 HR. 29 MIN.	3 HR. 19 MIN.	4.4 FT/HR
5	7.4	MT RAIL LINK BRIDGE 0	3160.0	3166.1	2 HR. 43 MIN.	3 HR. 48 MIN.	4.7 FT/HR
6	10.0	OLD RAILROAD BRIDGE	3140.0	3142.7	4 HR. 19 MIN.	5 HR. 5 MIN.	0.9 FT/HR
7	14.0	CONFLUENCE WITH BITTERROOT RIVER	3090.0	3093.5	7 HR. 36 MIN.	8 HR. 38 MIN.	1.4 FT/HR

The "Fair Weather" Failure scenario is based on a hypothetical failure during normal summer flows and full reservoir conditions.

"MAJOR FLOOD" DAM FAILURE

	LOCATION (MILES DOWNSTREAM OF DAM)		PRE-BREACH RIVER ELEVATION (FEET MSL)	MAXIMUM FLOOD WAVE ELEVATION (FEET MSL)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO RISE OF TWO FEET (HOURS)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO MAXIMUM RISE (HOURS)	APPROXIMATE AVERAGE RATE OF CHANGE IN WATER SURFACE ELEVATION BETWEEN RISE OF 2 FEET AND MAXIMUM RISE
1	1.0	PINEGROVE	3253.3	3253.8	N/A	1 HR. 19 MIN.	N/A
2	2.5	BANDMANN BRIDGE	3243.9	3244.2	N/A	2 HR. 0 MIN.	N/A
3	5.6	UNIV. OF MONTANA	3215.9	3216.6	N/A	2 HR. 26 MIN.	N/A
4	6.7	HIGGINS BRIDGE	3195.0	3196.9	N/A	2 HR. 36 MIN.	N/A
5	7.4	MT RAIL LINK BRIDGE 0	3188.1	3188.4	N/A	2 HR. 48 MIN.	N/A
6	10.0	OLD RAILROAD BRIDGE	3153.8	3154.0	N/A	4 HR. 2 MIN.	N/A
7	14.0	CONFLUENCE WITH BITTERROOT RIVER	3118.0	3118.6	N/A	9 HR. 57 MIN.	N/A

The "Major Flood" scenario is based on a hypothetical dam failure during a "Probable Maximum Flood" (PMF) event.

LEGEND

1 Location	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	0.0	0000.0	0.0	HR - MIN.	HR - MIN.
Major Flood	0.0	0000.0	0.0	HR - MIN.	HR - MIN.

TYPICAL FLOOD ROUTING CROSS SECTION
ALL ELEVATIONS RELATE TO MEAN SEA LEVEL (MSL)

INDICATES AREA POTENTIALLY INUNDATED BY A "FAIR WEATHER" DAM FAILURE

INDICATES ADDITIONAL AREA POTENTIALLY INUNDATED DUE TO DAM FAILURE UNDER "MAJOR FLOOD" CONDITIONS

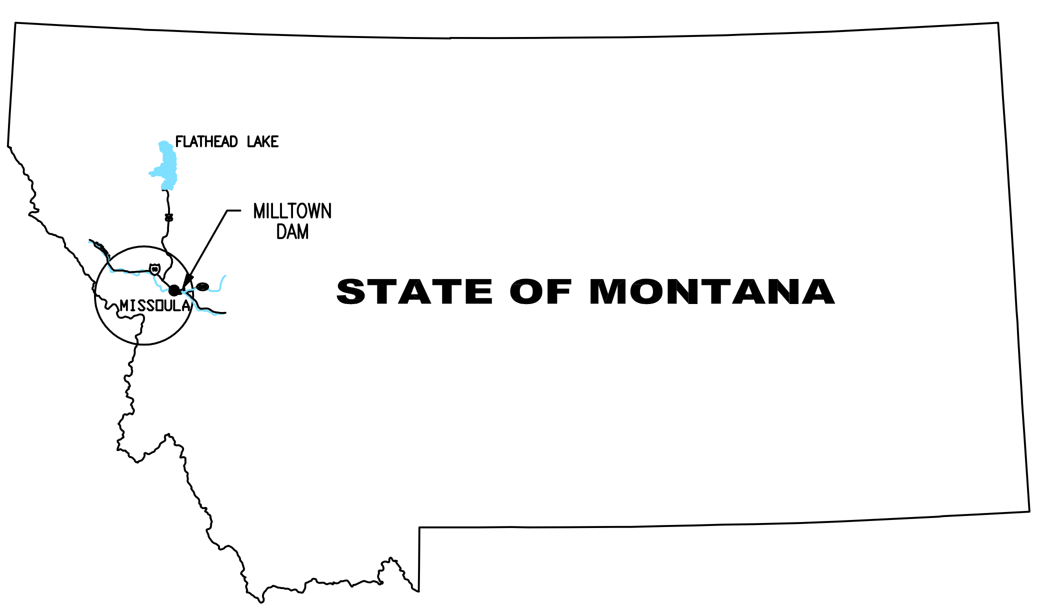
IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

IMPROVED PRIMARY OR SECONDARY HIGHWAY/ROAD
UNIMPROVED ROAD
TRAIL

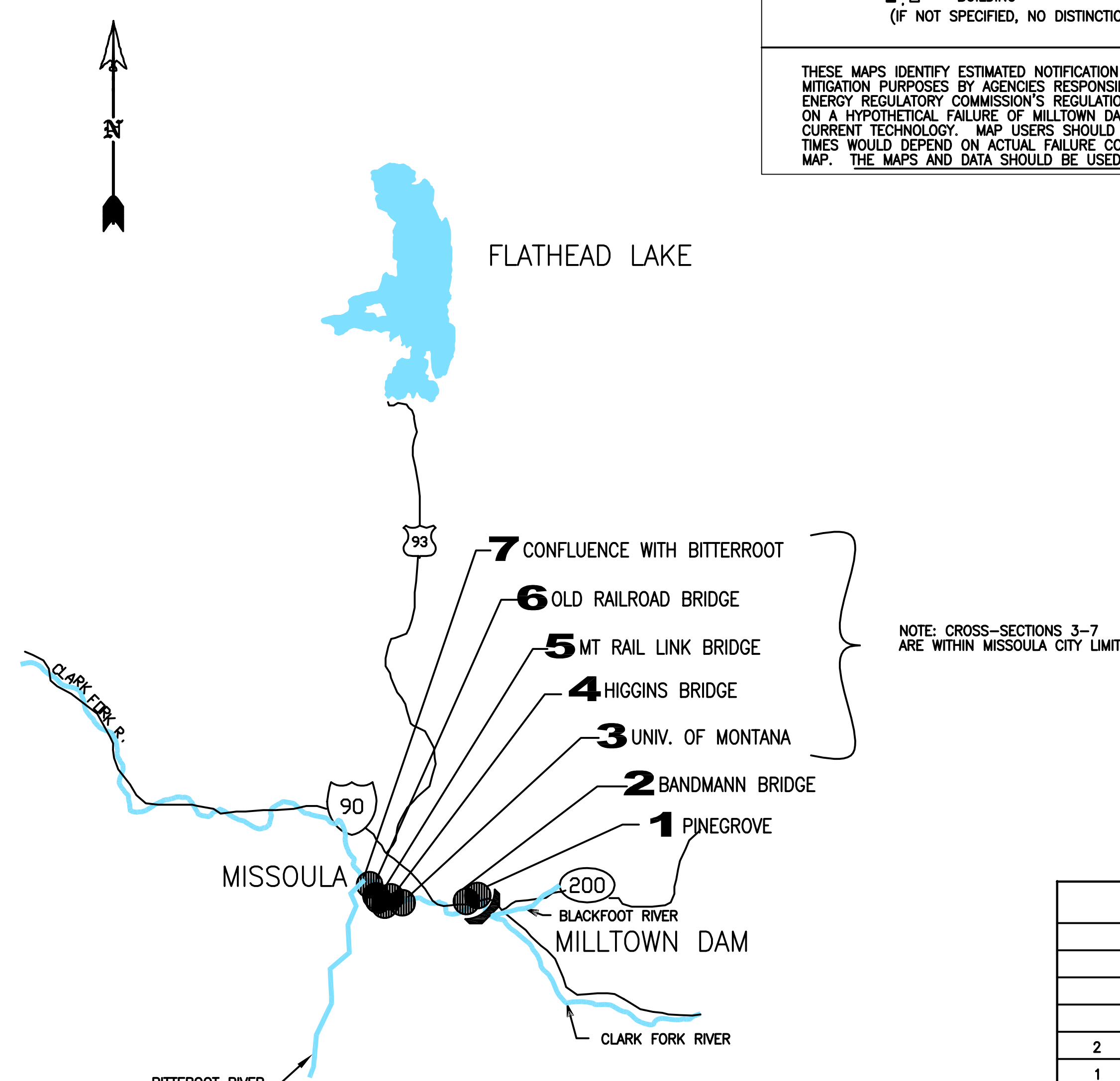
INTERSTATE ROUTE U.S. ROUTE STATE ROUTE OTHER ROUTE

