Pilot project for the environmental technology verification

In the field of organic wastewater treatment technologies
for small-scale establishments

Protocol for the verification tests on organic wastewater treatment technologies for small-scale establishments (kitchens/restaurants and food manufacturing plants)

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Environmental Management Bureau,
Ministry of the Environment

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Main section

I. Introduction

1. Target technologies

The wastewater treatment technologies specified in this protocol for the verification are those (equipment, plants, etc.) that appropriately process organic wastewater from small-scale establishments (with a daily wastewater flow rate of less than 50 m^3) such as kitchens/restaurants, food manufacturing plants, and the like. This protocol for the verification in particular concerns prefabricated, low-cost, compact, easy-maintenance technologies that may be additionally installed in conventional facilities and are commercially available. In addition, the protocol for the verification also focuses on a wide variety of wastewater treatment technologies for the removal of particular pollutants, as well as collective wastewater treatment technologies.

The wastewater treatment technologies are classified into two broad categories, biological treatment and non-biological treatment, but also include the combination (hybrid) of these treatments.

2. Types and outline for verification tests

(1) Types of verification tests

In the verification test, the following items will be verified by conducting a series of operations, including startup, operation, and shutdown of a target verification apparatus installed at the source of wastewater.

- Environmental protective effect under practical operational conditions in the range specified by an environmental technology developer
- Energy, materials, and cost required for operation
- Operational environment allowing normal operations
- Labor for operations and maintenance (hereinafter referred to as the “O&M”)

A verification test conducted at a single verification test site (hereinafter referred to as the “Test Site”) may not be sufficient to verify the entire performance of the target verification technology, but provides enough information to judge the suitability of the technology for the treatment of similar wastewater. If desired by an environmental technology developer, verification at multiple Test Sites will be approved.

(2) Verification testing process

The verification test will mainly be conducted according to the steps specified below.

i Planning

The plan for the verification test (hereinafter referred to as the “Test Plan”) will be prepared before the test is conducted. In this planning stage, influent wastewater characterization is necessary for preparation of the site-specific Test Plan. More specifically, the Test Plan will be prepared by a Verification Organization in cooperation with an environmental technology developer and the owner of a Test Site.

The main activities in the planning stage are as follows:

- Specifying the individuals and organizations involved in the test
- Specifying the general and technology-specific objectives of the test
- Selecting a suitable test site
- Obtaining influent wastewater characterization data
- Specifying verification and monitoring items
- Determining analytical and sampling methods and the test period
- Establishing a Test Plan that includes specific procedures, a schedule, and the individuals in charge, based on the results of the above items

ii Verification test

In this stage, a verification test will be conducted according to the Test Plan described above. The verification test verifies the conformity of a target verification apparatus with its objectives specified in the planning stage. The Verification Organization may, if necessary, subcontract part of the verification test to external test organizations.

iii Data assessment and reporting

In the final stage, all data collected will be analyzed for verification, and a report on the verification test (hereinafter referred to as the "Verification Report") will be compiled. A Verification Organization is responsible for analysis of the data and reporting. To accelerate the above process, the Verification Organization may subcontract an external organization to prepare a draft of the Verification Report.

The Verification Report will be submitted by the Verification Organization to the Ministry of the Environment. In the report, the suitability of the verification tests will be discussed by the working group on the organic wastewater treatment technology (hereinafter referred to as the "working group") of the committee on the pilot project for the environmental technology verification. After being approved by the Ministry of the Environment, the report will be returned to the Verification Organization. The approved Verification Report will then be issued by the Verification Organization to the environmental technology developer and simultaneously disclosed to the public.

3. Definitions of terms and phrases

The definitions of the major terms and phrases are in accordance with those of the Japanese Industrial Standards (hereinafter referred to as "JIS"). The standards in JIS particularly relevant to this protocol for the verification (hereinafter referred to as "Protocol") are as follows:

JIS K 0094	"Sampling methods for industrial water and industrial wastewater"
JIS K 0102	"Testing methods for industrial wastewater"
JIS B 8530	"Glossary of terms for pollution control equipment"
JIS B 9940	"Testing methods of pH controlling equipments" (pH represents the hydrogen ion concentration.)
JIS B 9941	"Testing methods of precipitation equipments"
JIS B 9942	"Testing methods of filtration equipments for clarifying"
JIS B 9943	"Testing methods of floatation equipments"
JIS B 9944	"Testing methods of activated sludge process equipments"

In addition, the terms and phrases used in this Protocol are defined as set forth in Table 1.

Table 1 Definition of terms and phrases used in this Protocol

Term/Phrase	Definition
Target verification technology	A mechanism for the removal of water pollutants and improvement of water quality to be verified in the verification test. The target verification technology should have a clear scientific basis.
Target verification apparatus	An apparatus to be used in the verification test among the apparatuses / equipment representing the embodiments of the target verification technology
Verification items	Items to be analyzed for determination of the performance of a target verification apparatus
Monitoring items	Items to be monitored for inspection of the operational status and the prevention of adverse effects on the surrounding area
Test Site	An establishment where a target verification apparatus is to be installed and the verification test is to be conducted
Verification applicant	A person wishing to have his/her own technology verified. If the applied technology is selected as a target verification technology, the verification applicant will be referred to as an “environmental technology developer.”
Environmental technology developer	A person who possesses a target verification technology. Until the applied technology is selected as a target verification technology, the person is referred to as a “verification applicant.”
Operations and maintenance record	Records that describe all work performed for O&M at a Test Site

II. Verification test system

1. Ministry of the Environment

- Comprehensively administers the entire pilot project for the environmental technology verification
- Comprehensively discusses the verification test system
- Selects target verification technology fields for the verification test
- Establishes and administers the committee on the pilot project for the environmental technology verification and its working groups
- Creates a protocol for the verification
- Selects Verification Organizations
- Financially supports Verification Organizations by bearing the expenses relevant to the verification tests
- Approves reports on verification tests
- Creates a Environmental Technologies Verification database (hereinafter referred to as “ETV database) for their dissemination

2. The committee on the pilot project for the environmental technology verification

- Offers advice on the management of the entire pilot project for the environmental technology verification
- Offers advice on the comprehensive evaluation of verification test results

3. Working group on the organic wastewater treatment technology

- Offers advice on management of the entire pilot project for the environmental technology verification in the field of organic wastewater treatment technologies
- Offers advice on creating a protocol for the verification
- Offers advice on the selection of Verification Organizations
- Offers advice on approval of the Verification Report

4. Verification Organizations

- Administer all processes of the pilot project for the environmental technology verification in target verification technology fields under the auspices of the Ministry of the Environment
- Construct the quality management system shown in Appendix 0
- Invite the public to register the technologies and products that are suitable as the target of the verification test
- Establish and administer respective Technology Panels
- Approve Test Sites
- Establish a Test Plan in cooperation with environmental technology developers and the owners of Test Sites
- Conduct and manage verification tests based on the Test Plan
- Operate and maintain the target verification apparatuses according to the “O&M manuals” prepared by environmental technology developers. The persons in charge of O&M should be suitably qualified or experienced and have received adequate training.
- Restrict entry to the location of verification tests during the test period.
- Ensure the health and safety of all persons relevant to the verification tests at the Test Sites

- Set and adjust the test schedule by assuring the means of communication among all participants in the verification test, and providing transportation assistance and technical advice as necessary
- When the verification test is subcontracted to an external organization, ensure that the quality management system which is required in the Protocol is indeed functioning properly at the subcontractor
- Audit the procedures for the verification test
- Take samples, inspection, measurement, and analysis in the verification test at the expense and under the responsibility of the Verification Organization
- Manage the data / information obtained in the verification tests
- Prepare the Verification Report based on analysis / evaluation of the data on the verification test
- Register in the ETV database the contents of the approved Verification Report

5. Technology Panels

- Offers advice on the Test Plan
- Offers advice on the problems that may occur during the verification tests
- Offers advice on the issuance of the Verification Report
- Offers advice on dissemination of the technologies verified in the verification test

6. Environmental Technology Developers

- Propose a Test Site
- Provide information on the Test Site
- Cooperate with Verification Organizations in establishment of the Test Plan, such as by providing information required for the verification test
- Conduct a preliminary survey on the influent wastewater characterization for judgment of the compatibility between a target verification apparatus and a Test Site when it is demanded by the Verification Organization
- Analyze the influent wastewater characterization to the target verification apparatus and provide the Verification Organization with that information
- Provide as many target verification apparatuses that can be used at the Test Site as required. In addition, provide the Verification Organization with its “O&M manual.”
- Bear the costs and responsibility for the transportation, installation, removal, and others of the target verification apparatus
- Bear, in principle, the costs for O&M of the target verification apparatus. In addition, bear the costs for chemicals, supplies, and utilities that may be additionally required.
- Provide technological support to the Verification Organization by assisting in the operation and measurement of the target verification apparatus during the verification test period, if necessary
- Provide engineers for O&M of the target verification apparatus, if necessary. The engineers should be properly qualified or experienced and have received adequate training.

- Provide existing relevant performance data for the target verification technology if it has been tested at other sites.
- Cooperate with the Verification Organization in preparing the Verification Report

7. Owners of Test Sites

- Cooperate with the Verification Organization, such as by providing information necessary for the verification test, in designing the Test Plan
- Cooperate in the verification test in accordance with the Test Plan
- Provide transportation and technical assistance in accordance with the agreement among the Verification Organization, environmental technology developer, and owner of Test Site
- Report to the Verification Organization on any change or fluctuation in business activity that may affect the quality and flow rate of wastewater at the Test Site

III. Selection of target verification technologies

1. Application

A verification applicant may apply to a Verification Organization for verification of the applicant's proprietary technology / product. Items to be specified in the application form are described below. The verification applicant should fill in the necessary information in the "Application form for verification" set forth in Appendix 1, and submit the application form together with the designated documents to the Verification Organization.

a. Company name, Address, Division of person in charge, Name of person in charge, etc.

b. In-house test results

c. Product data

d. Control points and the time and frequency of the control required for O&M

e. Developmental status and past delivery record

f. Innovativeness of the technology

g. Other relevant or unique features (if any)

h. Technical specification* for the target verification apparatus

i. O&M manual*

(Note) The documents designated with * should be attached to the application form.

