Identifier: **SOP-5135** **(Formally ENV-MAQ-702, R6)**	Revision: **0**	
Effective Date: 2/26/2008		

Waste and Environmental Services

Standard Operating Procedure

for **FISH SAMPLING**

APPROVAL SIGNATURES:

Subject Matter Expert:	**Organization**	**Signature**	**Date**
Philip Fresquez	WES-GS	Signature on file	1-25-2008
Quality Assurance Specialist:	**Organization**	**Signature**	**Date**
Laura Ortega	QA-IQ	Signature on file	1-25-2008
Responsible Line Manager:	**Organization**	**Signature**	**Date**
Craig Eberhart	WES-GS	Signature on file	2-5-2008

1.0 PURPOSE AND SCOPE

The purpose of this procedure is to describe the collection of fish samples on rivers and reservoirs as part of the foodstuffs monitoring program. This procedure applies to the individual(s) assigned to collect fish as part of the Foodstuffs Monitoring Program.

2.0 BACKGROUND AND PRECAUTIONS

2.1 Background

This document establishes the basic requirements for collecting bottom-feeding and predator-feeding fish samples upstream and downstream of LANL. Work performed under this procedure by LANL personnel will occur only after required training to applicable documents has been completed and documented.

Two categories of fish are collected:

- Predator feeders: rainbow trout, brown trout, kokanee salmon, largemouth and smallmouth bass, pike, white crappie, and walleye, etc.
- Bottom feeders: white sucker, channel catfish, carp, and carp suckers, etc.

Fish samples are collected at two locations with respect to Los Alamos National Laboratory:

- Upstream:
    - Rio Grande from the Otowi Bridge north
    - Reservoirs (Abiquiu dam, Heron dam, and/or El Vado dam).
- Downstream:
    - Rio Grande from the Otowi Bridge south
    - Reservoirs (Cochiti dam).

2.2 Precautions

The following documents are required:

- Before any work begins, a permit for scientific collection must be obtained from the New Mexico Department of Game and Fish. The application form, *Authorization for Taking Protected Wildlife for Scientific and/or Education Purposes*, may be requested from the New Mexico Department of Game and Fish, PO Box 25112, Santa Fe, NM 87501.
- An animal use protocol approved by the LANL Institutional Animal Care and Use Committee (IACUC Protocol 04-59-02R).
- Approved integrated work document (IWD).

At least one person in each field crew must have the following training:

- New Mexico Boating Safety Class (offered by State of NM Parks Dept.)

At least two people in each field crew must have the following training:

- First aid;
- Cardiopulmonary Resuscitation (CPR);

All Individuals are required to be trained in the following prior to performing this procedure:

- General Field Safety for All Employees;
- New Mexico *Better Boating and Regulations*;
- Boat SOP
- Electrofishing Orientation and Safety
- All participants in fish sampling on the water must know how to swim.

A minimum of three (3) and maximum of four (4) people is required to go out in the field—one driver and two to place nets or collect fish.

3.0 EQUIPMENT AND TOOLS

• First-aid kit and sunscreen; • Cellular telephone and/or radio; • Rubber gloves that cover the forearm; • Rubber boats to knee. • Safety glasses (polarized sunglasses); • Boat shoes or similar soft-soled shoes with good grip on wet surfaces; • Life vest; • Hat; • Ice chest with blue ice; • Sharp knife and Kevlar safety gloves for use with knife; • Wooden block to cut fish on; • Pontoon Boat	• Ziplock™ sample bags (one-gallon size) and large trash bags; • Marker for labeling bags; • Fishing equipment (gill nets, rods-and-reels); • Chain-of-custody forms; • Digital camera; • Pre-labeled amber glass screw-top jars (for organic analysis only); • Form “Fish Collection Locations and Physical Characteristics” (Attachment 2) (for organic analysis only); • Electroshocking Boat

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Preparatory Activities

Sampler or Field Team Leader	1.	Obtain Chain of Custody forms and labels from the Sampling Management Office. In general, prepare to collect from 5 to 10 samples (3 lbs each and may require compositing) from each source.

