

Draft Fish Health Management Plan for the Pelton Round Butte Project

PELTON ROUND BUTTE HYDROELECTRIC PROJECT

FERC No. 2030

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I. INTRODUCTION

Managing the health of fish in a watershed requires a program to determine health status and a system of recording mortality and disease. This allows fisheries managers to monitor trends and detect changes in disease status of fish that, in turn, may enable early intervention to minimize health impacts. A cornerstone of fish health management is the reduction or elimination of risk factors that could make fish more susceptible to disease. By identifying these risk factors, fisheries managers can take action before negative health effects occur. Factors include handling, movement, feeding, anesthesia, predator interactions, water quality management, vaccination, and broodstock management. Spread of disease-causing agents and disease impacts can be minimized within and among groups of fish by managing disease outbreaks, careful handling of dead fish, good hygiene and disinfection practices, and limiting fish movements.

Drugs and chemicals used for disease control must be properly administered and monitored to protect the public, environment and fish. This requires adequate diagnostic support, and safe storage, use and handling. To ensure that fish culture facility fisheries managers are employing good fish health practices, a written, current Fish Health Management Plan is required that outlines the actions or procedures that fisheries managers must use to meet fish health requirements. This document describes a Fish Health Management Plan for the Pelton Round Butte Hydroelectric Project.

A. Fish Health Monitoring of Fish Passage at Pelton Round Butte Hydroelectric Project

If fish passage (reintroduction) is attempted, a fish health specialist and some assistance (EBA) will be required to maintain a fish health monitoring project for adult fish passed, outmigrants, and resident fish during the interim phase.

- *Pathology*: involvement in planning, monitoring, evaluation and review.
- *Personnel*: Fish health specialist and some assistance.
- *Length of study*: During Interim Phase to assess the fish health issues, depending on how the process proceeds (adaptive management). Anticipated for five years with review at the end of this time.

These requirements are based on current knowledge developed during the experimental phase of the fish passage studies, as follows:

1. Interim Phase of Fish Passage

- Passage will require monitoring of viruses above the project.
- Passage will require monitoring of the passed fish prior to transport and post spawning.
- The risk posed by this IHN virus Type 2 strain to resident and anadromous fish will continue to be evaluated.
 - Passage may require vaccination of fish prior to transport above the projects. (If and when vaccines become available to IHN virus.)
- The risk to native stocks from *Myxobolus cerebralis* will require continued evaluation.
 - Passage will require monitoring of stocks above and below at a statistically valid level to determine the prevalence of this fish pathogen (*M. cerebralis*) within the system.
 - Losses within the system will need to be analyzed to determine causes.
- Other significant diseases that have caused losses among fish in the PRB Project areas and are of concern are furunculosis, bacterial kidney disease (BKD), and ceratomyxosis.
 - Vaccination for furunculosis is possible.
 - Passage may require antibiotic treatment to reduce losses from bacterial pathogens (BKD, furunculosis).

2. Final Phase of Fish Passage

Fish health monitoring will be required during the remainder of the licensing period (Final Phase of Fish Passage) at some level to be determined from the studies during this interim phase of fish passage.

Monitoring of fish health, selection of fish to transport, holding, treatment with antibiotics, chemicals and/or vaccines are issues that need to be addressed by a fish health specialist. The success of fish passage and natural reproduction will in part require good fish health procedures. The responsibility for this effort must come from the licensees, as this work is beyond the scope of the routine monitoring done by ODFW Fish Pathology. Currently PGE is responsible for a fish health specialist, fish health services and supplies associated with the production of hatchery fish at Round Butte Hatchery. We do not anticipate a difference in commitment from the licensees to fish health with fish passage. Additional experimental fish health work would be outside the scope of the licensees' responsibility unless directly related to the fish passage.

3. Guidelines and Procedures for Monitoring

Fish disease control guidelines and surveillance procedures applicable to rearing, transport and release of fish are found in Oregon Revised Statutes, the Integrated Hatchery Operation Team Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995), American Fisheries Society Fish Health Blue Book (Procedures for the Detection and Identification of Certain Fish Pathogens; 1994 and the Pacific Northwest Fish Health Protection Committee Model Comprehensive Fish Health Protection Program (September 1989).