■, □ = BUILDING
(IF NOT SPECIFIED, NO DISTINCTION MADE BETWEEN HOUSES, BARNS, OR OTHER BUILDINGS)

THESE MAPS IDENTIFY ESTIMATED NOTIFICATION ZONES TO BE USED FOR EMERGENCY PLANNING AND MITIGATION PURPOSES BY AGENCIES RESPONSIBLE FOR EVACUATION, AS REQUIRED UNDER THE FEDERAL ENERGY REGULATORY COMMISSION'S REGULATIONS. FLOOD INFORMATION DEPICTED ON THE MAP IS BASED ON A HYPOTHETICAL FAILURE OF MILLTOWN DAM. THE EFFECTS OF WHICH WERE MODELED USING CURRENT TECHNOLOGY. MAP USERS SHOULD BE AWARE THAT ACTUAL INUNDATED AREAS AND FLOOD WAVE TRAVEL TIMES WOULD DEPEND ON ACTUAL FAILURE CONDITIONS, AND MAY DIFFER FROM AREAS SHOWN ON THIS MAP. THE MAPS AND DATA SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.



LOCATION WITHIN STATE



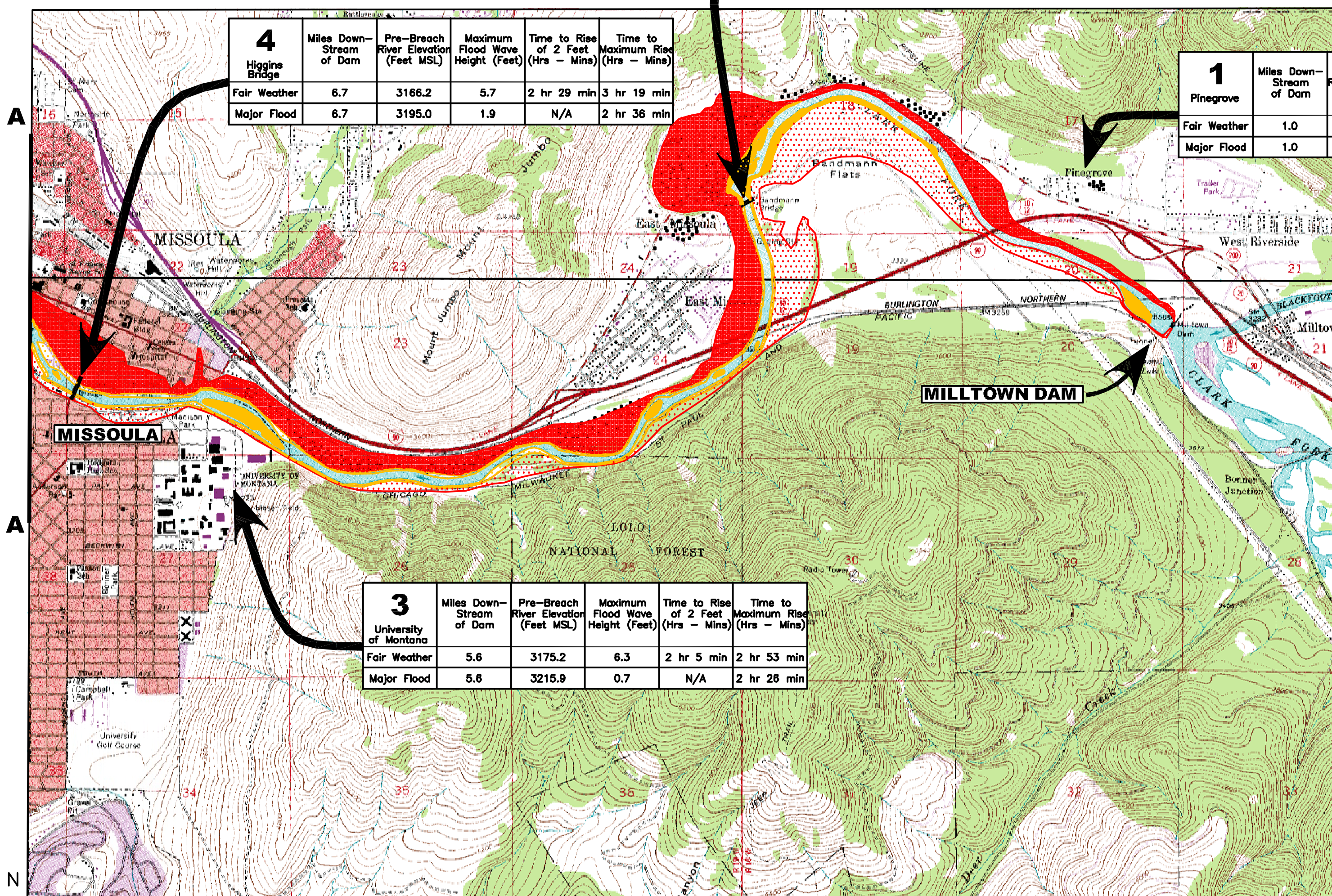
REVISION	DATE
2	10-20-03
1	5-5-00
0	2-5-98

DEPT. MGR. J.C.VAN DAVEER
DESIGNED J.R. HITT
DRAWN R.L.WILEY

THE CLARK FORK & BLACKFOOT, LLC

EMERGENCY ACTION PLAN
INUNDATION MAPS
MILLTOWN DAM
F.E.R.C. PROJECT 2543
KEY MAP

SIZE D DWG. NO. 43674-C14
SCALE NOTED DIV. NO. 33 SHT 1 OF 3



2 Bandmann Bridge	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	2.5	3201.5	9.6	1 hr 7 min	1 hr 46 min
Major Flood	2.5	3243.9	0.3	N/A	2 hr 0 min

