

**FY1999 Project for the Advise ment of Sustainable Development Support  
Commissioned by Environment Agency, Government of Japan**

**Text Book**  
**for**  
**Sampling for Environmental Monitoring**  
*- Analysis Video Series for Environmental Technology Transfer -*

**March 2000**

**Overseas Environmental Cooperation Center, Japan**

# TABLE OF CONTENTS

	page
INTRODUCTION	1
PART I : ENGLISH NARRATION	4
• Prologue	5
• Sampling of Water	6
• Sampling of Ambient Air	9
• Sampling of Flue Gas	12
• Epilogue	14
PART II : DETAILED EXPLANATION NOT GIVEN IN THE VIDEO	15
Chapter 1. : Objectives and Significance of Environmental Sampling	16
Chapter 2. : Sampling of Water	19
Chapter 3. : Sampling of Ambient Air	37
Chapter 4. : Sampling of Flue Gas	46

## Introduction

Following the 'Basic Operation in Chemical Analysis' of the previous year, this video – Sampling for Environmental Monitoring – has been produced by the Overseas Environmental Cooperation Center (OECC) as a visual guide for experts sent to environmental laboratories in developing countries to effectively conduct basic guidance in technology transfer as part of the 1999 Environment Agency project.

This video covers three main themes – Sampling of Water, Sampling of Ambient Air and Sampling of Flue Gas – for basic education on sampling, which is an important area in terms of environmental analysis technology.

In the production of this video, a committee comprising of the following members was established to discuss the scenarios and teaching material configurations, as well as authoring manuscripts as written supplements for technical details that could not be included in the video due to time restrictions.

### Environmental Analysis Video Production Support Committee

Chairman:	Hajime Shirayama	Executive Assistant Researcher, Environmental Science Research Center, Toyama Prefecture Executive Assistant Researcher, Northwest Pacific Region Environmental Cooperation Center
Committee members:	Koichiro Hirano	Chief Engineer, Research Institute for Environmental Science, Yokohama City
	Kazuo Makino	Chief Professor, National Environmental Training Institute, Environment Agency
	Hiroshi Murata	Director, Environmental Coordination Division, Administration Center for Miura and Yokosuka Districts, Kanagawa Prefecture
	Yoshichika Watanabe	Former Chief Professor of the National Environmental Training Institute, Environment Agency

We would like to thank the Yokohama City Research Institute for Environmental Science and the Environmental Pollution and Health Testing Institute of the Kanagawa Pharmaceutical Association for their kind cooperation with the filming.

### 1. Video Contents

#### 1) Prologue

Before launching into the main theme, the need for appropriate samples to be obtained for survey purposes is emphasized in order to secure accurate results through the conducted analysis to provide an objective understanding of the environment. In order to do so, field inspections must be conducted after clarifying the survey objectives, appropriate sampling plans must be drawn up, and accurate methodology must be used to carry out such sampling after sufficient preparation.

## 2) Sampling of Water

First there is an explanation of the different water samples, and the various types of vessels used for each sampling method are introduced along with notes on their usage. Secondly, the full process of taking water samples from a river is introduced. This covers field observation, taking records in field notes, measurement of basic field data (such as flow velocity, temperature, pH, transparency, etc.), the transfer of collected water into vessels, and pretreatment work for sample storage. Thirdly, the collection of bottom-layer water samples from great depths and transparency measurements are explained, while collection of factory effluent completes this topic.

## 3) Sampling of Ambient Air

It begins with an explanation that gaseous and particulate matters exist as forms of air pollutants. A number of methods are employed to collect gaseous pollutants, such as using absorbents, adsorbents, and vessels, and the specific collection procedures for each method are introduced. It explains that an important item during the collection process is the accurate measurement of the air flow rate. It also describes the necessity of calibration in order to do so, as well as introducing types of measuring devices. Secondly, concerning collection of particulate matter, it explains how to use the equipment and filter papers, etc., with low volume and high volume air samplers. Finally, diffusion samplers – which are convenient for simplified measurements – are introduced.

## 4) Sampling of Flue Gas

As above, this pollution falls into two categories, namely gaseous and particulate pollutants. Flue gases from waste incinerators are sampled to check oxides of sulfur and nitrogen ( $\text{SO}_x$  /  $\text{NO}_x$ ). Additionally, actual operations to measure moisture content and oxygen density within the flue gas are introduced. Isokinetic sampling is the most important point to consider when sampling for particulate pollutants in flue ducts. Explanations on how to set the filter paper at the tip of the probe are introduced as well as making actual measurements using a pitot tube.

## 2. Contents of the Attached Text

This text is made up of Parts One and Two as supplements to the video.

Part One contains the final version of the shooting scenario scripts that were created for video editing, and subsequently modified to match the images and narration upon completion. An English narration that has been recorded for the video is also included to facilitate its use when providing technical instruction to counterparts and for translation into local languages.

Part Two covers supplementary issues and subjects that could not be included in the video due to time restrictions. The authors of each chapter are introduced as follows.

- Chapter 1. Objectives and Significance of Environmental Sampling Hiroshi Murata  
(Kanagawa Prefecture)
- Chapter 2. Sampling of Water (2.1, 2.5, 2.6) Hajime Shirayama (Toyama Prefecture)  
Sampling of Water (2.2, 2.3, 2.4) Yoshichika Watanabe (Retired from Environment Agency)
- Chapter 3. Sampling of Ambient Air Koichiro Hirano (Yokohama City)
- Chapter 4. Sampling of Flue gas Mitsuru Fujimura (Green Blue)

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