II. GOALS OF A FISH HEALTH MANAGEMENT PLAN

A Fish Health Management Plan aims to:

1. prevent the introduction of exotic diseases or disease causing agents;
2. reduce the occurrence of disease in fish held in the holding facility;
3. minimize the spread of disease to stocks within and outside the facility;
4. maintain an environment that promotes the health and productivity of fish and reduces the susceptibility of fish to disease;
5. protect public health and minimize disease risks to cultured and wild fish through judicious use of drugs and chemicals; and
6. provide culturists, managers and regulators with appropriate information from which rational, scientifically based fish health management decisions can be made.

III. DEFINITIONS

The definitions provided below reflect how the following terms are used in this document.

Cultured fish: Fish that have spent part or all of their life cycle within a fish culture facility.

Disease: Problems caused by infectious agents, such as parasites or pests, and by other conditions that impair the performance of the body or one of its parts.

Disease screening: Testing for evidence of early signs of disease or factors that could predispose a fish or population to disease.

Disinfection: Actions undertaken to destroy infectious and parasitic disease-causing agents.

Drug: Any substance or mixture of substances manufactured, sold or represented for use in (a) the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical

state, or its symptoms (b) restoring, correcting or modifying organic functions.

Epidemiologically-linked: Epidemiological links result when groups of animals share risk factors for the disease of concern.

Fish Culture Facility: A location or facility that alters the normal movements, feeding and ecology of fish in order to affect their productivity in terms of reproductive success, growth or marketable fish products for commercial and/or stock enhancement purposes. In addition, a fish culture facility holds fish for a period of time.

Fish Health Management Plan: A written document that outlines the actions or procedures that will be used to meet the goals and requirements of these guidelines.

Fish Health Staff: ODFW agency staff assigned the responsibility for fish health monitoring and management at a fish culture facility.

Holding Unit: The basic, physical structures containing fish. These include netpens, tanks, troughs, spawning channels, brood lakes, fish traps, fish ladders and incubation units.

Fisheries Managers: A collective term used to describe those responsible for the management, health, and welfare of fish at culture facilities and in the environment.

Outbreak (Epizootic): An unexpected occurrence of mortality or disease. This can mean (1) disease occurring outside of the typical geographic or host range, (2) a previously unrecognized problem, (3) disease occurring at a rate higher than expected.

Qualified Fish Health Professional: A term used to describe those persons with adequate post-secondary training and experience in the recognition of diseases in fish. They are qualified to diagnose and prescribe treatment of fish diseases. Fish health specialists therefore serve as qualified fish health professionals.

Treatment: Management actions, drugs, chemicals or biological agents given or applied to fish, to prevent or mitigate the impacts of disease on a fish or group of fish.

Vaccine: A preparation or adjuvanted preparation of killed microorganisms; living attenuated, fully virulent, or related nonvirulent microorganisms; or parts of micro- or macroorganisms that are administered to produce or increase immunity to a particular disease.

IV. REQUIRED ELEMENTS OF A FISH HEALTH MANAGEMENT PLAN

A. Characterizing the Health Status of Fish at a Holding Facility

1. Fish Health Records

Facilities must have an information management system that provides managers with timely information to identify and assess changes in fish health to allow them to make fish health management decisions.

For individual groups of fish in the facility, fisheries managers must:

- a) keep up-to-date fish health records including:
 - disease history and management;
 - pattern of morbidity and mortality, sampling and diagnosis of disease;
 - actions taken to prevent, control, and treat disease;
 - records of movements of fish within the facility; and
 - health risk factors specific to the site and/or the affected fish group;
- b) keep records, at a minimum, for the entire time that the fish are being cultured (i.e., until they have been released to the wild or harvested); and
- c) be able to link fish health records to other production records (i.e., feed, environment, transfers).

2. Monitoring Disease and Infection

Fisheries managers must have a plan for routine assessment of fish to determine their disease status and an action plan to prevent the spread of disease that will minimize the impact on fish and other organisms.