2. Selection of target verification technologies

Based on the description of the application and the advice from the Technology Panel, Verification Organization selects target verification technologies and obtains approval from the Ministry of the Environment. The selection criteria are as follows:

a. Technological requirements:

- Does the applied technology fall under the category of target verification technology fields described in "1. Target technologies" on page 1?
- Is the application form properly filled in?
- Is the technology in a commercialization stage?

b. Possibility of verification

- Is it possible to complete the verification from cost and organizational standpoints?
- Is it possible to establish a suitable Test Plan?

c. Environmental protective effect, etc.

- Is it possible to scientifically explain the principle and mechanism of the technology?
- Is there any possibility of the technology causing side environmental issues?
- Does it provide a high environmental protective effect?
- Is it an innovative technology?

In the selection stage, a verification applicant can confer with the Verification Organization concerning the specific methods of verification, including the period and date of tests.

IV. Preparation for the verification tests

1. Selection of the Test Sites

Test Sites are to be approved by the Verification Organization, based on the proposal of the environmental technology developer. Both kinds of the following site could be approved as a Test Site in this pilot project:

- Sites at which a target verification apparatus already in operation is installed
- Sites at which a target verification apparatus is to be newly installed for a verification test

The influent wastewater to a target verification apparatus at a Test Site should have properties not far from the range specified in Tables 3 and 4 (these tables show the properties of the wastewater from the facilities specified by the Water Pollution Control Law). The influent wastewater should also be in the range specified by the environmental technology developer. In case the volume and load of the influent wastewater may differ from the range, they should not be different too far.

In cases in which target verification apparatuses are newly installed, the environmental technology developer, following due consultation with the owner of the Test Site for the purpose of harmonizing the tests with the environment surrounding the Test Site and ensuring that the test will have minimal influence on operation, will create an environment in which the verification test can be smoothly conducted. The environmental technology developer is responsible for restoring the Test Site to its original condition after completion of the verification test. When any modifications are required during the test period, the Verification Organization, owner of the Test Site, and environmental technology developer will consult regarding the modifications.

The environmental technology developer should submit at least the following information to the Verification Organization:

- Detailed description of the location of the Test Site and operational conditions of the establishment (e.g., fast food shop with 20 seats, restaurant in a school of 100 students, etc.)
- In case there are regulations regarding the Test Site, the legal requirements
- The condition and the amount of influent wastewater and operational condition of the facility. It includes the information that is collected through interviews with the relevant persons, such as the conditions of influent wastewater, period of influx of wastewater, operations that may affect the flow rate and water quality, and chemicals and additives used.
- Location of current facility and local map indicating the site where the target verification apparatus is to be installed
- Description of the use and transfer of water, from intake to discharge, at the Test Site
- Description of the method of installing the target verification apparatus, and of introducing influent wastewater to the target verification apparatus (Because the temperature of the wastewater may affect the performance of the target verification apparatus, the location of the target verification apparatus should be described in detail so that the effect of temperature can be judged.)
- Place where the effluent is to be discharged and method of disposing of excess sludge
- Proposal for monitoring and sampling locations
- Other relevant or unique features of the Test Site

If possible, the environmental technology developer should desirably submit the following additional information to the Verification Organization,:

- Diagram indicating the distribution of wastewater for the verification test (including the amount of raw-material supply and the volume of final products)
- Flow rate, water quality and temperature of wastewater in each distribution line, and the period of wastewater emission
- Presence or absence of disposers and traps (grease traps, etc.) at each indoor pipeline for wastewater, and their type and condition
- Identification of the steps that may affect biological treatment, such as hygienic and safety measures using disinfectants and detergents

2. Influent wastewater characterization

(1) Objectives

The objectives of influent wastewater characterization are as follows:

- Determination of the hydraulic flow characteristics of the wastewater sources, including the average, maximum, and minimum influent flow rate
- Evaluation of the concentration and amount of pollutants
- Determination of the need for pre- and post-treatment

(2) Evaluation items and data

An environmental technology developer evaluates the following properties of the influent wastewater to a target verification apparatus. If necessary, the Verification Organization will support the environmental technology developer by provide advice to relieve the environmental technology developer of an excessive load during influent wastewater characterization.

- Seasonal variation in the influent flow rate. The variation is desirably evaluated using the monthly data over a period of two years or more.
- Daily average of the influent flow rate, number of peak days, minimum influent flow rate per day, maximum influent flow rate, and approximate influent pattern. Basically, these values are also desirably evaluated using the daily data over a period of at least 2 months; however, the period may be shortened, such as when the fluctuation is not great, by permission of the Verification Organization.
- Weekly variation in the influent flow rate and water quality according to the operation of the Test Site. The variation is to be evaluated using the daily data on flow rate and quality for at least 1 week and the operational conditions corresponding to the period.
- Typical water-quality data. The water-quality data should be evaluated by sampling influent wastewater periodically for at least 24 hours. During the sampling period, at least one sample from the peak period should be included. The method of sampling is in accord with that specified in JIS.
- The historical data on the water quality and the operational conditions should be used for evaluation to the extent possible.

The environmental technology developer decides the pre- and post-treatment required for the target verification apparatus on the basis of the above evaluation. The developer also submits all data used for evaluation, together with the results of the evaluation, to the Verification Organization.

The environmental technology developer does not have to conduct the influent flow monitoring and sampling if the developer can estimate from similar cases the influent flow rate and the concentration and quantity of pollutants at Test Site with a high degree of accuracy. In such a case, the results of measurement in similar cases should be submitted.

The influent wastewater characterization is not required when the Verification Organization decides that the influent wastewater characterization is not necessary, such as when an existing wastewater treatment facility that has already been in operation for a sufficient period of time is used as the target verification apparatus.

Table 2 Flow monitoring and sampling summary for characterization

Property		Data
Flow monitoring	Seasonal variation	Monthly data for 2 years or more (if possible)
	Weekly variation	Daily data for at least 1 week and information on operation at the site
	Daily average influent flow rate, number of peak days, minimum daily influent flow rate, maximum daily influent flow rate, and approximate influent pattern	Daily data for at least 2 months
Influent quality	Typical water quality	Influent wastewater should be sampled for at least 24 hours. During the sampling, at least one sample from the peak period should be included.
	Weekly variation	Daily data for at least 1 week, and information on operation at the site

The Verification Organization is responsible for the following:

- Examines the validity of the results and data submitted by the environmental technology developer regarding influent wastewater characterization, and uses the data in the Test Plan
- Examines the validity of the pre- and post-treatment proposed by the environmental technology developer, and used the process in the Test Plan

The Verification Organization may demand sampling and analysis as a preliminary study of the influent characteristics of an environmental technology developer when there is extremely limited data available for determining the suitability of a Test Site, such as because there is no historical data on influent wastewater or because it is difficult to estimate from similar cases. In addition to the above information, the Verification Organization may demand other information and the like of the environmental technology developer.

Table 3 Examples of the properties of wastewater from food-product manufacturers[1]

No.[2]	Facility	Product name	Wastewater quality (Unit: mg/L except pH)[3]							Remarks
			pH	BOD	COD	SS	n-HEX	T-N	T-P	
2	Facility for livestock food-product manufacturers	Sausage, ham, bacon	ca. 7	300–600	200–400	100–300	——	50–80	10–15	Attention should be paid to nutritive salts in the case of biological treatment.
		Butter, cheese, casein, yogurt, powdered milk, condensed milk, market milk, ice cream, other dairy goods	6.5–11	50–350	50–200	70–150	——	30–40	5–8	Attention should be paid to nutritive salts, residual chlorine, and pH.
3	Facility for seafood-product manufacturers	Canned and bottled seafood, ham, sausage, other processed seafood product	7–8.5	200–2000	20–1800	150–1000	——	100	30	Attention should be paid to soluble proteins, nutritive salts, foul odors, and the like.
4	Facility for manufacturers of preserved food products from vegetables or fruits	Canned and bottled vegetables and fruits, pickled vegetables, jam, marmalade, jelly, peanut butter, frozen vegetables and fruits, etc.	1–12	200–600 (-2500)	100–2500	120–200 (-1000)	——	100–150	15–60	Attention should be paid to soluble matter and pH. Cl^- (pickles) 2500-8000
5	Facility for manufacturers of miso, soy sauce, edible amino acid, sodium glutamate, sauce, or vinegar	Miso, soy sauce, edible amino acid, sodium glutamate, sauce, tomato ketchup, vegetable sauce, mayonnaise, vinegar, spices, curry powder, chili-pepper powder, horseradish powder, pepper, etc.	6–8	40–300 (-2000)	300–1500	200–300	——	100–150	15–60	Attention should be paid to oils.
6	Facility for wheat-flour manufacturers (including facility for manufacturers of animal feeds or organic fertilizers)	Polished grains, polished rice, polished wheat, flour, wheat flour, buckwheat powder, corn powder, bean powder, soybean flour, sweet-potato powder, potato powder, alimentary yam powder, animal feed, seafood-derived fertilizer, crushed bone fertilizer, fish meal, garbage-derived fertilizer, bean-cake fertilizer, etc.	6–8	20–400	——	400–600	——	——	——	Attention should be paid to problems with foul odors.

1 Source: “Technology, policy and regulations for pollution control — Water control, 5 th Ed.”(Ed. Industrial Science and Technology Policy and Environment Bureau, Ministry of International Trade and Industry)

2 Number shown in Appendix Table 1, Enforcement Order, Water Pollution Control Law

3 Herein, “BOD” indicates biochemical oxygen demand; “COD” indicates chemical oxygen demand; “SS” indicates suspended solids; “n-HEX” indicates extractive substance in n-hexane; “T-N” indicates total nitrogen; and “T-P” indicates total phosphorus.