4 Higgins Bridge	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	6.7	3166.2	5.7	2 hr 29 min	3 hr 19 min
Major Flood	6.7	3195.0	1.9	N/A	2 hr 36 min

1 Pinegrove	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	1.0	3214.5	10.5	38 min	1 hr 12 min
Major Flood	1.0	3253.3	0.5	N/A	1 hr 19 min

3 University of Montana	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	5.6	3175.2	6.3	2 hr 5 min	2 hr 53 min
Major Flood	5.6	3215.9	0.7	N/A	2 hr 26 min

THESE MAPS IDENTIFY ESTIMATED NOTIFICATION ZONES TO BE USED BY EVACUATION AGENCIES FOR EMEREGENCY PLANNING AND MITIGATION PURPOSES, AS REQUIRED UNDER THE FEDERAL ENERGY REGULATORY COMMISSION'S REGULATIONS. FLOOD INFORMATION DEPICTED ON THE MAPS IS BASED ON A HYPOTHETICAL FAILURE OF MILLTOWN DAM, THE EFFECTS OF WHICH WERE MODELED USING CURRENT TECHNOLOGY. MAP USERS SHOULD BE AWARE THAT ACTUAL INUNDATED AREAS AND FLOOD WAVE TRAVEL TIMES WOULD DEPEND ON ACTUAL FAILURE CONDITIONS, AND MAY DIFFER FROM AREAS SHOWN ON THIS MAP. THE MAPS AND DATA SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.

SCALE 1:24000

MILES · FEET · METERS

CONTOUR INTERVAL 40 FEET

MONTANA

INUNDATION MAP LOCATION

"FAIR WEATHER" DAM FAILURE INUNDATION BOUNDARY

"MAJOR FLOOD" DAM FAILURE INUNDATION BOUNDARY

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

REVISION	DATE
2	10-20-03
1	5-5-00
0	2-5-98

THE CLARK FORK & BLACKFOOT, LLC

EMERGENCY ACTION PLAN
INUNDATION MAPS
MILLTOWN DAM
F.E.R.C. PROJECT 2543

DEPT. MGR. J.C.VAN DAVEER
DESIGNED J.R. HITT
DRAWN R.L.WILEY

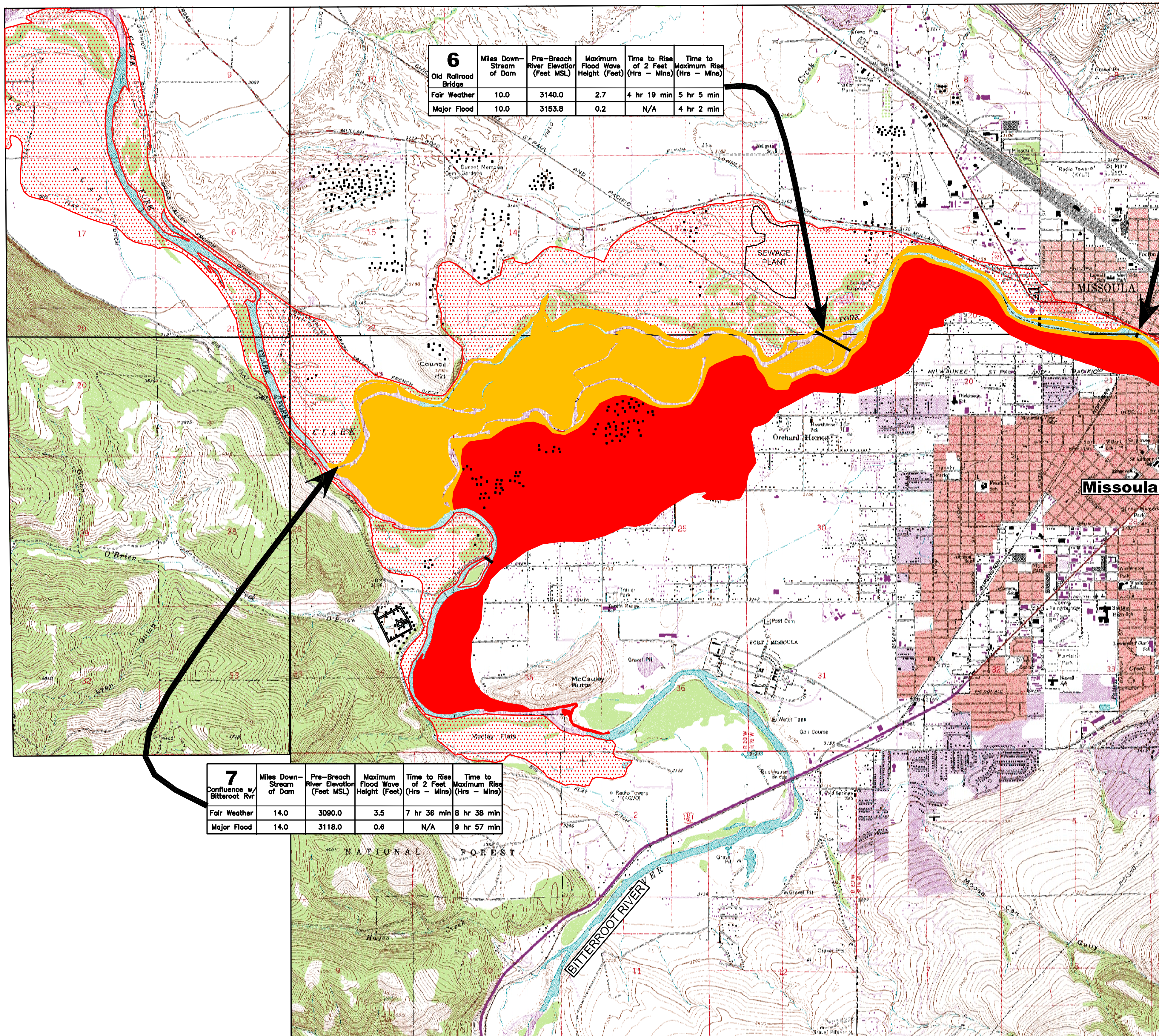
SIZE D · DWG. NO. 43674-C14

SCALE NOTED · DIV. NO. 33 · SHT 2 OF 3

43674-C14-2-2

C 22" x 34"
ACAD 2000

MILLTOWN DAM EMERGENCY ACTION PLAN
SHEET 3 OF 3



6 Old Railroad Bridge	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	10.0	3140.0	2.7	4 hr 19 min	5 hr 5 min
Major Flood	10.0	3153.8	0.2	N/A	4 hr 2 min

5 Montana Rail Link Bridge	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	7.4	3160.0	6.1	2 hr 43 min	3 hr 48 min
Major Flood	7.4	3188.1	0.3	N/A	2 hr 48 min

7 Confluence w/ Bitteroot Rvr	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height (Feet)	Time to Rise of 2 Feet (Hrs – Mins)	Time to Maximum Rise (Hrs – Mins)
Fair Weather	14.0	3090.0	3.5	7 hr 36 min	8 hr 38 min
Major Flood	14.0	3118.0	0.6	N/A	9 hr 57 min

"FAIR WEATHER" DAM FAILURE INUNDATION BOUNDARY

"MAJOR FLOOD" DAM FAILURE INUNDATION BOUNDARY

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

THESE MAPS IDENTIFY ESTIMATED NOTIFICATION ZONES TO BE USED BY EVACUATION AGENCIES FOR EMEERGENCY PLANNING AND MITIGATION PURPOSES, AS REQUIRED UNDER THE FEDERAL ENERGY REGULATORY COMMISSION'S REGULATIONS. FLOOD INFORMATION DEPICTED ON THE MAPS IS BASED ON A HYPOTHETICAL FAILURE OF MILLTOWN DAM, THE EFFECTS OF WHICH WERE MODELED USING CURRENT TECHNOLOGY. MAP USERS SHOULD BE AWARE THAT ACTUAL INUNDATED AREAS AND FLOOD WAVE TRAVEL TIMES WOULD DEPEND ON ACTUAL FAILURE CONDITIONS, AND MAY DIFFER FROM AREAS SHOWN ON THIS MAP. THE MAPS AND DATA SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.