Fisheries managers must:

- a) regularly and systematically inspect fish and fish holding units for signs of disease;
- b) increase monitoring efforts for groups of fish showing unusual mortality rates, signs of morbidity, or subjected to stressful events that could predispose them to disease;
- c) routinely evaluate fish health and other production records; and
- d) develop an action plan to prevent, control or treat disease.
- e) Fish Health Monitoring
 - (1) All stocks will be monitored regularly for the presence of fish pathogens and causes

- of fish loss. In cases where pathogens can be identified before large mortalities occur, procedures to reduce or eliminate the pathogen will be put into effect.
- (2) Naturally reared broodstocks and hatchery origin broodstocks will be sampled for disease agents when these fish are used as sources of eggs for reintroduction programs.
 - (3) When fish losses occur, the fish health specialist will be notified. An examination will be conducted as soon as possible and various techniques may be implemented to return the fish to a healthy status.
 - a. Modifications of transport regimes may be instituted.
 - b. Treatment of fish with approved chemicals or drugs
 - c. Where high loss occurs due to untreatable pathogens, fish may be destroyed.
 - (4) Health examinations will be conducted on fish prior to their transfer to other watersheds and before release of the fish.
 - (5) Fish health results of these monitoring examinations shall be recorded on a standard fish health form and incorporated into a fish health database.

B. Identifying and Managing Risks to Fish Health

Risk factors must be identified and managed to minimize their effect on fish health and their role in predisposing fish to disease.

1. Water Quality

Maintaining good water quality is vital to good fish health. Fisheries managers must have a:

- a) regular program for monitoring and recording water quality (i.e., temperature, oxygen, effluent); and
- b) contingency plan to restore water quality.

2. Factors That Predispose Fish to Disease

Certain activities can have a negative impact on fish, the effectiveness of their immune system and their ability to combat infections and disease. Fisheries managers will:

- a) minimize the time fish are exposed to stressful events such as anesthesia/sedation, crowding, and out-of-water events (i.e., handling, counting, grading, tagging, injecting);
- b) minimize predator interactions;
- c) provide fish with suitable rearing conditions and appropriate nutrition; and

- d) ensure equipment and methods used to handle fish will not result in significant injury or predispose fish to disease.

3. Vaccination

Vaccination is not a substitute for other aspects of fish health management, but part of an integrated disease prevention program. Fisheries managers must use:

- a) vaccination procedures that minimize injury, secondary disease or losses to fish; and
- b) vaccination programs based on local disease/infection conditions and information on the safety and efficacy of vaccines.

4. Broodstock Health Management

Broodstock should be transported in a manner that recognizes and manages disease risks specific to this life stage and their progeny. Fisheries managers must:

- a) use a system to identify individual or select groups of brood fish and their respective gametes from other production fish;
- b) address the hygienic, nutritional and handling concerns unique to broodstock; and
- c) use protocols for hygienic handling of broodstock or their gametes to prevent the transmission of disease causing agents to other fish.

C. Reducing Exposure to, or Spread of, Disease Causing Agents

Minimizing the exposure of fish to disease causing agents will reduce the spread of pathogens and disease.

1. Outbreak Investigation and Management

Detecting and managing outbreaks will help reduce the spread of disease or disease causing agents. Fisheries managers must:

- a) have access to the resources and qualified personnel needed to detect and manage a disease outbreak;
- b) develop a rapid response plan to reduce the spread of disease and initiate it when a disease outbreak is detected;
- c) detail all monitoring activities during and after an outbreak to establish the distribution of the disease and monitor the effectiveness of control and treatment measures;

- d) keep details of investigations and verification of all outbreaks (this must be under the supervision of a qualified fish health professional); and
- e) notify responsible parties, including ODFW, in the event of outbreaks in accordance with existing regulations or surveillance agreements.

2. Disease Prevention Methods

- a) Various techniques will be implemented by the Department to prevent serious fish losses and improve fish survival.
 - (1) Avoid disease problems by providing specific pathogen free water supply for fish holding units where feasible
 - (2) When feasible, the use of commercial vaccines to stimulate a protective response against a specific pathogen will be used.
 - (3) Injection of broodstock with antibiotics to reduce loss due to bacterial pathogens and water treatment with chemicals to reduce fungus infections will be performed as necessary.

3. Management of Dead Fish

Fisheries managers must:

- a) regularly remove dead fish from holding units and dispose of the fish in a manner that will not facilitate the spread of disease; and
- b) plan for the removal and disposal of increased levels/numbers of mortalities during unexpected disease outbreaks or loss of fish.
- c) monitor and recover dead fish in the upper watershed where broodstock are released and juveniles develop and rear. Notify the ODFW fish health specialist when these fish are likely to be found and save samples for monitoring as requested by the fish health specialist.
- d) keep records of fish losses and inform the ODFW fish health specialist.