No.[2]	Facility	Product name	Wastewater quality (Unit: mg/L except pH)[3]							Remarks
			pH	BOD	COD	SS	n-HEX	T-N	T-P	
7	Facility for sugar manufacturers	Sugar, cube sugar, granulated sugar, syrup, etc.	6–8	80–500	60–400	70–100	——	20–30	3–8	Attention should be paid to the outflow of carbon during the cleaning filters.
8	Tank for the sedimentation of crude bean jams for bread or confectionary manufacturers or bean-jam manufacturers	Breads, confections, biscuit, rice cracker, dry confectionery, cracker, candy, chocolate, rice cookies, preserves, wafers, etc.	6–8	200–600 (-1300)	200–800	100–150 (-900)	——	20–40	10–20	Oil separation is required. Attention should be paid to the balance of nutritive salts in processing by the activated-sludge method.
		Raw bean jam	6–8	500–4000	400–3000	250–500	——	60	15	Attention should be paid to the fluctuation of nutritive salts.
9	Rice washing machine for manufacturers of rice confectionary or koji yeast	——	——	——	——	——	——	——	——	——
10	Facility for beverage manufacturers	Beer	8–11	500–2000	800–1200	250–1000	——	30–50	5–15	The volume of washing water is approximately 0.9 m^3 per m^3 of barley. Attention should be paid to pH.
		Whisky, distilled spirits, brandy, blended sake, sweet rice wine, sweet fruit wine, flavored liquor, etc.	6–8	600–92000	300–50000	600–2000	——	20	10	Attention should be paid to dense wastewater.
		Sake	8–11	500–2000	300–1800	250–1000	——	15–25	3–10	
		Soft drinks, tea and coffee, soda, lemon soda, carbonated water, juices, syrup, honey (excluding fruit wines)	9–12	250–350	——	100–150	——	——	——	Attention should be paid to the balance of salts and the type of detergents used.
11	Facility for animal feed or organic-fertilizer manufacturers (including facility for wheat-flour manufacturers)	Polished grains, polished rice, polished wheat, flour, wheat flour, buckwheat powder, corn powder, bean powder, soybean flour, sweet-potato powder, potato powder, alimentary yam powder, animal feed, seafood-derived fertilizer, crushed-bone fertilizer, fish meal, garbage-derived fertilizer, bean-cake fertilizer, etc.	6–8	20–400	——	400–600	——	——	——	Attention should be paid to problems with foul odors.
12	Facility for animal/vegetable oil and fat manufacturers	Animal fats and oils, vegetable fats and oils Edible oils, salad oils, margarine, edible purified oils	4–9	100–2000	100–1500	400–600 (-1000)	——	20–30	40–80	Attention should be paid to the separation of emulsified oils, and measures should be taken against foul odors.

No.[2]	Facility	Product name	Wastewater quality (Unit: mg/L except pH)[3]							Remarks
			pH	BOD	COD	SS	n-HEX	T-N	T-P	
		Cooking oil, salad oil, margarine, refined fat and oil for cooking	1–7	150–1100	——	100–300	——	——	——	
13	Facility for yeast manufacturers	Yeast, medium, etc.	6–9	300–1200 (-7000)	1000–8000	100–300 (-1500)	——	300–600	20–50	Attention should be paid to nutritive salts.
14	Facility for starch or processed-starch manufacturers	Starch, sweet-potato starch, potato starch, cornstarch	6–8	500–3000	1000–1500	3000	——	100–200	30–40	Attention should be paid to changes in pH due to decomposition.
15	Facility for grape-sugar or starch-syrup manufacturers	Grape sugar, glucose, starch syrup, malt sugar	6–8	1500–2000	1000–1500	1000–2500	——	40–50	30–40	
16	Boiling facility for noodle-product manufacturers	Pre-cooked noodles, wheat noodles, Japanese vermicelli, buckwheat noodles, macaroni, handmade noodles	6–8	250–600	——	200–500	——	——	——	
17	Boiling facility for tofu or boiled-bean manufacturers	Tofu, fried tofu, dried bean curd, etc.	5.1–7.3	200–1400	100–1100	80–460	6–80	10–50	1.3–7.4	The manufacturers, including those on the scale of retail shops in urban areas, cooperative processing factories, and factories for volume sellers, differ significantly in scale. Dried bean curd is produced on a large scale.
18	Extraction facility for instant-coffee manufacturers	——	——	——	——	——	——	——	——	——
18-2	Facility for frozen-prepared-food manufacturers	Precooked semi-processed foods such as fried seafood, fried meat, croquettes, cutlets, meat sticks, hamburger, meat or shrimp ravioli, Chinese dumplings, other type of dumplings, meatballs, etc., frozen foods	6–8	200–1000 (-4000)	150–2000	100–500 (-1000)	(Oil) 30–200	30	6	

Table 4 Examples of the properties of wastewater from cooking facilities[4]

No.[5]	Facility	Product name	Wastewater quality (Unit: mg/L except pH)[6]							Remarks
			pH	BOD	COD	SS	n-HEX	T-N	T-P	
66-3	Cooking facility for use in catering centers	——	——	——	——	——	——	——	——	——
66-4	Cooking facility for box-lunch caterers or manufacturers	Rice lunch box, sushi lunch box, sandwich, precooked noodles, rice balls, etc.	6–10	40–1700	20–850	20–500	10–1200	4.5–44	1–13	The scale of the facilities varies significantly. Box-lunch caterers, facilities for mass feeding, and school meal facilities and the like are included.
66-5	Cooking facility for use in restaurants	Dining halls providing staple foods (bread, rice, cuisines, etc.), large-scale restaurants, restaurants specializing in Japanese, Western, Chinese, and other Asian cuisines	6–8	30–3400	40–1700	20–2200	12–2200	3–42	1–12	The wastewater from restaurants serving Western- and Chinese-style cuisine is rich in BOD, oil, and others.
66-6	Cooking facilities for restaurants specializing in buckwheat noodles, wheat noodles, and sushi, as well as restaurants that do not serve staple foods, such as coffee shops	Sushi, buckwheat noodles, drinks (coffee, tea, milk, etc.)	6–8	210–1200	150–1000	40–90	1–250	3–40	1–13	The wastewater from coffee shops serving light foods is rich in BOD and oil. The large difference in concentration seems to be the result of alcoholic beverages.
66-7	Cooking facility for use in high-class Japanese-style restaurants, bars, cabarets, nightclubs, etc.	Cuisines, staple foods, beverages including liquor	6–8	50–2600	30–700	30–900	5–780	4–39	1–13	Entertainment-related eating and drinking establishments such as high-class Japanese-style restaurants, bars, cabarets, taverns, beer parlors, and the like are included in this category. The variation in scale is large, as is the hourly and daily fluctuation. These facilities are located primarily in areas in which a sewage system is available.

4 Source: “Technology, policy and regulations for pollution control — Water control, 5 th Ed.”(Ed. Industrial Science and Technology Policy and Environment Bureau, Ministry of International Trade and Industry)

5 Number shown in Appendix Table 1, Enforcement Order, Water Pollution Control Law

6 Herein, “BOD” indicates biochemical oxygen demand; “COD” indicates chemical oxygen demand; “SS” indicates suspended solids; “n-HEX” indicates extractive substance in n-hexane; “T-N” indicates total nitrogen; and “T-P” indicates total phosphorus.

3. Determination of verification items

(1) Verification items regarding water quality

The verification items regarding water quality are used primarily to verify the wastewater processing capacity and the stability of the operation of target verification apparatuses.

In consideration of the opinions of the environmental technology developer, the technical specification for the target verification apparatus, and influent characteristics at the Test Site, the Verification Organization will determine the verification items regarding water quality so that the performance of the target verification technology can be suitably verified. The verification items regarding water quality thus determined will be described in the Test Plan.

The major verification items regarding water quality are summarized in Table 5.

Table 5 Examples of verification items regarding water quality

Examples of verification items regarding water quality
pH (hydrogen ion concentration)
BOD (biochemical oxygen demand)
COD (chemical oxygen demand)
SS (suspended solids)
n-HEX (extractive substance in n-hexane)
Coliform bacteria
T-N (total nitrogen)
T-P (total phosphorus)

(2) Verification items regarding operations and maintenance

The verification items presumably required for quantitative and qualitative evaluation of the performance in and cost for O&M are summarized in Table 6.

The Verification Organization will, in addition to discussing other verification items, describe the verification items regarding O&M thus determined in the Test Plan.

Table 6 Verification items regarding operations and maintenance

Category	Verification items	Major relevant cost
Environmental impact	Amount of waste sludge	Processing cost
	Amount of generated waste	Processing cost
	Noise and foul odor	——
	(If possible, qualitative evaluation, such as that of the ease of processing sludge, waste, and foul odors will also be conducted.)	(If applicable)
Electricity use and material consumption	Electricity and other power use	Cost of electricity and other powers
	Types and amounts of wastewater treatment chemicals	Cost for chemicals
	Other consumables	Cost for consumables
O&M performance	Visual inspection of effluent quality	——
	Period required for startup of the target verification apparatus Period required for shutdown of the target verification apparatus	——
	Number of operators, and the level of operator skill required for O&M of the target verification apparatus	——
	Reliability of the target verification apparatus	——
	Method of restoring from problems	——
	Evaluation of O&M manual	——

4. Determination of monitoring items

The Verification Organization will determine the monitoring items required for proper O&M, although they are not the verification items, and describe them in the Test Plan. The Verification Organization will discuss the required monitoring items in accordance with the O&M manual provided by the environmental technology developer, and add other items that the organization recognizes as necessary.

5. Determination of the test period

The test period required for the test should be determined in consideration of the characteristics of the Test Site, the influent wastewater, the target verification apparatus and the verification items, and described in the Test Plan.

With respect to the target verification technologies regarding biological treatment, the test is desirably continued for a period of 6 months following the sufficient stabilization of biological activity, but the test period may be shortened to at least 3 continuous months, provided that the period includes at least 2 months of cold winter weather. The period of malfunction and shutdown should not exceed 10% of the entire period.

The test period may be increased at the instruction of the environmental technology developers, or according to the Test Site and the properties of influent wastewater.

In the case of non-biological treatment, the period is desirably at least 3 continuous months after startup or a period in which all patterns of influent wastewater can be verified. The period of malfunction and shutdown should not exceed 10% of the entire period.

Table 7 The test period summary

Biological and hybrid treatments	● Desirably 6 continuous months following the sufficient stabilization of biological activity (may be shortened to at least 3 continuous months, provided that the period includes at least 2 months of cold winter weather) ● The period of malfunction and shutdown should not exceed 10% of the entire period.
non-biological treatment	● Desirably a period of at least 3 continuous months after startup or a period in which all patterns of influent wastewater can be verified ● The period of malfunction and shutdown should not exceed 10% of the entire period.

6. Establishment of the Test Plan

The Verification Organizations should establish the Test Plan in consideration of the characteristics of the Test Site, the influent characteristics, technical specification for the target verification technology, and others.

