Little Goose Dam
Full Flow PIT-Tag Detection System
Project Summary

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US Army Corps of Engineers,
National Marine Fisheries Service,
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PIT Tag Information Systems
Columbia Basin | ptagis.org

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1. INTRODUCTION

1.1 *Background*

In 2006, the design phase of this project was kicked off and was for the most part modeled after the Full Flow PIT installation installed at Lower Monumental Dam during winter and spring of 2006 and 2007. As the Goose Full Flow design progressed and the project started to move towards construction, issues within contracting occurred and the project was put on delay for 1 year. Starting in mid December of 2008, Harcon Inc. was awarded the contract and construction of the new Goose Full Flow PIT-tag detection system began.

1.2 *Purpose of Document*

The purpose of this document is to summarize the installation of the Little Goose Full Flow project from start to finish and to highlight the notable successes and challenges that the installation presented along with the final results and current status.

1.3 *Definitions and Acronyms*

This section provides the definitions of terms and acronyms used in the document.

1.3.1 *Acronyms*

1) PSMFC	Pacific States Marine Fisheries Commission
2) USACE	U.S. Army Corps of Engineers
3) QAR	Quality Assurance Representative
4) BPA	Bonneville Power Administration
5) NMFS	Nation Marine Fisheries Service
6) CLFP	Corrugated Lined Fiberglass Pipe
7) SOW	Statement of Work

1.4 *References*

This section lists reference documents.

- 1) http://php.ptagis.org/wiki/index.php/Little_Goose_Full_Flow_Project

2. PROJECT CONSTRUCTION

The goals and objectives of this project are to ensure that a working and efficient Full Flow PIT-tag detection system is delivered and will provide supplementary and or redundant PIT-tag detections on the transport flume at Little Goose Dam.

Once the project gained momentum, it was decided that the 4 PIT-tag shield boxes, CLFP and underlying support structure would be prefabricated and assembled into 2 sections with each section containing 2 of the 4 shield boxes. These assemblies would then be lifted into their final location within the transport flume.

2.1 *PIT-Shields/CLFP/Support Assembly*

While the assemblies were still at ground level, and at the time that the antenna shield boxes were being mounted to the supporting structure, it was suggested that the electrical isolation that

separates these two components be checked. The specifications called for “infinite” resistance between the two components. During the quality assurance check, it was found that this requirement was not met and further action would have to be taken to correct the situation.

Due to good detective work by the on-site QARs, it was found that the insulating material in the specifications document called out an Ethylene Propylene Diene M-class Rubber bearing pad. The QAR then found through research that the material contained carbon and would not be a suitable insulator to meet the spec. At this time, the USACE engineering department proposed using Ultra High Molecular Weight Polyethylene, which proved to be a suitable insulating barrier.

During the same inspection period, the QARs also found that the shield boxes had some intermittent welds that were supposed to be continuous and this was corrected.

2.2 *Electrical*

Some discussion was had with the isolation transformer and electrical schema. At first glance, it appeared that the electrical power supplying the PIT-tag transceivers was not completely isolated from plant power. The concern was that if the PIT-tag system power was not adequately isolated from plant power as specified in the plans, that the PIT-tag system could be impacted by unknown sources of interference. PTAGIS personnel then consulted with the USACE district electrical engineers and it was agreed that the electrical scheme would be adequate to preserve isolation along with NEC code requirements for safety purposes.

The district engineers were of great help in explaining the rational behind the wiring scheme and offered to assist if necessary in reworking an acceptable alternative if problems existed after the installation was complete. It was found that no rework of the electrical was required.

2.2.1 *Grounding*

The isolated grounding grid for the PIT-tag shield boxes had no issues. The contractor actually installed (4) 10 ft rods rather the (3) called out for in the specs. This was done knowing that the resistance criteria for this system were 5 ohms or less. No rework to this system was required.

2.3 *Fiber Optic Communications.*

Initially, the fiber optic terminations at the transceiver enclosures were incorrectly installed by the contractors. The issue was that patch panel was fastened to the transceiver enclosure back panel when the spec called for a fiber optic fan-out kit. PSMFC worked with the QARs and found the actual submittal that specified the correct termination requirement. The QARs then passed this on to the contractor and the issue was resolved with little to no delay in the installation.

2.4 *Miscellaneous*

Spray on insulation inside shield enclosures:

Initially after the insulation was sprayed, it was noticed that on two of the enclosures, the insulation did not adhere to the shield boxes. This was brought to the attention of the QARs and the problem was corrected by the contractor with little interference to the installation schedule.

Shield door latches:

The latches were very difficult to operate, even admitted by the contractor that installed them. Harcon Inc. made a great effort in realigning and adjusted the latches. The latches now work very well and easily opened and closed.

Shield to CLFP end gaps:

Initially the gaps were very excessive; some measured a 3 inch gap in one area and ½ inch in other areas. This was corrected to 1 inch symmetrically around the entire circumference of the pipe when the final elevation was set. The gap was then sealed with a backing rod and then sealed permanently with silicone adhesive.

3. PIT-TAG ANTENNA INSTALLATION AND RESULTS

The over all installation of the PIT-tag antennas was uneventful. The entire installation of the PIT-tag electronics was installed and tested in less than 2 weeks time. As suspected, we observed the same type of field propagation phenomenon as seen at the Lower Monumental installation. At that time, PSMFC installed ½ rigid conduits between transceiver enclosures 1 and 2, then 3 and 4. This was done to incorporate a synchronization cable to each of the transceivers in order to avoid the beat frequency observed. By doing this, the noise levels in each unit were reduced to levels that allow the system to operate at detection efficiencies that meet or exceed PSMFC criteria.

Although PSMFC has found an effective solution to the phenomenon that the CLFP poses, we are still investigating additional electronic modifications to the system with a goal of eliminating the need for sync cables.

4. SUMMARY

In summary, the project was an overall success in that it was finished on time for the scheduled water-up of the transport flume and that the PIT-tag system was actively detecting PIT-tags at that time. Although the project had typical issues, all hurdles were quickly overcome. This was due to the diligence and teamwork of the USACE QARs led by John Berglin, Little Goose project staff and Harcon Inc. The project met or exceeded all PSMFC goals and timelines.

The project was also very well managed and engineered. A major part of the success was due to the excellent design work of the Walla Walla district design team led by Stan Heller. His staff was always open to PSMFC design comments, was willing to work to resolve issues as they arose, and provided outstanding leadership.

Another key component was the consistent weekly construction meetings. These meetings provided a well-defined agenda that addressed and resolved issues of concern in a very efficient manner.

The USACE engineering team and on-site project management team should be highly commended for the success of this project.