(FTL)	2.	For the collection of fish from the Rio Grande, the electrofishing boat is used and for the collection of fish from the Reservoirs, the pontoon boat is used. Thorough knowledge of the workings of both boats is required. (Note: Since fishing is conducted on a triennial basis, it is a good idea to make sure that the engines on these boats are serviced by a professional and are in good working order prior to field operations.)
	3.	Obtain an IWD.
	4.	Before leaving the field, check the condition of the vehicle, trailer, and boat.
	5.	Identify a Point-of-Contact to provide pertinent information of destination, expected time-in, and methods of notifying the field team.
	6.	When leaving Los Alamos County, notify the group office to place you on travel status.
	7.	Ensure you have a working cell phone and a pager.
	8.	Travel to the sampling locations to collect fish for analysis.

4.2 Fish Harvesting Steps		
Sampler or FTL	1.	Depending on location (e.g., Rio Grande or Reservoirs), identify several sampling locations to be sampled. For Rio Grande sampling, samples are usually collected upstream of the Otowi bridge (background) and downstream of the Otowi bridge.
	2.	River collections: samples are collected by electroshocking. • PPE: rubber gloves to elbow, rubber boots to knee, • Begin sampling at the upstream boundary of the sampling reach proceeding in a downstream direction by maneuvering the boat along one shoreline, • Deploy the boom with the electrode array so that it is completely under water, • Turn on generator and start the electrofishing probe at a low voltage (150v) and a low frequency (30 Hz). • Operator presses voltage control with foot to operate. If ineffective in causing fish to surface, then gradually increase voltage until the fish surface. (**Avoid contact with electrodes and water during operation.)** • **Use <u>nonconductive</u> dip nets (fiberglass) to collect fish**. • Euthanize fish and place in cooler with ice (Note: It is not safe to place an open holding tank with water on this boat because of potential electrical shock). Reservoir collections: samples are collected with gill nets. • Gill nets are set by first anchoring one end of the net to a fixed point (e.g., a partially submerged tree). • Stretch the net and attach a weight to the bottom of the net at the other end and a float to the top. This float-weight system is effective for maintaining proper positioning of the net. • Set sample nets at three or four random locations (Note: It usually takes about 3 to 4 nets to catch the appropriate number of fish.). • Return to the net location no more than 24 hours later; carefully raise the net from the water (avoid entangling the net), and remove fish from the net. • Euthanize fish or place all live fish into a holding tank with water until fish can be euthanized.
	3.	Collect about 5 to 8 kg (11 to 18 lb fresh weight) of as many species possible. (Note: It takes about 3 lbs of fish to make one sample; thus, compositing fish may be necessary to obtain one sample.)
	4.	After all the fish have been collected, euthanize fish that are still alive: • stun the fish by clubbing them on the head with a small wooden bat called a priest. • decapitate the fish on a wooden block. **Wear Kevlar gloves**. • double pith (severe the spinal cord in both the body and decapitated head with a dissecting needle).

	5.	Divide the fish by species and composite fish (3 lbs per sample) to obtain samples. Fish must be cleaned (viscera removed and rinsed with clean water). Place cleaned fish samples in Ziplock bags with sampling location and date. Pack the fish on ice for transport back to the Laboratory. For radionuclide analysis, about 5 to 10 composite fish samples per site is adequate for analysis. For metals, use one fish fillet per sample; place fish fillet in Ziplock bag.
	6.	Complete a chain-of-custody form with the appropriate sampling information. Maintain proper chain of custody on the samples. See section 4.4 *Chain-of-custody for samples*.
	7.	Obtain an X and Y coordinate for every sample location.
	8.	Clean the net and neatly roll it for storage.
	9.	Once at the lab, store the samples in a freezer until they are submitted for analysis.