The Verification Organizations establish the Test Plan, based on the information provided by the environmental technology developer and the owner of Test Site, and the advice of the Technology Panel.

The items to be included in the Test Plan are listed in Appendix 2.

V. Verification test methods

1. Starting up the target verification apparatus

- The Verification Organization starts up the target verification apparatus in accordance with the O&M manual of the environmental technology developer. When an existing wastewater treatment facility is used as the target verification apparatus, the startup is not required.
- The Verification Organization starts up the apparatus for a period specified by the environmental technology developer. Following the startup period, the Verification Organization confirms that the target verification apparatus is operating in a stable manner for the verification test to be conducted as indicated in the O&M manual. When the apparatus is judged as being unstable, the Verification Organization continues the startup for a period of up to twice the predetermined period. If the apparatus is still unstable, the Test Plan shall be reexamined for modification and adjustment.
- Starts recording the monitoring items
- Takes samples and analysis of the influent and effluent.
  If the predetermined startup period exceeds 1 month, takes samples of a 24-hour composite sample of the influent wastewater once per month in accordance with the method specified in JIS. If the predetermined startup period is less than one month, there is no need to take sample.
- The environmental technology developer specifies modifications regarding the equipment, O&M, and the operational conditions, to ensure that the target verification apparatus is operated in an efficient and stable manner in the start-up as well as the pre- and post-processing required.
- The Verification Organization records the conditions, findings, and results of the startup of the target verification apparatus, including pre- and post-processing during the startup period, and enters them in the Verification Report.
- The environmental technology developer should attach to all constituent devices of the target verification apparatus, where it is readily accessible, data plates indicating the following items:
  - Name of device/apparatus
  - Serial number
  - Production number
  - Company name, address, name of the person in charge, emergency contact address of the environmental technology developer
  - Electrical requirements (volts, phase, amps, and Hertz)
  - Precautions on transporting and handling
  - Cautions and alarms (ensure readability and visibility)
  - Volume or flow rate (if applicable)

Table 8 Flow monitoring and sampling summary for startup

Flow-monitoring	● Start recording monitoring items
Influent and effluent quality	● If the predetermined startup period exceeds 1 month, take samples of a 24-hour composite sample of the influent wastewater once per month in accordance with the method specified in JIS

2. Operations and maintenance

The target verification apparatus should be inspected periodically and kept in suitable condition in order to maintain stable operation and thereby ensure proper operation and increase the efficiency of operation throughout the test period. Regardless of whether the Verification Organization or another organization is responsible for the O&M, all procedures involving inspection, O&M should be adjusted in advance by the Verification Organization, described in the Test Plan, and confirmed by the concerned parties.

In any case, persons who have detailed knowledge of wastewater treatment and are familiar with the O&M of similar apparatuses should conduct the O&M.

(1) Regular operations and maintenance

- O&M to ensure proper operation of the target verification apparatus during the test period should be performed in accordance with the O&M manual.
- Calibration should be performed in accordance with the O&M manual. Calibration should also be performed at least as frequently as specified in the O&M manual. In addition, a record of calibration should be included in the record of O&M at the Test Site.
- Monitoring items should be kept within predetermined range to ensure proper operation of the apparatus.
- All these actions taken for O&M should be recorded. The record of each action for O&M should include the site, date, name of the person in charge, actions taken, findings at the Test Site/target verification apparatus, and the results. These records should be included in the record of O&M at the Test Site, as well as in the Verification Report.
- In selecting the verification items regarding O&M, the problems that may arise when an operator is not sufficiently capable of conducting O&M should also be considered.

(2) Actions in the event of upset conditions

The Verification Organization will inform the environmental technology developer as soon as possible in the event of upset conditions. The Verification Organization should take the actions for restoring the apparatus to stable operation specified by the environmental technology developer. In the event of unforeseen circumstances, the Verification Organization will take the actions together with the environmental technology developer.

The data obtained under the upset conditions will not be used in the statistical analysis for the Verification Report, but shall be described and analyzed in the Verification Report. As soon as stable operation is resumed, alternative samples will be taken.

The conditions, cause and result, and method for resumption under upset conditions shall be described in the Verification Report. When the cause is unclear or it is not possible to judge whether the conditions are indeed unusual, the data obtained during the period is used in the statistical analysis for the Verification Report.

(3) Cost estimation

In cooperation with the environmental technology developer and the owner of the Test Site, the Verification Organization will collect and sort the data required for cost estimation for O&M, such as the costs for processing sludge and waste, for electricity at the Test Site, for wastewater treatment chemicals, and for other consumables.

Table 9 Methods for determining verification items regarding operations and maintenance, and others

Category	Verification items	Determination method and description
Environmental impact	Amount of waste sludge	The weight of dried sludge is calculated from the volume of sludge in the tanks and its water content. (kg/day)
	Amount of generated waste	Weight (kg/day)
	Noise and foul odor	If applicable
	Quality	Ease of secondary treatment, reusability, etc.
Electricity use and material consumption	Electricity and other power use	Electricity use is determined by a current indicator attached to the power source covering all target verification apparatuses. (kWh/day)
	Types and amounts of wastewater treatment chemicals	The amount is determined by a metering pump or indicator attached to the side wall of the chemical tank.
	Other consumables	If applicable
O&M performance	Visual inspection of effluent quality	Generation of color, turbidity, air bubbles, solid matter, etc.
	Period required for startup of the target verification apparatus Period required for shutting down the target verification apparatus	Time (suitable unit)
	Number of operators and the level of operator expertise required for O&M of the target verification apparatus	The maximum number of operators and working days (man-days) for each operational items and the technicality and difficulty of O&M shall be described.
	Reliability of the target verification apparatus	Causes of problems
	Methods of restoring from problems	Ease of and problems in resumption
	Evaluation of the O&M manual	Readability, understandability, and problems

3. Flow monitoring

The Verification Organization should monitor the flow rate of influent and effluent during the test period. The daily flow rate and daily maximum flow rate are monitored at the predetermined monitoring location. When the volume of influent is almost identical to that of the effluent, only one of the wastewaters may be used for monitoring of the flow rate.

The flow rate of influent and effluent should be measured in accordance with the following:

- JIS K 0094 8. Measurement of flow rate, in “Sampling methods for industrial water and industrial wastewater”
- JIS Z 8762 “Measurement of fluid flow by means of orifice plates, nozzles, and venturi tubes inserted into circular cross-section conduits running full”
- JIS Z 8765 “Method of flow measurement by turbine meters”
- JIS Z 8766 “Vortex flowmeters -- Methods of flow measurement”

Excerpt of JIS K 0094 “8.6 Flow-rate measuring condition of wastewater and making of measured value”

Unit of examination　During the working period in factory or workshop, or during the operating period of wastewater treatment facilities, choose days when there is no unusualness on working time, the disposal amount of wastewater, and working condition, and then carry out the examination on the flow rate of wastewater with making at least one working day one unit.

Intervals of examination　On the examination day, principally, carry out the measurement of amount of wastewater at absolutely constant interval of 10 minutes or 15 minutes from the opening time of working or from the operating time of wastewater treatment facilities, and continue the measurement from the finish of working on that day to the opening of next day work or from the finish until the discharge of wastewater ends. In case of no fluctuation on the flow rate of wastewater, above time interval may be suitably prolonged.

4. Sampling

Samples for analysis are taken in accordance with the procedures described in the relevant JIS methods shown in Table 10 and other relevant regulations. The measurement methods for items of field research such as pH and temperature should be determined with reference to "JIS K 0094 7.2 Water temperature" and the like. In addition, the devices used for sampling should be specifically described in the Test Plan.

The Verification Organization determines the location, period, frequency, and the like of sampling, in accordance with JIS K 0094 "Sampling method of industrial water and wastewater." In the determination of the date and frequency of sampling, the date and frequency of sampling that is critical for the purpose of verifying the stability of operation should be selected with reference to information such as that on the fluctuation in the volume of wastewater and the load of pollutants, which is obtained through the influent wastewater characterization.

Excerpt of JIS K 0094 "5. Test items and amount of sample"

Test items and amount of sample The amount of sample differs depending on the combination of those as the number of test items, concentration of target component, and preserving treatment of sample. Generally speaking, one item needs about 0.5 liter to 1 liter, and 2 liter to 10 liter shall be enough for all tests. When sample is to be preserved instead of immediate test, considering the amount to be preserved in common to test items, the number of test containers and amount to be sampled shall be decided (refer to 7.). In case where an individual standard specifies the amount of sample to be taken, follow it.

Excerpt of JIS K 0094 "6. Items to be recorded when sampling"[7]

Items to be recorded when sampling When sampling, the following items shall be recorded.

1) Name of sample and sample number
2) Name of sampling site and position of sampling (such as surface water or depth of sampling)
3) Date and time of sampling
6) Name of person carried sampling
7) Situation of sampling site (items probably giving influence on sample quality, such as rough sketch of sampling site)
8) Atmospheric temperature and water temperature when sampling
9) Other referential matters such as appearance of sample (color, turbidity or the like of sample), or existence of odor.

Excerpt of JIS K 0094 "10. Sampling of industrial wastewater"

Sampling site It shall be the discharging point of factory or workshop. Where it is difficult to sample at discharging point, the sampling site may be chosen where the same quality of wastewater can be sampled, for instance, the sewerage cesspool of wastewater channel or wastewater pipe line, or the discharging point of final conditioning tank or treating facilities for wastewater.

Sampling time and sampling frequency

Remarks 1. Though sampling time and sampling frequency are decided according to the fluctuation of water quality, generally in case of daily test, make sampling 3 times or more in working time of a day (every 2 h or 3 h), but in case of less fluctuation of water quality, it may be lessened.

When making weekly water test, carry out whole-day water test by 2 days or

[7] Item 4 and 5 are omitted.

3 days in a week, and carry out this test for 4 weeks or more.

When making monthly water test, carry out whole-day water test by 2 days or 3 days a week in every other month. Alternatively, sample one time a day, whose time zone is shifted, with interval of 1 day or 2 days.

2. When obtaining average quality of water in a day, mixed sample (composite sample) in available. Conveniently, carry out sampling 3 times or more (for instance every 2 h or 3 h) in working time of one day to prepare mixed sample, however, it is advisable to mix at mixing ratio proportionally to the flow-rate change of industrial wastewater, and if the load capacity of wastewater quality is to be obtained, sampling method according to 4.2.2 would be better.