SCALE 1:24000

MILES: 1 .5 0 1

FEET: 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

METERS: 1000 0 1000 2000

CONTOUR INTERVAL 20 FEET

MONTANA

INUNDATION MAP LOCATION

THE CLARK FORK & BLACKFOOT, LLC

EMERGENCY ACTION PLAN
INUNDATION MAPS
MILLTOWN DAM
F.E.R.C. PROJECT 2543

REVISION	DATE
2	10-20-03
1	5-5-00
0	2-5-98

DEPT. MGR. J.C.VAN DAVEER
DESIGNED J.R. HITT
DRAWN R.L.WILEY

SIZE D DWG. NO. 43674-C14

SCALE NOTED DIV. NO. 33 SHT 3 OF 3

EAP

C 22" x 34"
ACAD 2000

VIII. APPENDICES

A. Investigation and Analyses of Dambreak Floods

1. Method Used to Identify Potentially Inundated Areas

Hypothetical inundation boundaries and flood wave travel times were determined through application of the U.S. National Weather Services' DAMBRK flood forecasting computer software. The DAMBRK model represents the latest methodology for modeling of dam failures and the use of hydrodynamic theory to predict dam-break flood wave formation and routing.

In the model, Milltown Dam was administratively failed using conservative assumptions. The resultant flood waves for both the "fair weather" breach and failure during the "Probable Maximum Flood" (PMF) were routed through the downstream river reach to a point 17 miles downstream of the dam and approximately three miles beyond the confluence of the Bitterroot and Clark Fork rivers.

2. Assumptions Made in the Analyses

In the "fair weather" breach model, an antecedent inflow condition of 3,000 cubic feet per second (cfs) into the reservoir above Milltown Dam, through the project, and on downstream was assumed. In the PMF breach model, a maximum inflow at Milltown Dam of 272,000 cfs was used.

The reservoir was assumed to be full – at the normal full pond elevation of 3,258.35 feet MSL (Mean Sea Level, USGS datum) – in the "fair weather" breach model. For the PMF breach model, it was assumed that the project's non-overflow structures would be overtopped by 15.45 feet, resulting in a peak reservoir water surface elevation of 3,283.25 feet MSL USGS datum (24.9 feet above normal full reservoir level) at the time the dam began to fail.

The assumptions made regarding the temporal and geometric description of the model's Milltown Dam breach are within the range of suggested breach parameters outlined in the FERC Engineering Guidelines. The assumed breach of Milltown Dam consisted of the entire spillway section – a rectangular-shaped section, 220 feet wide and 39 feet below the top of the non-overflow sections. The breach bottom elevation is conservatively below the tailwater elevation. The breach of the reinforced concrete-over-rock-filled timber crib spillway was assumed to have fully developed over a one-hour period.

As a means of logically choosing Manning's *n* channel roughness values for application in the model, a cross-section at the existing gauging station three miles below Milltown Dam was analyzed using the Manning's equation, whereby the cross-section shape, water surface elevation, and slope were known, and the equation was solved for *n*. While floods of a magnitude resulting from either a PMF flow or a dam-failure caused flood have never been measured in this reach, it is thought that analysis of the highest recorded flows at this gauging station would yield a more accurate Manning's *n* value than one arbitrarily selected from reference books. For the Clark Fork River below Milltown Dam, a Manning's n channel roughness coefficient value of 0.075 was used.

The study inflow hydrograph of 3,000 cfs used in the "fair weather" breach model approximates the 67-year average flow for the Clark Fork River below Milltown Dam. The PMF hydrograph – with a maximum flow of 272,000 cfs – used in the PMF breach model was derived in the 1988 PMF study performed by Bechtel Inc. Relationships between the Milltown Development's reservoir water surface elevation, storage capacity, and total discharge capacity were taken from established NWE records and tables, and information developed by the Part 12 Consultant.

Cross-sections and channel slopes were developed from USGS topographical maps with 5-, 10-, 20- or 40-foot contour intervals. The 17 cross-sections modeled for the analyses were located where significant changes in channel configuration occurs and at identifiable sites of specific concern, such as bridges. With the interpolated cross-sections automatically generated by DAMBRK, there were a total of 330 cross-sections in the model.

3. Consideration of the Domino Effect

The domino effect, a sequential failure of downstream dams as a result of the failure of Milltown Dam, was considered in this analyses. The first dam downstream is located at Thompson Falls, 160 river miles away. The entire volume normally stored in the reservoir behind Milltown Dam could be contained in the top 0.07 foot of Thompson Falls Reservoir. Just 14 miles downstream of Milltown Dam, at the confluence of the Clark Fork and Bitterroot Rivers, model results show that "fair weather" breach outflows would not approach threatening levels. At a point 17 miles downstream of the dam, additional flooding due to breach flows during a PMF approach an increment of 2 feet. For these reasons, the domino effect was not applicable for dams downstream of Milltown Dam.

4. Special Considerations in Dam Breach Analyses

A special consideration in development of the model was the discrepancy between USGS and CFB elevation datums (CFB datum – USGS datum = 1.472 feet). In combining geometric data from both USGS and CFB sources for utilization in the model, all elevations were converted to the equivalent USGS elevations.

5. Results of the Analysis

Results of the DAMBRK study are summarized and plotted on the Milltown Dam EAP inundation maps (contained in map pouches at the back of this plan). The key map (sheet number one of three) contains tables of information, including flood wave heights and travel times, for key locations downstream of Milltown Dam. The other inundation maps delineate potentially inundated areas on scale maps of the affected region. Section VII in this EAP further describes the inundation maps.

For "fair weather" failure of Milltown Dam, the resulting outflow hydrograph had a peak flow of 34,900 cfs. In the case of a breach during PMF conditions, the peak outflow was 318,000 cfs. Due to the small volume of water impounded by Milltown Dam, breach-caused flood waves attenuate rapidly toward pre-breach flows as they progress downstream.

6. Termination of Flood Routing

Routing of the flood wave was terminated 17 miles downstream of Milltown Dam, three miles beyond the confluence of the Clark Fork and Bitterroot Rivers. Presentation of potential inundation zones on inundation maps was discontinued 3 miles downstream of the confluence of the two rivers. At this location, the "fair weather" breach flood wave had attenuated to a flow of 8,100 cfs – a non-threatening flow commonly exceeded in the Clark Fork Rover at this location during spring runoff. In the case of failure during a PMF event, modeled water surface elevations rose just slightly more than 2 feet above pre-breach stages. A natural flood event anywhere close to the magnitude of the PMF would provide substantial warning in itself. Residents would be either cognizant of the threat of flooding or already be experiencing flood conditions before the dam failed. For these reasons, inundation mapping was discontinued at this point.

