

MEMORANDUM FOR THE RECORD

SUBJECT: *15JDA03 MFR* – Failed operating shaft’s connection with the orifice plate at MU 4C STS – Gate well caused juvenile fish mortalities and migration delay.

PROBLEM:

On 3 June 2015 an electrician, responding to a TR regarding cycling issues at the MU 4C orifice, reported dead juvenile salmonids floating on the surface of the gatewell.

At 0842 JDA Operations discovered the MU 4C gatewell orifice valve plate had separated from the shaft. This prevented fish from exiting the gatewell into the JBS. MU4 was immediately taken OOS and an underwater camera inspection confirmed that orifice 4C was closed in spite of a surface indication to the contrary. JDA orifices are 15 feet below the water surface and therefore invisible to a direct visual inspection. If the shaft disconnects from the orifice plate there is a false indication that it is open while in reality it is closed.

JDA Project dipped the MU4 gatewells and released a few hundred juvenile salmonids, in good condition, into the forebay. Bulkheads are installed and repairs are expected to be complete by COB on 4 June 2015.

Mortalities have been relatively low due to quick detection of this failure, however, 10 dead juveniles were recovered and are reported below.

- A. Species – 5 Clipped Yearling Steelhead, 2 Unclipped Yearling Chinook, 3 Clipped Sub-Yearling Chinook
- B. Origin – Clipped Salmonids are most likely hatchery, the unclipped Chinook are thought to be “wild”.
- C. Length – Approximately 10-35 cm
- D. Marks and tags – None observed
- E. Marks and Injuries found on carcass – None
- F. Cause and Time of Death – Possible excessive residence time/ trapped in operating gate well with orifice gate closed (estimated time of death - within 3 days.)
- G. Future and Preventative Measures – Repair the failed orifice gate connection at MU4 C and return MU4 to service ASAP. Continue to observe gatewells, and note mortalities on a daily basis. In long term, design and install a true indication of the orifice position to eliminate a potential for the current false interpretation.



Sincerely,
JDA Fisheries

Comments:

JDA Project – MU4 returned to service (RTS) at 1700 on 4 June.

NOAA Fisheries - -----Original Message-----

From: Gary Fredricks - NOAA Federal [mailto:gary.fredricks@noaa.gov]

Sent: Friday, June 05, 2015 7:17 AM

To: Zyndol, Miroslaw A NWP

Subject: [EXTERNAL] Re: FPOM: official coordination - MFR 15JDA03 MU4 gatwell morts

Miro, We've seen this before. What exactly was the failure here with the shaft-gate connection. Did it just come loose, did something break, nut come off, etc? Just wondering if there is anything we can do to make this connection better since it seems to be a weak link in the system. Do you have any pictures of this linkage? Thanks, Gary

JDA Fisheries – Gary,

I was the two bolts attaching the shaft to the plate, which sheared off and had to be reinstalled.

The current JD design, with the submerged/invisible orifices at 14 feet depth in the gatwells, makes it tricky to detect when the shaft disconnects from the gate.

The gatwells with a problem orifice are required to be dewatered, which is a long and involved process of fixing it as well.

I will send you the blueprint showing this connection later today as I am still gathering information/facts from the Maintenance Department.

Thanks.

MZ

11 June 2015 FPOM - Fredricks noted that this isn't the first time that this has happened. Zyndol said the bolts are shearing. Monthly inspections do not look at the connections. Changes are proposed so the position of the plate can be determined during the inspections. Zyndol said these 48 orifice plates were installed in 1984 and only two have broke in the last four years (2011, 2015). JDA is also discussing complete replacement of the equipment. Zyndol said the method for maintaining these is to dewater the unit since the orifice plates are 15' underwater. There is no way to manually open the plates if the connectors break. Setter said there are now silicone bolts that NWW is using because of corroding issues. This will be an update on the July agenda.