When mixing of samples causes the reaction giving inferior influence for test, mixing sample cannot be done.

5. Analysis of water quality

The major verification items regarding water quality and the analytical methods are summarized in Table 10. Analytical methods for items other than the verification items regarding water quality below shall basically be in accord with the methods described in the relevant JIS and other regulations.

Table 10 Major verification items regarding water quality and analytical methods

Item	Method
pH	JIS K 0102 12.1
BOD	JIS K 0102 21
COD	JIS K 0102 17
SS	MoE Notification No. 59, 1971 "Environmental standards regarding water pollution" Appendix table 8
n-HEX	MoE Notification No. 64, 1974 "Testing method regarding wastewater standards ordained by the Minister for the Environment in accordance with the provision in the decree that specifies wastewater standards" Appendix table 4
Coliform bacteria	MHLW-MOC Decree No. 1, 1962 "Decree regarding the method for testing sewage water quality" Appendix table 1
T-N	JIS K 0102 45.1 or 45.2
T-P	JIS K 0102 46.3

6. Others

As shown in Table 11, some apparatuses have their own JIS tests. These standards should also be referred to as necessary.

Table 11 JIS test methods for water-pollution control apparatuses (for reference)

Number (JIS B 8530)	Term	JIS number specifying the test method
2201	pH controlling equipment	JIS B 9940 (Testing methods of pH controlling equipments)
2101	Precipitation equipment	JIS B 9941 (Testing methods of precipitation equipments)
2104	Filtration equipment for clarifying	JIS B 9942 (Testing methods of filtration equipments for clarifying)
2103	Floatation equipment	JIS B 9943 (Testing methods of floatation equipments)
2301	Activated sludge process equipment	JIS B 9944 (Testing methods of activated sludge process equipments)

VI. Preparation of the Verification Report

The results obtained in the verification test shall be reported in the Verification Report. All data, including the results of influent wastewater characterization, the results of the verification test for the period from startup to the end of operation, all actions taken for O&M, and any changes in water quality during the test period, shall be described in the Verification Report.

The Verification Report shall contain the following:

- Executive summary
- Introduction and background
- Identification and description of the target verification technology and apparatus (including capabilities)
- Manufacturer of product (Name, address, TEL)
- Serial number
- Period and Test Site
- Conditions for the verification test and layout of apparatuses (including the layout of the target verification apparatus and others)
- Procedures and methods for the verification test (including those for influent wastewater characterization, startup of the target verification apparatus, and analysis at the Test Site and laboratory)
- Report on the influent wastewater characterization (including observation on the changes over time and others, conditions, data summarized in graphs and tables, and results)
- Report on the Startup period required for the target verification apparatus (including observation, conditions, data summarized in graphs and tables, and results)
- Report on the test period of the verification test (including observation, conditions, data summarized in graphs and tables, and results)
- Results and discussions of the verification test (The verification test results are discussed. The data shall be summarized in graphs and tables.)
- Other literature and data for reference
- Appendix (Test Plan, O&M manual, record of O&M, records on sampling and its confirmation, records on sample analysis and its confirmation, photos of the sampling location and Test Sites, general description of the quality management system, general description of the control of data quality, unprocessed data, etc.)

The Verification Organization prepares a draft of the Verification Report and, after obtaining the consent of the environmental technology developer concerning the description and discussions by the Technology Panel, finalizes the Verification Report. The Verification Report submitted to the Ministry of the Environment shall be discussed by the working group and approved by the Ministry of the Environment. In addition, the Verification Organization shall prepare a brief summary of the verification test results with reference to Appendix 3.

VII. Remarks in conducting the verification test

1. Quality control of data

(1) Data-quality index

It is absolutely necessary that the data on the verification items be accurate and reliable. The data on the verification items contains errors and variation due to various factors, such as the individual who conducts measurement, the sample storage condition, the reagents used, the analytical environment, and the like, and thus the accuracy of the data should be controlled properly during the entire test period, from sampling and analytical procedures to the rounding up of the results.

Quantitative data-quality indexes (DQIs) could include the following:

- Precision (standard deviation or range obtained by measuring several subsamples of the same sample)
- Completeness (percentage of the number of valid samples that should have been taken)

When there is data that requires quality management using DQI, such as the measured values of the concentration of trace chemicals, that data should be identified. Acceptable limits and criteria, and evaluation procedures should be specified and described in the Test Plan, along with the above data.

Some verification items regarding water quality are not suitable for quality control with DQI due to their analytical procedures, and thus the accuracy of these items should be controlled in accordance particularly the data management & verification method shown in Table 12, in addition to the standard operation rules which the organization employs.

These methods of accuracy control should always be used in the handling of data that is to be given as the test results in the Verification Report, and the data for use in the calculation of these results.

Table 12 Methods for accuracy control

Example of verification items regarding water quality	Method for accuracy control
BOD	Confirmation of measured values using a standard solution (glucose, glutamic acid)
COD	Duplicate or triplicate sampling of approximately 10% of samples
SS	
n-HEX	

(2) Measurement and data acquisition

For quality control of data, the following requirements should be given during measurement and data acquisition:

- Any assumptions on which the Test Plan is based, as well as all sampling locations and the samples to be collected there, should be reported to and approved by the Technology Panel during design of the Test Plan.
- Any time sampling and analysis of samples are conducted, a record of these actions and confirmation should be kept.
- Any non-standard sampling methods and devices or analytical methods and instruments that may affect the representativeness of data should be validated and documented.

- The requirements for sample handling, storage location, and transportation should also be described. The description shall include sample labels, custody forms, and sample custody log.
- All analytical methods and instruments used should be documented.
- The requirements for the calibration of all analytical instruments and procedures, including the calibration standards, should be specified in the Test Plan.
- Any type of data not obtained by measurement, such as that obtained through interviews and the like, should be examined to determine the limitation on the use.

2. Management, analysis, and presentation of data

The data obtained in the verification test includes quantitative data such as that on verification items regarding water quality, flow rate, the amount of chemicals used for treatment, and the amount of waste sludge, as well as qualitative data such as that on the reliability and operability of the target verification apparatus and operators demands. The methods for management, analysis, and presentation of these data are as follows:

(1) Data management

Data should be managed securely, as described in “Appendix 0: Quality management system to be constructed at the Verification Organizations, 3. Quality management system, (3) Control of documents and records” on page 33.

(2) Data analysis and presentation

The data obtained in the verification test should be analyzed statistically and presented. The data not subjected to the statistical analysis (including that obtained under upset conditions) shall be included in the Verification Report as an appendix.

i Flow data

- Daily, weekly, and monthly average flow rates and their 95% confidence intervals.
- Graph showing peak instantaneous influent flow rate.
- Graph showing peak daily influent flow rate.
- Date, month, day, time, and sample number corresponding to the data presented on the graph, as applicable.

ii Data on verification items regarding water quality

- Graph showing all the influent sampling results.
- Graph showing the monthly average concentration and 95% confidence interval of the pollutants in influent wastewater.
- Graph showing variations, e.g., seasonal and weekly variations, in the concentration of pollutants in influent wastewater.
- Graph showing all the effluent sampling results.
- Graph showing the monthly average concentration and 95% confidence interval of the pollutants in effluent.
- Graph showing the variations, e.g., seasonal and weekly variations, in the concentration of pollutants in effluent.
- Table summarizing the average removal efficiency and 95% confidence interval of each parameter of the target verification apparatus
- Date, month, day, time, and sample number corresponding to the data presented on the graph, as applicable

All equations used in the statistical analysis should be described in the Verification Report. Equations for use in the data analysis are summarized in Table 13 for reference purposes.

Table 13 Equations for use in statistical analysis (for reference)

Removal efficiency	$\frac{(C_{influent} - C_{effluent})}{C_{influent}} \times 100\%$	$C_{influent}$: influent concentration $C_{effluent}$: effluent concentration
Sample mean (average)	$y_{bar} = \Sigma v / n$	y_{bar}: Sample mean Σv: Sum of sample values n: Sample size
Standard deviation	$S = (\Sigma(y - y_{bar})^2 / n)^{1/2}$	n: Sample size s: Sample standard deviation y: Individual sample value y_{bar}: Sample mean
95% Confidence interval	$y_{bar} \pm t_{\alpha/2} \bullet (s / n^{1/2})$	y_{bar}: Sample mean $t_{\alpha/2}$: t-value corresponding to the degree of freedom of n-1 and an α of 0.05

iii Verification items regarding O&M

- Summary of observations
- Summary of the operability and reliability of the target verification apparatus (indicating both stable operation and upset conditions)
- Summary of the usefulness of the O&M manual
- Summary of the reliability of the target verification apparatus and the variations in verification items regarding O&M observed during the verification test
- Summary of the skills required for O&M
- Monthly average maintenance hours
- Sludge generation data over time
- Chemical use and cost over time
- Electricity and other power use and cost over time
- Average monthly electricity and other power use and cost over time
- Use and cost of any other consumables

3. Environment, health and safety

The Verification Organization should take strict environmental, health, and safety measures with respect to the verification test. The environment, health, and safety management program should be included in the Test Plan. In the management program, relevant environmental problems and potential hazards regarding the verification test and Test Site should be identified, and countermeasures against them should be specified. The Verification Organization should inform the personnel at the Test Site, including employers and employees who are not involved in the verification test, of the potential hazards and the countermeasures against them. The following items are to be discussed in the environment, health and safety management program:

- Precaution regarding the operation of the target verification apparatus, effluent discharge, and waste generation
- Biological, chemical and electrical hazards
- Handling, storage and discharge of the chemicals relevant to the verification test
- Handling and discharge of residues and waste relevant to the verification test
- Material Safety Data Sheet
- Compliance with local regulations regarding electricity and plumbing
- Exhaust and ventilation systems, when gases are generated in the target verification apparatus
- Prevention of fires
- Confirmation of emergency contacts (emergency medical, fire fighting, etc.)
- Ensuring of occupational health and safety
- Others

The entire environment health and safety management program, including Material Safety Data Sheets, should be properly stored and available for inspection by anyone at the Test Site. The address and phone number of emergency contacts, and of the nearest hospital should be listed on one page. The sheet should be displayed in a suitable location, protected with a transparent plastic cover.