B. Plans for Training, Exercising, Updating and Posting the EAP

1. Annual Training

EAP training will be conducted on a yearly basis for all personnel involved with the EAP at the Milltown Development. This training will include, but is not limited to:

a) Discussion on how to respond properly to an emergency situation
b) Procedures to follow during an emergency
c) Basic communications skills - how and when to use them. Samples of typical communications during implementation of the EAP warning flowchart will be given to all personnel during this training
d) Discussion of problem failure will be discussed
e) Review of response plans will be reviewed
f) The "Failure is Imminent or Has Occurred" and "Potentially Hazardous Situation is Developing" warning flowcharts shown on pages 2 and 3 will be reviewed for each failure scenario.

This training will be held once every 12 months at a time and date to be determined by the EAP coordinator and will be held in conjunction with the annual review of the EAP.

2. Exercise

A. Annual Drills

1) Training of all personnel involved with the EAP will be conducted at least once every year. Testing the readiness of all personnel involved with the EAP will be conducted once every year.

2) Problem failures will be discussed and followed through with enactment drills.
   a) Relative safety of employees and downstream inhabitants will be weighed and tested, using hypothetical situations.

3) Response plans will be enacted for daylight and nighttime conditions.
   a) Training to include familiarity and use of all emergency, safety, and first aid equipment.

b) Inventory of emergency supplies and resources to be maintained and updated at training sessions

4) Communications channels to be tested during training sessions include:
   a) Bell System phone
   b) CFB-owned radio installed in vehicle

5) Notification procedures over the telephone will be exercised during the training session, emphasizing "test only" conditions, to authenticate all listed phone numbers. The order in which notification is made will be the same as that required by an actual emergency. In order to prevent a misunderstanding, no reference to a "dam failure" is to be made during a "test only" condition. For clarity, the following statements should be made at the beginning of each telephone contact: "This is a test of the Emergency Action Plan for the Milltown Project. This test only condition is for the implementation of the Warning Flowchart on page 2 of the plan. Again, this is only a test." The person making the contact should always ask, **"Do you understand how to carry out your responsibility according to the EAP?"** before ending the call.

The success of the annual test of readiness will be determined by the Milltown Plant Foreman and the EAP Coordinator. Within thirty (30) days of the date of the test, the EAP Coordinator will submit a statement to the FERC Regional Engineer, which will verify that the EAP has been exercised. A critique of the test and any revisions or updates to the plan (or statement that no revisions or updates were needed) will accompany this test verification statement. The critique will include the following:

i) Concerns regarding telephone contacts;
ii) Evaluation of the time required to implement the test;
iii) Identify areas of improvement to shorten time required to implement the EAP; and
iv) Address the testing of emergency power sources and remote surveillance systems used to signal an emergency situation (i.e., dam failure alarm).

Immediately following the test, verification will be made from all entities holding Milltown Dam EAP manuals so determination can be made that all have the most up-to-date manual available. This information shall also be included in the critique and submitted in writing to the FERC Regional Director by December 31 of each year.

Review of the annual test procedure will be documented by plant personnel and supervisory personnel. All personnel and agencies identified on the warning flowchart on page 2 will report verification of their phone contacts to plant personnel.

B. Comprehensive Drills

FERC requires performance of Comprehensive drills, such as the Tabletop and the Functional Exercises, once every 5 years.

The **Tabletop** drill precedes the functional drill and involves a meeting of CFB/NWE officials and the state and local emergency management officials in a conference room environment. This is usually considered the trial run of the functional exercise.

The **Functional** drill is the highest level exercise that **does** **not** involve the full activation of NWE and state and local emergency management agency field personnel and facilities or test the evacuation of residents downstream of the dam. It involves all of the various levels of NWE, federal, state, and local emergency personnel that would be involved in an actual emergency. The exercise involves the simulation of a dam failure and other specified events with time constraints. The participants "act-out" their actual roles. This exercise is designed to test the functionality of the EAP and evaluate the coordination activities between CFB/NWE and all other agencies.

The tabletop and functional exercises for the Milltown EAP were last conducted on November 6, 2003.

3. Annual Updates

A review of the adequacy of the EAP will be conducted once a year. This review is to verify document content, phone numbers, responsibilities, position titles, etc. A determination of any new developments or other changes downstream or elsewhere will be made to determine whether any revisions to the current EAP are necessary. Revisions will be made immediately after any changes are discovered and updated pages to the EAP will be mailed to each person or entity, which holds a Milltown EAP manual. A statement will be furnished to the FERC Regional Engineer each year stating that the EAP has been thoroughly reviewed and includes the date it was last tested. Attached to this statement will be updated pages or a separate statement that no revisions or updates were needed.

4. Posting the EAP

As previously mentioned, the Milltown EAP "Failure is Imminent or Has Occurred" and "Potentially Hazardous Situation is Developing" warning flowcharts (pages 2 and 3) are permanently posted in the Milltown Dam operator room and office.

In addition, copies of the Milltown EAP will be maintained and readily available at the following locations:

Milltown Dam Powerhouse
Plant Foreman's House
Plant Operator's House
NWE Safety, Health, and Environmental Services Department - Butte
NWE SOCC - Butte
NWE Division Operating Center - Missoula
NWE Corporate Communication - Butte
Sheriff's Office – Missoula County
911 Call Center – Missoula County
Montana Division of Disaster and Emergency Services (DES) - Helena
DES District 1 Representative
Missoula County Office of Emergency Services
Missoula City-County Health Department – Missoula
Governor's Office - Helena
FERC - Portland Regional Office
National Weather Service - Missoula

C. Site Specific Concerns

The core site-specific concern for the Milltown Development involves Superfund – related issues and potential consequences of storing metals impacted sediments in the Milltown reservoir. An estimated 6.6 million cubic yards of sediments are stored upstream of the Milltown dam in the Milltown reservoir. The sediments are impacted by heavy metals including arsenic, copper, and zinc from historic mining and smelting operations in the Butte and Anaconda areas. Exhaustive Superfund investigations have been conducted for over fifteen years. In December of 2004, EPA released their Record of Decision (ROD) for the Milltown Reservoir Superfund Site (MRSS). EPA's proposed remedy includes removing a portion of Milltown Dam. NorthWestern supports the ROD and, subject to a fair and equitable allocation of the remedy implementation costs, will voluntarily agree to surrender the FERC operating license. Currently EPA, Atlantic Richfield (responsible party), NorthWestern and others continue discussions regarding finalizing a Consent Decree.

There have been two recent changes in the hazard potential classification for the Milltown Development. By May 7, 1999 letter, FERC revised the hazard potential classification from low to significant due to the potential for risk to the downstream population and potential environmental damage from the release of arsenic and metals impacted sediments from the Milltown reservoir. By September 12, 2000 letter, FERC revised the hazard potential classification from significant to high due to the potential for loss of life in homes in some downstream locations should the dam breach during some flood loadings based on the February 2000 Dambreak Analysis for 40% of PMF and PMF.