4.3	**Organic Analysis Sampling Steps**	
Sampler or FTL	1.	Depending on the types and amounts of fish collected, pick out fish from each location that are of even size (and age).
	2.	Fill in the data collection log that describes physical characteristics (Attachment 2).
	3.	Place fillet (plus skin) into pre-labeled 500 mL amber screw-top jars.
	4.	Fill out chain-of-custody form with appropriate sampling information. Maintain proper chain-of-custody on the samples. See chapter *Chain-of-custody for samples*.
	5.	Place samples into ice-filled chest for transport to the laboratory.
	6.	Once at the laboratory, keep cool or frozen and in the dark until submittal to analytical laboratory.
4.4	**Maintaining Custody of Samples**	
Sampler or FTL	1.	Document chain-of-custody for all samples used to demonstrate compliance.
	2.	Verify the possession and handling of samples is traceable at all times. [NOTE: A sample is considered in custody if it is one of the following: • In one's physical possession; • In one's view after being in one's physical possession; • In one's physical possession and then locked up so that no one can tamper with it; or • Kept in a secure area where access is restricted to authorized and accountable personnel only. A secured area is an area that is locked (e.g., a room, cooler, vehicle, or refrigerator).]
	3.	If the area cannot be secured, use a custody seal to secure the area or the sample container.
4.5	**Transferring Custody of Samples**	
Sampler or FTL	1.	Whenever samples are transferred into the custody of another person or organization, complete the "relinquished by/received by" and "date" sections of the form. [NOTE: These sections of the form must provide a complete history of custody of the samples from collection to transfer to the analytical laboratory.]
4.6	**Broken Chain-of-Custody**	
Sampler or FTL	1.	Whenever there is a break in the chain-of-custody of a sample, document the failure by initiating a deficiency report in accordance with ISD 322-4, *Issues and Corrective Action Management Process*.
	2.	Document the occurrence, evaluate the potential impact (if any) on the samples, and propose a fix to prevent recurrence.

4.7	**Emergency Actions to Take in the Event of Control Failure**	
FTL	1.	Perform First Aid for cuts, as appropriate.
	2.	For all injuries, provide first aid and see that the injured person is taken to Occupational medicine (only if immediate medical attention is not required) or to the nearest hospital.
	3.	Notify the individual's supervisor and group office as soon as possible.
4.8	**Records**	
FTL	1.	Submit the following records generated by this procedure to the Records Processing Facility: • Completed Chain of Custody form. • Fish Collection Locations and Physical Characteristics (Attachment 2).

5.0 PROCESS FLOW CHART

Flow chart is to be included at a later date.

6.0 ATTACHMENTS

Attachment 1 Fish Sampling Hazard Review (2 pages)

Attachment 2 Fish Collection Locations and Physical Characteristics (1 page)

7.0 REVISION HISTORY

Author: Phil Fresquez

Revision No. *[Enter current revision number, beginning with Rev.0]*	Effective Date *[DCC inserts effective date for revision]*	Description of Changes *[List specific changes made since the previous revision]*	Type of Change *[Technical (T) or Editorial (E)]*
0	6/28/96	New Document	T
1	3/99	Reformatted in accordance with LIR300-00-01, Safe Work Practices.	E
2	4/01	Added new Section 9.0, Training.	E
3	4/02	Added new text regarding electrofishing procedures.	T
4	4/03	Team name change to Environmental Surveillance.	E
5	5/12/04	Updated and reformatted document to conform with MAQ procedures.	E
6	5/11/05	Replaced HCP with HR, added euthanization steps, added prerequisite for animal use committee approval, and removed electroshocking steps and attachments.	T
0	1/30/08	Renumbered and reformatted to WES Division	E

Using a CRYPTOCard, click here to record "self-study" training to this procedure.

If you do not possess a CRYPTOCard or encounter problems, contact your training specialist.

ATTACHMENT 1: HAZARD REVIEW FOR FISH SAMPLING	
Hazard Review for Fish Sampling	Records Use only

Work Tasks/Steps	**Hazards, Concerns, and Potential Accidents; Likelihood/Severity**	**Controls, Preventive Measures** (e.g., safety equipment, administrative controls, etc.)	**Hazard Level** (from IMP 300-00-00, Hazard Grading Matrix)
Pontoon Boat Collections.	See IWD for this work.	See IWD for this work.	Medium
Electrofishing Boat Collections	See IWD for this work.	See IWD for this work.	High

Wastes or Residual Materials

After processing, bag all fish parts not used in the analysis and dispose at the LA area landfill. Do not place fish parts into any dumpster.

Emergency Actions to Take in Event of Control Failure

For all injuries, provide first aid and see that injured person is taken to Occupational Medicine (only if immediate medical attention is not required) or the nearest hospital. Notify supervisor and group office as soon as possible.

ATTACHMENT 2

FISH COLLECTION LOCATIONS AND PHYSICAL CHARACTERISTICS

This form is from MAQ-702

Date	Sample No.	Site	GPS Location	Species	Weight	Length	Girth

Samples collected by:

Signature _____ Name (print) Z no. _____ Date _____

Field team member:

Signature _____ Name (print) Z no. _____ Date _____

Field team member:

Signature _____ Name (print) Z no. _____ Date _____

Field team member:

Signature _____ Name (print) Z no. _____ Date _____