Appendix 0: Quality management system to be constructed at the Verification Organizations

Introduction

The Verification Organizations participating in the model project for the verification of environmental technologies should desirably construct the quality management system in accordance with JIS Q 17025: 2000 (ISO/IEC17025: 1999) “General requirements for the competence of testing and calibration laboratories.” In this Appendix, some elements of the quality management system that are required to be constructed at Verification Organizations that do not have such a quality management system in accordance with the above standard will be described.

1. Scope

The quality management system specified in this Appendix is applicable to all departments or procedures relevant to the verification test in the Verification Organization. In addition, if part of the verification test is subcontracted to an external organization, that organization is also included in the scope of application.

The Verification Organization in which all departments relevant to the verification test have already received the following certification, JIS Q 17025: 2000 (General requirements for the competence of testing and calibration laboratories) or JIS Q 9001: 2000 (Quality management systems - Requirements), will be regarded as satisfying the requirements specified in this Appendix.

2. References

JIS Q 17025: 2000 (IS0/IEC 17025: 1999) General requirements for the competence of testing and calibration laboratories

JIS Q 9001: 2000 (IS09001: 2000) Quality management systems - Requirements

3. Quality management system

(1) Organization and responsibility

The organization concerned shall be an entity that can be held legally responsible.

The responsibilities of key personnel in the organization relevant to the verification tests shall be clearly defined. Appoint a member of the staff as quality manager (however named) who, irrespective of his or her other duties and responsibilities, shall have defined responsibility and authority for ensuring that the quality system is implemented and followed at all times.

(2) Quality system

The organization concerned shall establish, implement, and maintain a quality management system appropriate to the scope of its activities regarding the verification test.

In the quality management system, the quality policy regarding the verification test and the procedures for the quality management system shall be documented. These documents shall be communicated to and understood by the appropriate personnel.

The policy shall include the following:

a) The organization's commitment to ensuring the quality of verification tests

b) The organization's statement on the quality standard of the verification tests

c) The objectives of the quality system

d) A description of the construction and implementation of the quality management system

In addition, the system for promoting verification tests, as well as the role, responsibility, and

authority of the personnel concerned, shall be documented.

(3) Control of documents and records

The organization concerned shall control documents such as the standards regarding the verification tests (protocol for the verification and relevant standards) and the Test Plan, as well as drawings, software, specifications, written directives, and manuals.

With respect to document control, the following shall be ensured:

a) All documents shall be reviewed and approved for use by authorized personnel prior to their issuance.

b) All documents shall contain a description of the relevant documents to ensure that appropriate documents can be found easily and are available at any time at all Test Sites.

c) Invalid and/or obsolete documents shall be promptly removed or be assuredly prevented from unintended use.

d) The management method for documents as data shall be specified and maintained.

e) The form for records and the location of documents, as well as the inspection method, shall be specified and maintained.

In addition, records regarding the verification tests shall be identified, properly collected, indexed, specified for usage, filed for applications, maintained, and adequately discharged, and the storage period for them shall be decided. In particular, records in the original copy of the test data, data and information that enables trace audits, records of calibrations, records of the persons involved, each individual report published, and copies of calibration certificates shall be stored for a predetermined period.

(4) Subcontracting of the tests

If the organization concerned subcontracts to perform the verification test, the organization shall select a competent external organization, and demand the same quality management as that of the Verification Organization.

(5) Purchase of goods and services

The organization concerned shall examine, by appropriate measures such as inspection, whether the goods and services purchased from external sources that may affect the quality of verification tests satisfy the requirements specified in the protocol for the verification, and shall not use them for the verification tests until this examination is completed.

In addition, the organization shall evaluate the suppliers of goods and services, and make a list of the approved suppliers.

(6) Control of complaints and nonconforming tests

The organization concerned shall have a system and method that shall be implemented when any of its verification tests or the results of these tests do not conform to the protocol for the verification or other specifications for any reason. The organization shall have a system and method for handling contingencies such as complaints from environmental technology developers, the inhibition of impartiality, information leaks, and others. These systems shall include a person in charge and personnel required for the handling of such cases.

(7) Corrective and preventive actions

When any of its verification tests or the results of these tests do not or may not conform to the protocol for the verification or other specifications, the organization concerned shall investigate the reasons therefor and take corrective or preventive actions.

(8) Audit

The organization concerned shall conduct audits to judge whether the verification test has been properly conducted. When the verification test is subcontracted to an external organization, the operations of the subcontracted organization shall be audited.

The audit shall be conducted at least once during the test period. If the verification test lasts 2 years or more, the audit shall be conducted periodically, and the frequency of audit shall desirably be more than once per year.

In addition, the audit shall be conducted by personnel who are independent of the verification test to as great an extent as possible. The results of the audit shall be reported to the superintendent of the organization concerned.

4. Technical requirements

(1) Personnel

The organization concerned shall ensure the competence of all who operate specific equipment for the verification test, perform tests, evaluate results, and sign test reports. The personnel performing specific tasks shall be qualified on the basis of appropriate education, training, and/or demonstrated skills, as required.

(2) Accommodation and environmental conditions

The facilities for the verification test, including but not limited to energy sources, lighting, and environmental conditions, shall be such as to facilitate correct performance of the tests. The organization concerned shall ensure that the environmental conditions do not invalidate the results or adversely affect the required quality of any measurement. Particular care shall be taken when the verification test is undertaken at sites other than a permanent laboratory facility.

The organization concerned shall monitor, control, and record environmental conditions of the test in accordance with the protocol for the verification, the Test Plan, and other standards. Tests shall be stopped when the environmental conditions jeopardize the results of the tests.

(3) Test methods and method validation

The organization concerned shall use appropriate methods and procedures for all tests within its scope and determine the test methods in accordance with the protocol for the verification.

When the method to be used is not specified in the protocol for the verification, the organization concerned shall select either an appropriate method disclosed in international standards, regional or national standards, scientific texts, or the like, or a method specified by the manufacturer of the equipment. When it is necessary to use methods not covered by standard methods, these shall be subject to agreement with the verification applicant, and their validity shall be appropriately examined prior to use. Validation is the confirmation by examination that the requirements for a specific intended use are fulfilled. The validation shall be conducted based on discussion and subsequent approval by the Technology Panel.

When computers or automated equipment are used for data management, the organization concerned shall provide suitable environmental and operational conditions for the purpose of managing the computers and automated equipment properly, to ensure that there is no loss or improper conversion of data as a result of accidental erasure.

(4) Equipment

The organization concerned shall be furnished with (or leased) all items of the equipment required for the execution of verification tests. If a piece of equipment can only be operated by authorized personnel, the organization concerned shall specify the equipment. Equipment that has been subjected to overloading or mishandling, gives suspect results, or has been shown to be defective or outside specified limits, shall be taken out of service until it has been repaired and confirmed to perform correctly.

(5) Measurement traceability

All equipment used for tests that has a significant effect on the accuracy or validity of the result of the verification test shall be calibrated before being put into service.

(6) Sampling

The organization concerned shall take samples of reagents, materials, or products in accordance with the protocol for the verification.

(7) Handling of test and calibration items

If necessary, the organization concerned shall transport, receive, handle, protect, store, retain, and/or dispose of test items in accordance with the protocol for the verification.

(8) Verification of data and assurance of test result quality

The data resulting from the verification test shall be recorded in such a way that trends are detectable and, where practicable, statistical techniques shall be applied to the review of the results. This verification shall be conducted by a person other than the one who conducts the verification test.

(9) Reporting the results

The organization concerned shall report the results of the test conducted accurately, clearly, unambiguously, and objectively in accordance with the protocol of the verification tests.

Appendix 1: Application form for verification

The verification applicant should submit the application form specified below. In particular, be sure to fill in the columns designated with *, which indicates important information for the selection of verification target technologies.

[Applicant]

Company name*	
Address*	
Division and name of person in charge*	
Contact address*	TEL: FAX:
	e-mail:
Name of technology/product*	

1. In-house test results

Items			Unit	Measurement value
Influent flow rate*		Daily variation in the influent flow rate	Flow rate (m^3/h)	
		Daily average influent flow rate	Flow rate (m^3/h)	
		Daily influent flow rate	Flow rate (m^3/h)	
Effluent flow rate*		Daily variation in the effluent flow rate	Flow rate (m^3/h)	
		Daily average effluent flow rate	Flow rate (m^3/h)	
		Daily maximum effluent flow rate	Flow rate (m^3/h)	
Water quality	pH	Influent		
		Effluent		
	BOD	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	COD	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	SS	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	n-HEX	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	( )	Influent	( )	
		Effluent	( )	
		Removal	%	
		Volume load	kg/m^3 per day	

Items		Unit	Measurement value, etc.
Amount of waste sludge*		kg/day	
Amount of generated waste		kg/day	
Possibility of generating noises and foul odors			
Electricity and other power use		kWh/day	
Types and amount of	( )	kg/day	
wastewater treatment chemicals	( )	kg/day	
Indicate the chemical in parentheses	( )	kg/day	
Amount of other consumables	( )	kg/day	
	( )	kg/day	
Indicate the consumable in parentheses	( )	kg/day	
Person in charge of measurement*			
Date of measurement*			

2. Product data (Submit a technical specification as an attached document.)

Items		Description
Name of the target verification apparatus*		
Serial number		
Name of the manufacturer*		
Contact address*	TEL	( ) –
	Website	http://
	E-mail	@
	FAX	( ) –
Dimensions*	W(mm)	
	D(mm)	
	H(mm)	
Weight (kg)*		
Necessity of pre- and post-treatment*		No - Yes (Describe the treatment specifically)
Additional equipment*		No - Yes (Indicate the equipment specifically)
Life of the target verification apparatus*		

Items	Description			
Approximate cost Examples of expense items of the initial cost: Civil work, construction, equipment, etc. Examples of expense items of the running cost: Wastewater treatment chemicals, consumables, sludge and waste disposal, electricity, etc.	Expense item	Unit cost	Quantity	Total
	Initial cost			
	Running cost (per month)			
	Yen/m^3 of effluent			

3. Control points and time and frequency of the control required for O&M

Control point **Indicate, e.g.,** "refilling of wastewater treatment chemicals," "sludge/waste treatment," "periodic inspection," etc.	**Time required for each control**	**Indicate the frequency of control by filling in the frequency in parentheses and checking the month, week, or day.**
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)

4. Developmental status and past delivery record

Check the number that best describes the current situation.