4. Sanitation and Bio-security Procedures

Maintaining a clean, safe work environment reduces the potential for spread and exposure of fish to infectious or parasitic disease causing agents. Fisheries managers must:

- a) reduce the potential movement of infectious or parasitic agents within and between facilities by:
 - using good hygiene and sanitation protocols that manage the movement and disinfection

- of staff, contractors, visitors, vessels or vehicles; and
- routinely cleaning and disinfecting equipment and holding units;
- b) safely handle and dispose of disinfectants (in accordance with occupational safety waste management and pollution regulations).
- c) Sanitation Procedures:
 - (1) Each fish holding area will implement the following sanitation procedures.
 - a. Footbaths containing disinfectant must be present at the facility's entrance and exit.
 - b. Sanitize equipment and rain gear utilized in fish handling, transport and after leaving one area and before using in other units, areas, or buildings.
 - c. Disinfect equipment, including vehicles used to transfer eggs or fish among facilities or areas, before using with any other fish lot or at any other location. Disinfecting and disinfected water will be disposed in areas where the treated water will not enter state waters. (see Appendix below)

5. Release or Escape of Fish

Fisheries managers must:

- a) minimize the risk of escape or release of sick or infectious fish from fish culture facilities; and
- b) consider disease and treatment status when planning deliberate release or relocation of fish stocks.

6. Movement of Fish

Fish Health status must be considered when evaluating the risks of moving fish stocks. Fisheries managers must:

- a) ensure all equipment used to transport fish:
 - safeguards the health of the fish being moved;
 - minimizes the risk factors that may predispose the fish to disease;
 - minimizes transfer of disease causing agents; and
 - reduces the risk of accidental loss of fish and gametes during transport activities;
- b) assess and mitigate the disease risks from cultured fish that are known to be, or are suspected to have, a disease or infection;
- c) assess and mitigate the risks associated with intentional release of fish to the wild;
- d) minimize the transfer of disease agents between stocks within and in the vicinity of the

- holding or trap facilities; and
- e) ensure optimal water quality during transport events.

D. Use of Drugs and Chemicals in Fish Health Management

1. Diagnostic Support

The fish health specialist will ensure that:

- a) reliable diagnoses are obtained; and
- b) prescriptions for treatments can be obtained in an effective manner.

2. Drug, Chemical and Biological Use for Disease Treatment and Prevention

Fisheries managers must:

- a) ensure staff have access to information on the drugs, chemicals and biologics that are used on site;
- b) ensure safe handling and storage of drugs and chemicals;
- c) keep records of the amounts of drugs, chemicals, biologics and medicated feeds purchased or moved into a fish culture facility and/or used during treatment;
- d) ensure groups of fish that are treated can be identified during treatment and subsequent withdrawal times; and
- e) keep records of treatment for the entire time that the fish are being cultured or until they have been released or harvested.

3. Drug and Chemical Use for Prevention and Control of Fish Diseases

- a) During fish health monitoring visits or if fish losses occur, fish health specialists will recommend appropriate drug or chemical treatments and changes in fish culture practices to help maintain fish health and prevent losses.
- b) Treatments will be either prophylactic, preventative measures against future loss, or therapeutic, measures to reduce loss from an ongoing disease outbreak.
- c) Only chemicals that are approved or permitted by the US Food and Drug Administration (FDA), US Environmental Protection Agency and Oregon Department of Environmental Quality (DEQ) will be used for treatment of fish at hatcheries. These chemicals must be:
 - (1) FDA labeled and approved for use on food fish.
 - (2) Allowed by the FDA as an Investigational New Animal Drug.

- (3) Obtained by extra-label prescriptions from veterinarians.
 - (4) Allowed by FDA as low regulatory priority.
 - (5) Chemicals not permitted on food fish but approved through the US Fish and Wildlife Service for fish listed under the federal Endangered Species Act.
- d) All chemical use at hatcheries must follow labeled environmental precautions and meet standards specified by DEQ Waste Discharge permits.