Because of the change in hazard potential classification, FERC requested that NWE re-evaluate the stability of the project structures for flows up to the probable maximum flood (PMF). NWE submitted a hydrologic review and flood load case stability analyses report to FERC in December 1999. Results of the evaluation indicated that all sections of the dam would be stable under flood conditions up to and including the PMF; however, because of overtopping predicted to occur during the largest theoretical flood, excessive erosion of the right abutment of the dam might occur. NWE submitted an overtopping evaluation report to FERC in May 2000. Following its review, FERC directed NWE to re-evaluate the PMF using the latest hydrometeorological report (HMR) and submit a plan and schedule to mitigate the overtopping erosion potential for the right abutment.

NWE submitted a new PMF evaluation report to FERC in August 2001. FERC approved the new PMF evaluation report in March 2002. As previously discussed in Section II, due to the ROD for the MRSS and the likelihood that Milltown Dam will be removed within the next 10 years, FERC has approved a delay to the design and construction of a remedy for the right abutment.

D. Documentation

This section is provided so that documentation of consultations and correspondence related to this EAP, including letters, agreements, etc., may be inserted and kept within the plan.

Revised 1/05

Verification

STATE OF MONTANA)
) ss.
County of Silver Bow)

The undersigned, being duly sworn, states that he/she has read the following document and knows the contents of it, and that all of the statements contained in this document are true and correct, to the best of his/her knowledge and belief.

William W. Thompson, PE
Senior Engineer
NorthWestern Energy

SUBSCRIBED AND SWORN to before me this 12th day of January, 2004.

Nedra Chase
Notary Public for the State of Montana
Residing at: Butte MT
My Commission Expires: Sept 25, 2004

(Notary Seal)

E. Agency Approval of the EAP

It is necessary that plan holders involved in emergency response acknowledge their roles and responsibilities in the Milltown EAP. Approval forms have been mailed to the emergency response agencies listed in Section VIII.B.4. Signed copies of these forms are kept on file at NorthWestern Energy's office in Butte, Montana. Copies are also sent to the Federal Energy Regulatory Commission (FERC). New forms are mailed to the emergency response agencies only when the entire Milltown EAP is revised (at least once every five years) or when the agencies determine that changes should be made in their evacuation and/or emergency response designations.

I, ______________________________ (name) __________________ (title) ________________________ (agency) approve of CFB's Milltown Emergency Action Plan and of my responsibility set forth in the EAP.

____
Signature
____

F. Standard Operating Procedure for Significant Ice Jams and Large Ice Floes

1. Introduction and Purpose

Occasionally, an unusual combination of meteorological and hydrological conditions may result in a significant ice jam and/or ice floe upstream of the Milltown Project and create difficult plant operating conditions. The purpose of this document is to describe the meteorological and hydrological conditions that may lead to a significant ice jam and/or ice floe and to provide, to the extent possible, a standard procedure for operating the Milltown Project during such an event.

This document shall be included in the plant operational procedures manual and as an appendix in the Milltown Emergency Action Plan (EAP).

2. Background

This section provides a brief description of the incident that led to the development of the standard operating procedures for significant ice jam/ice floe events. This brief incident description is included to provide plant personnel with the background information regarding the incident that served as the basis for the operating procedures described below. Even though each situation/event is different, knowledge of past events is integral to successfully responding to future events. Note the owner of the Milltown Project at the time of the incident described below was The Montana Power Company (MPC).

In late January and early February 1996, an unusual combination of weather conditions resulted in a significant ice floe and ice jam event upstream of the Milltown Project. Several days of continual sub-zero temperatures caused thick ice to form in the Clark Fork and Blackfoot Rivers. The sub-zero temperatures were followed by a period of rapid warming and significant rainfall resulting in ice breakup and the formation of a significant ice jam/ice floe in the Blackfoot River that approached the Milltown Reservoir. The Missoula County Office of Disaster and Emergency Services (DES) reported that the ice jam/ice floe traveled down the Blackfoot River at velocities of up to 10 miles per hour and measured approximately 10 feet high, 40 feet wide, and 5 miles long. MPC was in close communication with DES throughout the event. When the DES reported the ice jam/ice floe was just three miles upstream of the dam and moving fast with an estimated arrival time at the dam of 22.5 minutes, MPC, in coordination with appropriate agencies, tripped intermediate stanchions and lowered the reservoir level to crest in preparation to pass maximum flows and help ensure the safety of the dam. Soon after the stanchions were tripped, the ice floe stopped approximately one mile above the dam near the Stimson Lumber Mill.

Following the event described above, FERC requested that MPC assess the potential for damage to the dam during ice jam/ice floe events on the Clark Fork and Blackfoot Rivers. MPC contracted Washington Infrastructure Services, Inc. (WISI) who prepared an ice jam/ice floe evaluation report. MPC submitted the WISI "Ice Jam Evaluation Report" (December 2000) to FERC in December 2000. WISI concluded that the panel gate spillway, radial gate and divider block sections of the dam would be stable under ice impact loading. FERC concurred with the report findings. In particular, regarding dam safety, FERC considered MPC's response to this unusual event a prudent operational procedure.

The response activities implemented by MPC in February of 1996 and the procedures outlined in MPC's "Milltown High Water '97 Information and Resource Guide" (Resource

Guide) served as the basis for the standard operating procedures described below. The Resource Guide was developed in conjunction with local, state and federal agencies.

3. Meteorological and Hydrological (Weather) Conditions

In 1998, ENSR prepared a report entitled "Analysis of Meteorological and Hydrological Conditions Contributing to Ice Formation and Breakup on the Clark Fork River in January and February 1996." ENSR concluded that the 1996 event was rare from both a meteorological and hydrological perspective. ENSR estimated a 100-year recurrence interval for this type of significant ice jam/ice floe event and a 10-year recurrence interval for ice jam events of lesser magnitude.

Although an ice jam/floe event of the significance experienced in 1996 is not common, it is important that plant personnel be aware of, and review, the combination of weather conditions that may precede a significant ice jam and/or ice floe event. The sequence of weather-related conditions preceding a major ice jam and/or ice floe event takes days or weeks to develop which allows ample warning time in order to prepare to implement the standard operational procedures described below.

Weather conditions that may precede a significant ice jam and/or ice floe event include:

- Above-normal precipitation resulting in above-normal snow pack in the Clark Fork River watershed;
- Above-normal seasonal river flows;
- Several days of freezing temperatures resulting in thick ice formation in the river channels;
- Reduced stream flows due to ice formation in the river channels; and,
- Rapid warming trend possibly combined with rainfall resulting in ice breakup and movement.

4. Situation Awareness and Notification Procedures

a. General Awareness

Monitor current weather conditions and forecasts during the appropriate time of the year when there is a potential for an ice jam and/or ice floe. Be especially aware during extended periods of freezing weather when thick ice is forming above the dam. Check weather forecasts frequently for predictions of unusually warm weather that would result in rapid breakup and movement of the ice. Monitoring weather conditions ensures ample preparation time.

Be generally aware of the conditions that influence the movement of an ice jam and/or ice floe. These include the configuration of the Clark Fork and Blackfoot Rivers, the hydraulic capacity of the project, the river flow and associated velocity, and other site constraints that limit the size of the potential ice floes such as topographic constrictions.