1. The apparatus is only available as a pilot unit and is not commercialized.
2. The apparatus has already been commercialized and is available as a product.
3. The apparatus has past delivery records.

↓

(Indicate the past records specifically.)

5. Innovativeness of the technology

Describe the innovativeness of the technology, patents, utility model patents, or others filed and granted, the scientific papers disclosed, past awards, and the like.

6. Test Site of your choice

7. Other relevant or unique features (if any)

[Documents to be attached to this application form]

- Technical specification for the technology/product
- O&M manual

The O&M manual should include information on the following:

- Installation and startup of the target verification apparatus
- O&M
- Restart of operation following an emergency stop
- Calibration and exchange of components
- Troubleshooting
- Spare parts
- Optimization of operation and environmental protection
- Ability to handle variations in test conditions

Appendix 2: Test Plan

The Test Plan provides a general description of the objectives and procedures of verification tests, such as the design of verification tests and the various procedures in the verification tests. Influent wastewater characterization, startup, and other operations of the target verification apparatus, as well as the verification test itself, are included in the Test Plan. In addition, the Test Plan should also include the control of data quality, data handling, data presentation, and the environment, health, and safety management program.

For preparation of the Test Plan, suitable information should be provided by the environmental technology developers and the owners of the Test Site. The Verification Organization and the Technology Panel are basically responsible for preparation of the Test Plan.

The content of the Test Plan may vary according to circumstances, but should include at least the following:

1. Cover sheet/approval of the verification test participants/table of contents

A cover sheet for the Test Plan, signatures of the pilot project participants (environmental technology developers, etc.) who approved the Test Plan, and the table of contents are given.

2. Description and objectives of the verification tests

The objective and a description of the verification tests are given.

3. Participating organizations and personnel responsibilities

The organizations participating in the verification tests and the responsibilities of the representatives are described.

4. Test Site description

- Name, address, and owner of the Test Site
- Information on the business conditions of the Test Site (type of business (restaurant, coffee shop, etc.), business scale (number of seats, capacity, etc.), number of employees, number of customers per month, etc.)
- Current flow rate, water quality, processing condition of wastewater
- Location of the target verification apparatus, method of feeding wastewater to the target verification apparatus, wastewater distribution diagram of the entire establishment

5. The target verification technology and apparatus description

- Principle of the target verification technology, system configuration including pre- and post-processing
- Capacity of the flow rate and pollutant load, dimensions and weight of the target verification apparatus
- Required consumables, expendables, electricity and other power use
- Methods for installation, startup, operation, regular maintenance, and troubleshooting of the target verification apparatus
- Control of the processing conditions required by the target verification apparatus (addition of nutritive salts, pH control, dissolved oxygen level, biomass conc., etc.)
- Physical and chemical nature and frequency of the generation of sludge and waste, precautions on handling

- The level of operator skill required to successfully operate the target verification apparatus
- Noise and foul odor control, housing requirement

6. Design of verification tests

(1) Influent wastewater characterization

- Methods of measuring the flow rate and the variations in it
- Water-quality components to be analyzed, methods of measuring variations in water quality, frequency of measurement
- Flow monitoring and schedule for taking samples for each component

(2) Startup of the target verification apparatus

- Startup schedule for the target verification apparatus
- Remarks on startup (flow rate, type and conc. of additives, calibration and adjustment of constituent parts, etc.)

(3) Test period

- Test period and entire schedule

(4) Analysis of water quality

- Verification items regarding water quality
- Sampling method, devices for sampling, sampling schedule (frequency), storage method, storage period
- Analytical methods and instruments, analytical schedule (frequency)
- Calibration method and calibration schedule

(5) Operations and maintenance

- Monitoring items and monitoring, schedule and person in charge of monitoring, recording format
- Locations for monitoring the flow rate, monitoring method and instrument, monitoring schedule
- Method and instrument for determining the amount of sludge, measurement schedule
- Method and instrument for measuring electricity and other power use, measurement schedule
- Method for measuring the amount of wastewater treatment chemicals and consumables used, measurement schedule
- Methods and instruments for evaluating other verification items, information-collecting schedule

7. Quality control of data

- Types of data that use a data quality index (DQI), such as precision, completeness, etc., as well as the method
- Necessity of providing additional quality-control information, such as data on calibration of the devices for sampling and analytical instruments, relevant information, etc. (All unprocessed data will be described in the Verification Report as an Appendix.)

8. Management, analysis and presentation of data

(1) Data management

The Test Plan should include a description of data management and handling. The methods for managing and handling various types of data that are produced in the verification tests, such as field notes, O&M forms, laboratory reports, computer worksheets, graphs, tables, photos, videos, and the like, should be specified.

The Verification Organization designates one data-quality manager.

(2) Analysis and presentation

The Test Plan should include a detailed description of the methods for analyzing and integrating data. Accordingly, statistical methods and equations for use in analysis, as well as data for use in the presentation and the presentation format of the data should be specified.

9. Audit

The Test Plan should also include information on the audit group.

10. Appendix

The following should be described in the Test Plan as an Appendix:

- O&M manual provided by the environmental technology developer
- Environment, health and safety management program (including Material Safety Data Sheets)
- Historical data on the flow rate and quality of influent wastewater
- Other literature and data for reference

Appendix 3: Image of a brief summary of the verification test results

(1) Name of the target verification apparatus, and others

Name of the target verification apparatus	
Manufacturer	
Test Site	
Name of the person in charge of measurement	
Test period	From to

(2) Monitoring items and verification items regarding water quality

Items			Unit	Measurement value
Influent flow rate		Daily variation in the influent flow rate	Flow rate (m^3/h)	
		Daily average influent flow rate	Flow rate (m^3/h)	
		Daily maximum influent flow rate	Flow rate (m^3/h)	
Effluent flow rate		Daily variation in the effluent flow rate	Flow rate (m^3/h)	
		Daily average effluent flow rate	Flow rate (m^3/h)	
		Daily maximum effluent flow rate	Flow rate (m^3/h)	
Water quality	PH	Influent		
		Effluent		
	BOD	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	COD	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	SS	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	n-HEX	Influent	mg/l	
		Effluent	mg/l	
		Removal	%	
		Volume load	kg/m^3 per day	
	( )	Influent	( )	
		Effluent	( )	
		Removal	%	
		Volume load	kg/m^3 per day	

(3) Items regarding environmental impact

Items	Unit	Measurement value, etc.
Amount of generated sludge	kg/day	
Amount of generated waste	kg/day	
Noise and foul odor		

(4) Items regarding used resources

Item	Unit	Measurement value
Electricity and other utility consumption	kWh/day	
( )	kg/day	
Amount of chemicals used for treatment ( )	kg/day	
Indicate the chemical in parentheses ( )	kg/day	
( )	kg/day	
Amount of other consumables used ( )	kg/day	
Indicate the consumable in parentheses ( )	kg/day	

(5) Performance in O&M

Time and frequency of control at each control point

Control point Indicate, e.g., “refilling of wastewater treatment chemicals,” “sludge/waste treatment,” “periodic inspection,” etc.	Time required for each control	Indicate the frequency of control by filling in the frequency in parentheses and checking the month, week, or day.
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)
	( ) min	( ) times per (month, week, day)

Other qualitative findings

Item	Findings
Findings regarding water quality	
Period required for startup of the target verification apparatus Period required for shutting down the target verification apparatus	
Number and skill of operators required for O&M of the target verification apparatus	
Reliability of the target verification apparatus	
Method of restoring from problems	
Evaluation of O&M manual	

(6) Processing capacity and stability of operation

Graphs showing the processing capacity and stability of operation will be displayed.

(7) Product data

Items		Description
Name of the target verification apparatus		
Model number		
Name of manufacturer (distributing agent)		
Contact address	TEL	( ) –
	Website	http://
	E-mail	@
	FAX	( ) –
Dimensions	W(mm)	
	D(mm)	
	H(mm)	
Weight (kg)		
Necessity of pre- and post-treatment		No - Yes (Describe the treatment specifically)

Items	Description			
Additional equipment	No - Yes (Describe the equipment specifically)			
Life of the target verification apparatus				
Approximate cost Examples of expense items of the initial cost: Civil work, construction, equipment, etc. Examples of expense items of the running cost: Wastewater treatment chemicals, consumables, sludge and waste disposal, electricity, etc.	Expense item	Unit cost	Quantity	Total
	Initial cost			
	Running cost (per month)			
	Yen/m^3 of effluent			

(8) Miscellaneous

Indicate points to keep in mind.

Reference

I. Brief overview of the pilot project for the environmental technology verification

1. Objectives

Many innovative environmental technologies that are already in a practically applicable stage and seem to be useful have not come into wide use because end users, including local municipal entities, companies, consumers, and the like, cannot use the technologies with confidence due to the lack of objective evaluation of the environmental protective effect and the like.

Accordingly, in this pilot project for the environmental technology verification, with respect to the innovative environmental technologies that have not been widely accepted as described above, the environment protective effect and others will be objectively verified by an independent organization on an experimental basis.

It is hoped that the pilot project for the environmental technology verification will accelerate the dissemination of the environmental technologies developed by venture companies and the like, and contribute to the activation of economic activity through environmental protection and the advancement of regional environmental industries.

2. What the “verification” means

In the pilot project for the environmental technology verification, the environmental protective effect and the like of particular environmental technologies will be verified through the collection of objective data based on various tests and others. There is a similar term, “certification,” in which the suitability to the standard of an environmental technology is judged in terms of the performance that a technology should provide. The present project does not conduct such “certification.”

3. System for promoting the project

The pilot project for the environmental technology verification will be carried out by the Ministry of the Environment in cooperation with the “Verification Organizations” (local municipal entities, etc.), which are independent organizations that conduct technology verification under the entrustment and contract of the Ministry of the Environment.

4. Procedures of the project

The pilot project for the environmental technology verification will generally be conducted in accordance with the following procedures:

(1) The Ministry of the Environment will identify the needs of the technology developers / distributing agents, users, and others, through the use of questionnaires or the like.

(2) The Ministry of the Environment will select target verification technology fields based on discussions in the committee on the pilot project for the environmental technology verification.

(3) The Ministry of the Environment will prepare a “protocol for the verification,” which establishes the specific methods of technology verification regarding the selected target verification technology fields.

(4) The Ministry of the Environment will select the “Verification Organizations,” which are the independent organizations that conduct the verification tests.