APPENDIX 1: Disinfection of Fish Transport Truck Tanks

The Department of Environmental Quality requires that water containing chlorine (sodium hypochlorite) is not released into streams or lakes of the state. Fish Pathology reviewed our previous recommendations for disinfections procedures and provides the following revisions:

1. Use 10 ppm sodium hypochlorite for a minimum of 10 minutes.

We have reviewed information on what level of chlorine is lethal to fish pathogens and generally bacteria, viruses and parasites should be killed in less than 10 minutes when exposed to 10 ppm chlorine. **A noted exception is the spore of *Myxobolus cerebralis* the agent of whirling disease** that is found in infected fish. Researchers report chlorine levels of 5,000 ppm may be required to kill this spore and that is not practical for use in truck disinfection. Procedures for dealing with this parasite are discussed later in this memo.

Sodium hypochlorite solution is generally available at 5.25% (Chlorox) or recently is sold as a more “concentrated” form of ~6.56%.

For every 100 gallon of water in the tank use:

72 ml of 5.25% sodium hypochlorite
58 ml of 6.56% sodium hypochlorite

Make sure all surfaces in the tank are exposed to the disinfectant for 10 minutes.

2. Hoses used to unload the fish from the tank should also be disinfected at the same time as the tank itself. These hoses should be placed in the tank or in a container containing the 10 ppm sodium hypochlorite and after the 10 minutes they should also be exposed to the neutralizing solution.

3. Areas on the tank or truck that get wet from the water in which the fish are transported should be sprayed with 25 ppm iodophor.

The disinfectant should be maintained on the surface for 10 minutes and allowed dry in the sun if possible. We are not recommending that the underside of the truck or inside of the cab be treated routinely but if gross contamination of these areas occurs disinfection should be done.

4. Neutralize with sodium thiosulfate at a 25 ppm concentration for 10 minutes.

Use the form of sodium thiosulfate that dissolves quickly in water. This is available from the following sources:

- Argent

For every 100 gallons of 10 ppm sodium hypochlorite water add 9.5 g of sodium thiosulfate.

5. Discard the neutralized disinfectant solution from the tanks onto the ground or a pit where it will not drain into the stream. Rinse the tank with water from the new location where fish are to be hauled or use spring or specific pathogen free water if available.

6. Disinfection procedures should be conducted in the following situations:

- a. Before beginning the loading of fish from a different facility, different species at the same hatchery, or if different stocks of the same species having a known occurrence of a pathogen such as bacterial kidney disease or IHN virus.
- b. If adult salmon or brood fish are transported then disinfection should occur before any juvenile fish are transported.
- c. Anytime a group of fish known to be infected with a serious fish pathogen or having recovered from a serious disease is transported before hauling ponds that did not experience that problem.
- d. When lake or stream water has been used for adjusting water temperature.
- e. Disinfection is not necessary between loads of adult fish or brood fish to one or more facility if the loading of water is used at the originating facility each time. Also, when hauling fish of the same species but of different stocks from the same facility if all lots are healthy or have the same disease agents.

7. Procedures to follow to minimize the risk of spreading *M. cerebralis*.

- a. The infective stage of this parasite and infected fish are currently found in the Grande Ronde and Imnaha watersheds of Northeast Oregon and in Clear Creek of the Clackamas River watersheds. Our policy has been to not transport known infected fish from these locations to watersheds where we have not found the infection in wild fish. Since the parasite occurs in anadromous steelhead and salmon in the Snake River basin including Northeast Oregon the potential for this parasite to spread to anywhere in the Columbia River basin and coastal streams exists. The water source to be used for hauling fish should be reviewed at each facility. Update information on the occurrence of the parasite needs to be disseminated.

APPENDIX 2: Regulations/Policies Directly Related to Fish Health Management

Oregon Administrative Rules

OAR635-007-0501

Definitions

As used in this Division and Division 40

(13) "Disease" means problems caused by infectious agents, such as parasites or pests, and by other conditions that impair the performance of the body or one of its parts.

(46) "Risk" means the extent to which, a management practice may reduce population productivity or cause an undesirable change in genetic characteristics of a population.

