

# OPERATION AND MAINTENANCE PLAN

## LITTLE SUCTION CREEK DIVERSION

### BLAINE COUNTY, MONTANA

February, 2013

#### General

Operation and maintenance of the Little Suction Creek Diversion is an asset to the success of the Fort Belknap, Lake 17 Dam, and Little Suction Creek Diversion Project. The purpose of the diversion is to route the 47 square mile Little Suction Creek drainage into the headwaters of Duck Creek for additional water supply to Lake 17 reservoir. Little Suction Creek Diversion has an estimated design life of 50 years, which can be assured and/or increased by developing and carrying out a good operation and maintenance program. The diversion structure includes the following components:

- a. Diversion Dam
- b. Diversion Channel
- c. Auxiliary Spillway
- d. Road Crossing
- e. Grade Control Structures

Periodic inspections must be made to assure that the system is in good condition and operating correctly. As a minimum the following are required.

- a. A formal inspection of the entire system at least once annually in the fall and after any large storm event.
- b. Periodic inspections should be made during the summer season while the system is operating. This would generally be a part of the weekly management and operation of the system

#### Operation of the Little Suction Creek Diversion

The diversion has washed out several times in years past. The new diversion is repaired in the wash out areas and equipped with a sand chimney filter to prevent internal erosion. Five drains are included to allow water to be released on the downstream side. The drains are protected with a gravel drainfill, and then covered with rock riprap. Drainage is automatic based on the amount of water collected in the chimney filter.

During the 25 year event approximately 1575 cfs will be diverted into the diversion channel and routed to Lake 17. At this point there will be no flow in the auxiliary spillway. The 50-year event will divert 2018 cfs to Lake 17 while the auxiliary spillway will pass approximately 70 cfs. And the 100-year event will divert 2370 cfs to Lake 17 while the auxiliary spillway will pass 260 cfs. Diversion is automatic based on the amount of flow in Little Suction Creek.

An auxiliary spillway is constructed to allow flows in excess of the approximate 50 year event to continue flowing down Little Suction Creek. The flow is controlled by the elevation of the spillway channel. The spillway consists of one foot of over excavation and soil replacement with compaction and final seeding for stability. The right side and a portion of the left side of the spillway will include a small dike.

A road crossing, known as the Stinson Road Crossing will be constructed north of the diversion dam in order to allow access to agricultural land east of the diversion channel. The capacity of the culverts in the road crossing matches the capacity of the low flow portion of the diversion channel. Three 30-inch diameter HDPE pipes are installed. These pipes will be resistant to corrosion and are protected with rock riprap.

Below the Stinson Road Crossing, are five grade control structures. These rock riprap structures are designed to limit the advance of head cut erosion that could develop downstream or between the structures. If a head cut develops downstream, it will progress upstream to one of the grade control structures. When it reaches one of the structures, some of the rock will tumble into the downstream section increasing the stability at that point.

#### Maintenance of the Diversion Dam

1. The diversion dam has a sand chimney filter that is capable of collecting water that may seep from the upstream side. Once collected the water can outlet at one of five drains along the toe. The outlets are protected with a rock riprap covering. Periodic inspection and replacement of rock that has been lost will be required. Channel development away from the drains should be repaired and reseeded.
2. Periodic inspections and repair of local erosion on the slopes or damage to vegetation are required.
3. Eradicate or otherwise remove all rodents and burrowing animals. Immediately repair any damage caused by their activity.
4. The seeded areas must be protected from grazing
5. Careful observations need to be made to assure there are no areas on the downstream side of the embankment with uncontrolled seepage. If any are observed, determine the cause and make plans for repairs.
6. Prevent the growth of any woody vegetation, especially trees that can grow large enough that when they fall the slope is damaged when roots pull out soil and riprap.
7. Clean any debris that may accumulate within the diversion channel.

Maintenance of the Diversion Channel.

1. Periodic inspections and repair of local erosion or sloughing within the diversion channel is required.
2. Remove any debris that has collected within the channel that may impede the flow.

Maintenance of the Auxiliary Spillway.

1. Periodic inspections and repair of local erosion or sloughing within the spillway, on the slopes, or damage to vegetation will be required.
2. Protect seeded areas from grazing.

Maintenance of the Road Crossing and Grade Control Structures.

1. Periodic inspections and repair of the road crossing and the grade control structures will be required.
2. Repair active areas of erosion in the immediate vicinity of riprap sections below the road crossing.
3. The grade control sections are designed to stop head cut migration. Erosion that is excessive or is starting to go around the rock structures will need to be repaired.
4. Seeding eroded areas will reduce further erosion.

**Fort Belknap Approval:**

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