Large ice floes moving down the Blackfoot River must pass a sharp bend in the river just upstream of Bonner and a total of five highway and railroad bridges before entering the reservoir. The river channel configuration and bridges increase the likelihood that large ice floes will be broken into smaller sections before entering the reservoir. For reference, there is no record of a significant ice jam/ice floe ever passing the location of the Bonner Dam, which is approximately 1 mile upstream of the Milltown Dam near the Stimson Lumber Mill. Note the reference to the Bonner Dam is only intended as a river landmark and it is not intended to imply that the Bonner Dam in any way slows the movement of major ice floes.

The Clark Fork River broadens as it approaches the Milltown Dam with wide over bank areas at or near the reservoir high water level. This means the pressure head build-up of the water behind an ice floe (i.e., the "driving" force) will become less as the floe reaches the upstream end of the reservoir and the water driving the floe can pass around the floe.

Refer to the WISI "Ice Jam Evaluation Report" (December 2000) mentioned above for a more complete discussion.

b. Notification Procedures

1. If there is an indication that a significant ice jam and/or ice floe is developing, contact Butte and Missoula Division NorthWestern Energy (NWE) supervisory staff and inform them of the situation. Supervisory staff will assist in monitoring the situation and provide agency communication support by establishing an Emergency Operating Center. If necessary, supervisory staff will also contract with an environmental consultant to collect water quality samples during the event. Water quality sampling activities will be coordinated with the EPA.

2. If a significant ice jam and/or ice floe is, or appears to be, imminent:

   a. Implement the Non-Failure Flood Warning Flowchart in the Milltown Development Emergency Action Plan (EAP).

   b. Request immediate additional personnel from Missoula Division to assist with pulling spillway panels and breaking ice.

   c. Notify the Missoula County Office of Emergency Services (OES) at 523-4758.

   d. Contact the National Weather Service at (800) 676-6975 (24-hour) or (406) 329-4840 (local) and inform them of the situation and request current weather information. Check back frequently for updated information.

   e. Notify NWE Corporate Communications (Claudia Rapkoch) at (406) 497-2841.

   f. Notify the Federal Energy Regulatory Commission – Portland Regional Office (FERC-PRO).

DEPUTY REGIONAL ENGINEER		***REGIONAL ENGINEER***
PAT REGAN		***HARRY HALL***
OFFICE: (503) 552-2741	OR	OFFICE: (503) 552-2700
HOME: (503) 534-2621		HOME: (503) 636-1111
CELL: (503) 706-8733		CELL: (503) 706-8842

   g. Notify Russ Forba, USEPA at (406) 457-5042.

5. Plant Operational Procedures – Imminent Significant Ice Jam and/or Ice Floe

a. Employee and public safety is the number one priority throughout all operations. Personal flotation devices shall be worn as established by guidance provided by the Safety, Health & Environmental Services Department.

b. Accurately record all events and actions.

c. The radial gate can be used to pass the majority of increased flow, ice and debris. Make sure the radial gate is fully operational. Check for ice build-up around the edges and cables. If necessary, break the ice to make sure the gate is operational. The radial gate has a hydraulic capacity of 8,900 cfs at the normal operating pond elevation of 3259 feet and 10,680 cfs at a pond elevation of 3264 feet.

d. Lower the pond to minimum operating elevation 3256 feet. The following license compliance conditions apply to drawing down the Milltown Reservoir. However, temporary modifications to the following conditions can occur during emergency situations (beyond CFB's control) or for short periods upon mutual agreement between CFB and the Montana Department of Environmental Quality.

e. If the reservoir elevation is between 3,260 and 3,256, the reservoir can only be drafted at a rate of 1 foot per day.

f. If the reservoir elevation is less than 3,256, the reservoir can only be drafted at a rate of ½ foot per day.

g. Initiate the necessary steps to remove the spillway trash boom as soon as possible. Removing the trash boom requires heavy equipment. Contact Triple Tree, Inc. at 258-6213 or 258-6273 and request immediate assistance. For reference, during the 1996 ice floe event, trash boom removal required two D9 bulldozers and auxiliary lighting.

h. As flows approach approximately 50-75% of the hydraulic capacity of the radial gate (about 5000-8000 cfs), begin removing spillway slide panels to pass higher flows. It may be necessary to break ice around the panels before they can be removed. In order to draw ice and debris toward the radial gate, pull panels nearest the radial gate first. Maintain sufficient flow through the radial gate to divert trash through the gate. Move removed panels, except for one bay, to the far-left side of the spillway and remove them from the dam with a line truck or crane.

i. Generate power as long as practical but take the plant off-line if debris and ice block the intakes to the units or if trash and a high tailrace become difficult to manage.

j. If all the spillway slide panels have been removed and it is still difficult to pass ice or, if a large ice floe is approaching the dam, begin tripping intermediate stanchions if it is absolutely necessary. Tripping intermediate stanchions will allow larger pieces of ice to pass without impacting the spillway bridge supports and will also help to ground large ice floes and prevent impact with facility structures.

k. Begin tripping intermediate stanchions on the 25-foot bay next to the radial gate and work toward the left end of the spillway. [Note: To ensure project safety, this procedure has been intentionally deleted from this copy of the EAP.]

Note: To ensure project safety, this figure has been intentionally deleted from this copy of the Emergency Action Plan.

Intermediate Stanchion

6. Post Event Tasks

a. As soon as possible following the event, complete the record of events and actions.

b. Send the event record to all agencies involved in the event.

c. Conduct an event analysis meeting. Discuss the effectiveness of the procedures and any problems and/or improvements.

d. If problems and/or improvements are identified during the event analysis meeting, edit the procedures and re-issue edited material.

e. Conduct an inspection of plant structures. If necessary, schedule an inspection by a qualified professional engineer.

f. List all necessary repairs identified during the inspection including required materials.

g. Schedule and complete necessary repairs.

7. Training

Plant personnel shall review the procedures described in this document annually in conjunction with EAP training. The procedures will also be reviewed after implementation in order to analyze their effectiveness and to make any necessary changes or improvements.

APPENDIX D

Remedial Action Work Plan

Final

REMEDIAL ACTION WORK PLAN
STAGE 1A RESERVOIR DRAWDOWN AND SCOUR MITIGATION

Milltown Reservoir Sediments Site

Prepared by:

ENVIROCON

May 25, 2006

TABLE OF CONTENTS

List of Acronyms

BMPs	Best Management Practices
CFBLLC	Clark Fork and Blackfoot LLC
CFR	Clark Fork River
DFDR	Draft Final Design Report
EPA	U.S. Environmental Protection Agency
MRSOU	Milltown Reservoir Sediments Operable Unit
PDR	Preliminary Design Report
RA	Remedial Action
RAMP	Remedial Action Monitoring Plan
RAWP	Remedial Action Work Plan
RD	Remedial Design
SAA	Sediment Accumulation Area
State	State of Montana
USGS	United States Geological Survey

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) has been developed to detail the Remedial Action (RA) work to be performed during Stage 1A Reservoir Drawdown and Scour Mitigation for the Milltown Reservoir Sediments Operable Unit (MRSOU) of the Milltown Reservoir/Clark Fork River (CFR) Superfund Site.

1.1 Remedial Action Work Plan Purpose and Scope

The purpose of this RAWP is to communicate the approach for the implementation (i.e. RA) of the remedial design (RD) contained in the "Stage 1A Reservoir Drawdown and Scour Mitigation Draft Final Design Report (DFDR)" (Envirocon, 2006). Because Stage 1A activities are limited to a fully reversible drawdown of the Milltown Reservoir that require no alterations to the Milltown Dam, this RAWP is similarly limited in scope and detail. The scope of this RAWP includes discussion of the Milltown Dam operating procedures required to achieve the 8 to 10 feet of drawdown designed for Stage 1A activities.