Stat. Auth: ORS Ch. 496.138, 496.162, 497.252, 498.022, 506.700 and 508.704

Stats. Implemented ORS Ch. 496.138, 496.162, 497.252, 498.022, 506.700 and 508.704

Hist: FWC 25-1984, f. 6-21-84, ef. 7-1-84; FWC 6-1990, f. & cer. ef. 1-29-90;

FWC 2-1992, f. 1-28-92, cer. ef. 2-1-92; FWC 37-1992, f. 5.29-92, cert. ef 6-1-92

OAR635-007-0523

Operating Principles for Natural Production Management

(2) Competition, predation, and disease: Introduction of fishes of the same or different species as those already present may seriously reduce natural production through competition for food space or through predation. Introduction of disease also may reduce natural production. The Department shall oppose any actions that allow competition, predation, or disease to prevent meeting natural production objectives of management plans.

OAR635-007-0527

Operating Principles for Wild Fish Management

(7) Competition, predation, and disease: Releases or transplants of fish of the same or different species, including hybrid fish may seriously reduce the survival of wild fish through competition for food and space or through predation. Introductions of disease may also deplete a wild population. An extreme level of mortality from these sources poses a risk to conserving and utilizing the genetic resources of wild populations. The Department shall oppose any actions that allow mortality from competition, predation or disease to cause a population to experience a decline in abundance that if continued would likely reduce the number of spawners to 300 breeding fish. In addition where a population has been depressed to level of 300 or fewer spawners, the Department shall support and advocate actions to correct the cause of such population decrease.)

OAR635-007-0527

(13) Aggregate stock fishery management: To bring individual populations into compliance with wild fish management, priority shall be given to correcting problems through the development, listing, selection, and implementation of corrective actions as they relate to use of hatchery fish, habitat, competition, predation, disease, and other known sources of mortality before harvest restrictions on any aggregate stock fishery shall be considered.)

OAR635-007-0555

Transport of Diseased Fish

(1) Live fish suspected by the Department to have a disease infection may not be transported from one watershed to another within this state or exported from this state without the written consent of the Department.

(2) The Department may restrict or prohibit transport of infected fish, or fish which may be infected, to or from certain watersheds or areas.

Stat. Auth: ORS Ch. 496, 497, 498, 506 and 508

Stats. Implemented ORS Ch 496, 497, 497, 506 and 508

Hist: FWC 27-1982, f. & ef. 4-30-82;FWC 25-1984, f. 6-21-84, ef. 7-1-84;

Renumbered from 635-43-505

OAR635-007-0565

Fish Disease Control Policy

It shall be the policy of the Oregon Department of Fish and Wildlife to protect the fish resources of the state by preventing the importation or introduction, to new waters or areas, those fish disease agents known to adversely affect hatchery or natural production of fish.

Stat. Auth.: ORS Ch. 496 & 506

Stats. Implemented ORS Ch. 496 & 506

Hist.: FWC 25-1984, f. 6-21-84, ef. 7-1-84

OAR635-007-0585

Import or transfer of Fish Restricted

(5) No fish which have, or are from a station or area with a recent or continuing history of Category II disease (IHNV, *Myxobolus cerebralis*) may be imported, exported, or transferred except as authorized by the Department for transfer to locations where the same disease agent already occurs.

Stat. Auth: ORS Ch. 496.138, 496.146,506.119

Stats. Implemented ORS 506.124

Hist: FWC 25-1984, f. 6-21-84, ef. 7-1-84;FWC 3-1991, f. & cert. ef. 1-18-91;

FWC 66-1996, f. 11-27-96, cer. ef. 12-1-96

OAR635-007-0600

Permit Required to Transport, Hold or Release Fish

(5) The Department may refuse to issue a Fish Transport Permit on the following grounds:

(b) the Department finds the holding or release of the fish specified, either singly or in combination with the holding or release of fish under other permits, would tend to adversely affect existing fish populations in or below the holding or release site;

Stat. Auth.: ORS Ch. 496 & 506

Stat. Auth: ORS Ch. 496, 497, 498, 506 and 508

Stats. Implemented ORS Ch. 496, 497, 497, 506 and 508

Hist: FWC 27-1982, f. & ef. 4-30-82;FWC 25-1984, f. 6-21-84, ef. 7-1-84;

Renumbered from 635-43-300; FWC 3-1991, f. & cert. ef. 1-18-91

OAR635-007-0501