2.0 REMEDIAL ACTION

The following outlines critical components of the RA for Stage 1A activities. Detailed information can be found in the DFDR.

2.1 Milltown Dam Modifications

The following paragraphs describe the Milltown Dam operations required for the Stage 1 drawdown. These activities will be performed by Clark Fork and Blackfoot LLC (CFBLLC). Permanent alterations to the dam structures are not required and will not occur for Stage 1 activities. Figure 3 of the DFDR also provides a conceptual overview of the operation plan for Stage 1 drawdown.

Depending on flow conditions the drawdown will be achieved by removing and replacing panel gates in combination with adjustments to the radial gate opening or it will be achieved by just using the radial gate. CFBLLC will determine how many and which panel gates are removed in combination with opening of the radial gate to achieve and maintain the drawdown. In order to maintain reservoir level control, intermediate panel-gate spillway stanchions, as well as the boat barrier and the panel-gate spillway trashboom, will remain in place during Stage 1 drawdown. The maximum rate of drawdown will be 1 foot/day until elevation 3,258 feet NAVD88 and then 0.5 feet/day below 3,258 NAVD88. The rate and degree of drawdown may be modified in order to mitigate sediment release downstream to protect biological resources and to ensure surface water quality standards are not exceeded.

As previously stated intermediate panel-gate spillway stanchions will be left in place to facilitate replacing panel gates and raising reservoir water elevation if needed as a scour mitigation BMP or as a precautionary measure in case there is a situation, such as an ice floe or trash/debris passage event or a construction problem/delay, that necessitates raising the reservoir elevation. Leaving the intermediate stanchions in place requires that the trashboom also be left in place in order to safely manage trash and debris during the spring 2007 high flow season. In order to safely manage trash and debris, the reservoir elevation will need to be increased back to normal full pool elevation as flows increase in spring 2007 unless prior agreement is reached with the agencies to allow temporary removal of intermediate stanchions from spillway bays during the rising limb of the hydrograph in order to allow trash passage over the panel-gate spillway. Increasing the reservoir elevation back to full pool in the spring of 2007 will occur sometime during the rising limb of the hydrograph with the actual dates dependent on actual flow increases and trash/debris coming from upstream. Following the 2007 peak flow, the reservoir will once again be drawn down as described above. Currently, following the spring 2007 drawdown, it is anticipated that the reservoir should not need to be refilled again.

General maintenance and monitoring of the dam will continue through the Stage 1 drawdown period consistent with applicable sections of 18 CFR Part 12 for a non-power generating facility that will only remain in use temporarily. The general maintenance, monitoring and continued operational requirements for the dam are summarized in Appendix B of the DFDR.

2.2 Site Access and Traffic Control

No actions will be necessary to limit site access or control access. The public will be allowed its normal access to the Site during and after the drawdown until Stage 1B construction activities anticipated to begin in October 2006. Site access and control is detailed in the Site Access and Control Plan submitted with the Stage 1A Preliminary Design Report (PDR).

2.3 Dust Control

No earthwork activities are a part of Stage 1A actions so dust control is likely not necessary. However, the 8 to 10 feet of drawdown will expose unvegetated portions of Sediment Accumulated Area (SAA) I sediments. Past drawdowns have not resulted in a blowing dust problem from SAA I therefore dust is not expected to be a problem during the permanent drawdown. If the SAA I sediments become a source of visible, blowing dust after they have dried out, Envirocon will take the necessary actions to prevent dust generation. These actions could include wetting with water and a suitable additive such a magnesium chloride, revegetation, or capping the exposed areas with earthen materials or a geofabric.

3.0 RA OPERATION AND MAINTENANCE PLAN

No irreversible modifications to the dam and no earthwork are required for Stage 1A drawdown. The existing operating and maintenance plan of CFBLLC will be followed during Stage 1 drawdown. If dust control measure(s) are required for SAA I, an operation and maintenance plan will be developed and submitted for approval.

4.0 SAMPLING AND ANALYSIS PLAN

The sampling and analysis plan for all RA including Stage 1 drawdown is contained in the Remedial Action Monitoring Plan (RAMP). In addition to the requirements contained in the RAMP, Envirocon will also undertake the following monitoring activities that are specific to Stage 1 drawdown but may continue into Stages 2 and 3 as well.

Envirocon is interested in determining how the CFR water level at Duck Bridge and the dam correlates to the water levels in SAA I sediments and alluvium. To that end, a CFR staff gauge has been installed on the Duck Bridge pier closest to SAA I. The gauge was surveyed and tied into the 1988 United States Geological Survey (USGS) datum. Concurrent with the Stage 1 drawdown the river level at Duck Bridge will be recorded on a frequency to be determined based on site conditions and data needs. Measurement will continue until river level data is no longer needed. Along with the river staff gauge, Envirocon will also measure piezometers in SAA I and along I-90 on a frequency that will provide enough data to produce the river water level – piezometric surface correlation.

5.0 TASK-SPECIFIC SUPPLEMENTS TO THE CONSTRUCTION QUALITY ASSURANCE PLAN

There are no task-specific supplements to the construction quality assurance plan for this RAWP.

6.0 TASK-SPECIFIC SUPPLEMENTS TO THE HEALTH AND SAFETY PLAN

There are no task-specific supplements to the health and safety plan for this RAWP.

7.0 BMPs AND CONTINGENCY PLANS

Three contingency plans have been developed and provided to the agencies under separate cover. A summary of each of the plans is included in Section 3.6 of the DFDR. The three plans address surface water quality, groundwater quality and cleanout of irrigation intakes. The contingency plans include, where appropriate, an analysis of construction BMPs to be employed to address certain environmental situations.

If visible dust becomes a problem from the exposed portions of the reservoir bed, Envirocon will employ BMPs to control the dust as described in Section 2.3.

8.0 REQUIREMENTS FOR RA CERTIFICATION

This section is not applicable to Stage 1 RA.

9.0 PROGRESS REPORTING

Weekly written reports will be submitted to the EPA and State as to the progress of the Stage 1 drawdown. Because of the limited nature of the scope of Stage 1 drawdown related activities periodic, routine, scheduled meetings will not be held during Stage 1A but will be held upon the request of the EPA or State of Montana.

10.0 SCHEDULE

Given the trashboom is to be left in place, initiation of the 2006 drawdown will be delayed until after the period of higher potential for trash coming down from upstream since the management of trash collecting on the boom is not possible under drawdown conditions during peak flow. Generally, the period of greater potential for trash passage is limited to the rising limb of the hydrograph, which typically ends by early June. CFBLLC will utilize information from the National Weather Service's Northwest River Forecast Center to determine when peak flows have been reached and the drawdown can be initiated. CFBLLC will monitor the flows and trash generation and alert the EPA when it determines the drawdown should begin. The Environmental Protection Agency (EPA), in consultation with the State of Montana (State), will approve the beginning of the drawdown prior to CFBLLC beginning its drawdown activities.

11.0 REFERENCES

Envirocon, 2006, “Stage 1A Reservoir Drawdown and Scour Mitigation Draft Final Design Report (DFDR)” prepared by EMC^2 for Envirocon, May.