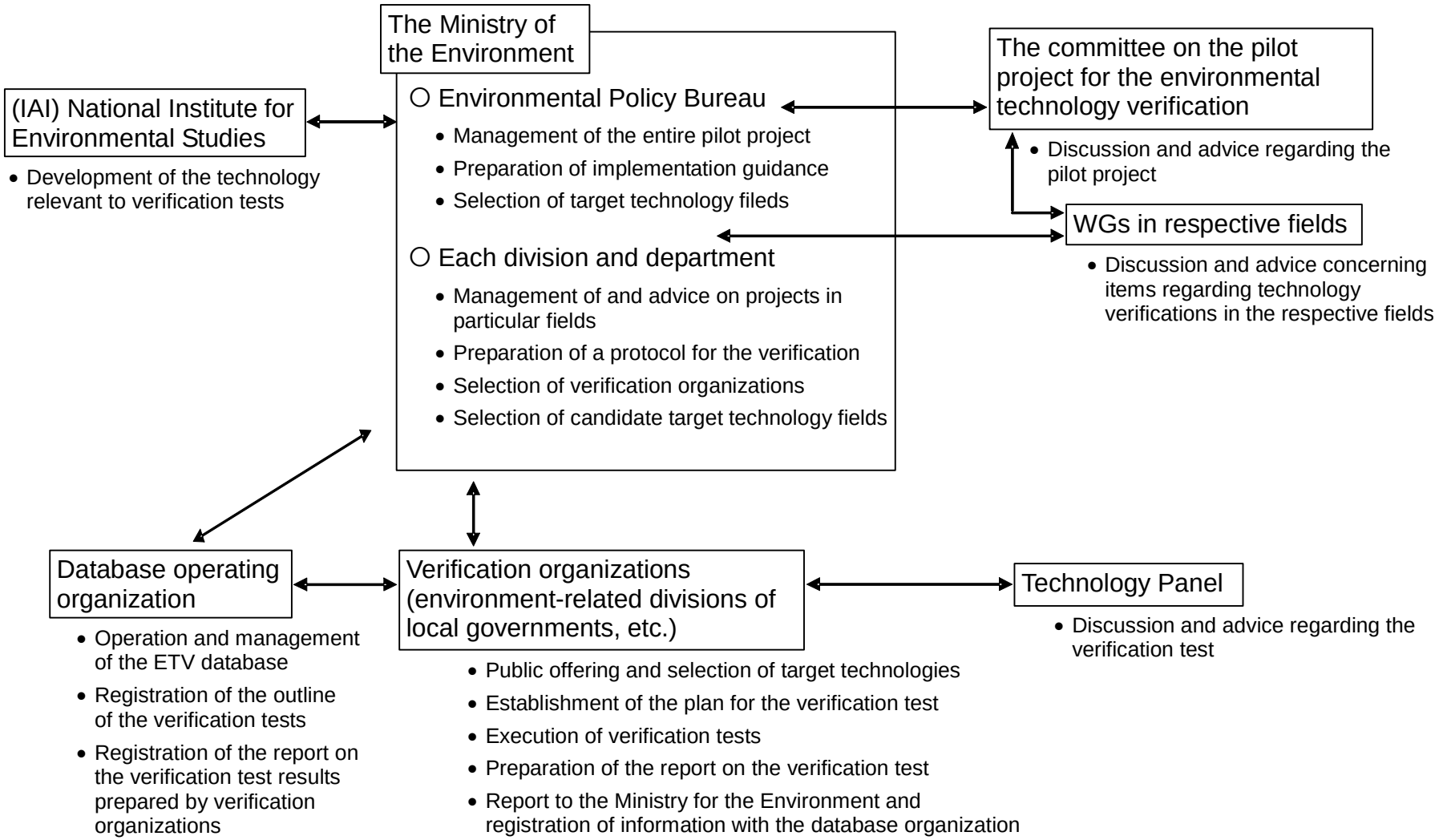
(5) The Verification Organizations will invite applications from companies and the like for the technology to be verified.

(6) The Verification Organization will select the technologies to be verified in the project from among the applications, following discussion in a panel consisting of the specialists.

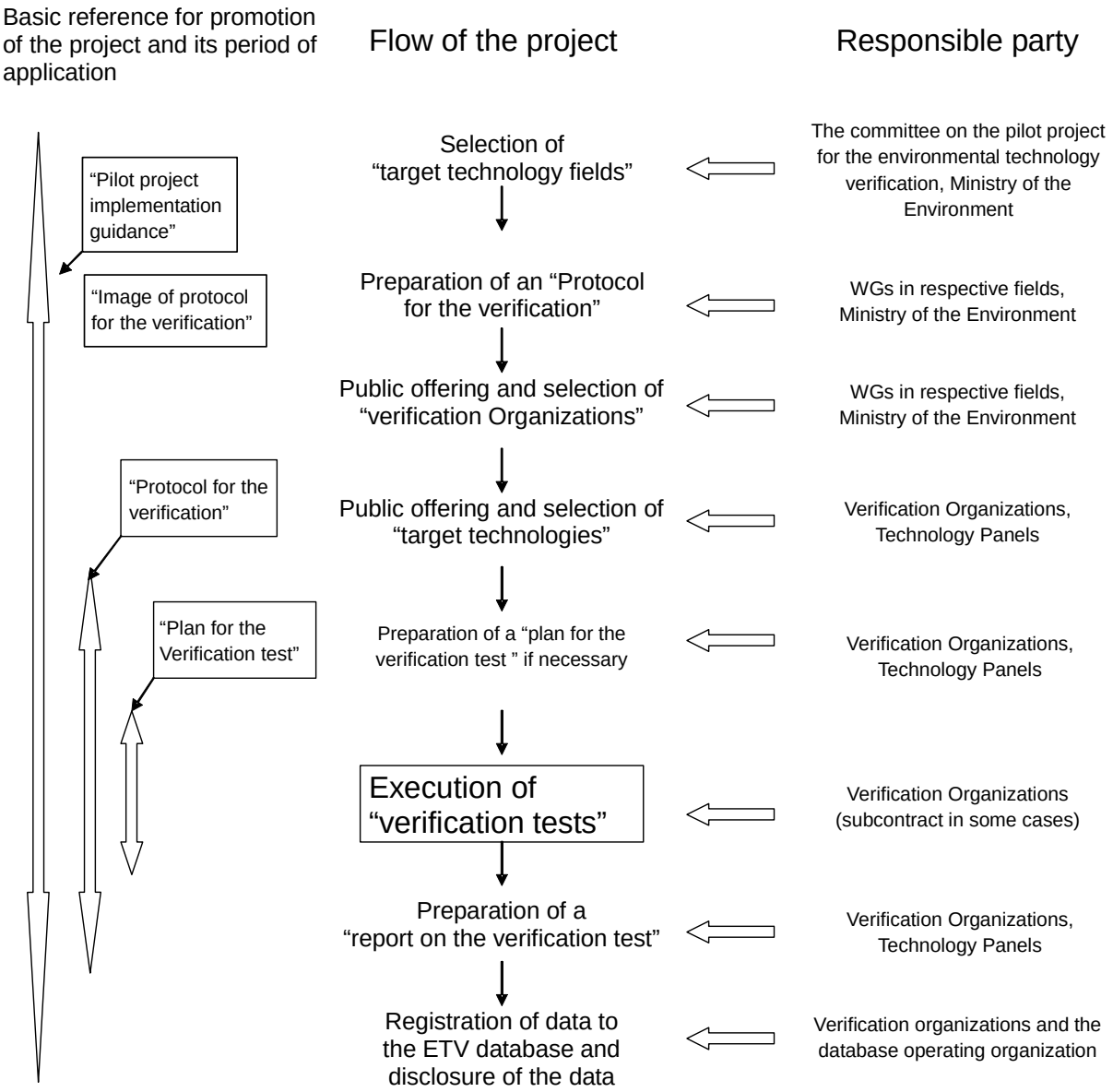
(7) The Verification Organizations will conduct verification tests on the selected technologies in accordance with the protocol for the verification.

(8) The Verification Organizations will summarize the results of the test in report form, notify the technology developers/distributing agents of them, and report to the Ministry of the Environment. In addition, the report will be registered in a database on the Internet and made available to the public.

II. System for promotion of the “pilot project for the environmental technology verification”



III. Flow of the pilot project for the environmental technology verification



IV. Prospectus for organizing the working group on the organic wastewater treatment technology in the committee on the pilot project for the environmental technology verification for 2003

1. Objective of the working group

The working group on the organic wastewater treatment technology is established for the purpose of discussing based on specialized knowledge the "organic wastewater treatment technologies for small-scale establishments" in the technology areas in which technology verification is scheduled to be conducted in 2003, in the pilot project for the environmental technology verification and thus promoting the project smoothly and efficiently.

2. Items to be investigated and discussed

(1) Fields of organic wastewater treatment technologies

i Preparation of a protocol for the verification

ii Selection of Verification Organizations

iii Confirmation of Verification Reports

iv Other items relevant to execution of the project

(2) How future verification tests regarding wastewater treatment technologies shall be conducted, and the selection of candidate technology fields

3. Organization and others

(1) The working group consists of 10 or fewer members.

(2) The working group has a chairperson.

(3) The chairperson will supervise the working group.

(4) The members will be appointed by UFJ Institute Ltd., from among academic experts, well-informed individuals, and the like relevant to verification tests on organic wastewater treatment technologies, with the approval of the Environmental Management Bureau of the Ministry of the Environment.

(5) The members will be under commission for the period from the date of appointment by UFJ Institute Ltd. to the end of the same fiscal year.

(6) In addition, participants and interested parties in the pilot project for the environmental technology verification may also attend the meetings of the working group as observers and the like, if necessary.

4. Disclosure of the discussion and others, etc.

Meetings of the working group will, in principle, be held in public. However, the chairperson may hold a closed meeting of the working group if a public meeting may cause significant obstacles to fair and neutral discussion, and provide particular individuals with unfair benefit or detriment.

5. Secretariat

The general affairs of the working group will be processed by UFJ Institute Ltd., with the consent of the Environmental Management Bureau of the Ministry of the Environment.

The Committee on the pilot project for the environmental technology verification for 2003
List of the members of the working group on the organic wastewater treatment technology

Chairperson	Masanori Fujita	Prof. Grad. School of Eng., Osaka Univ.
	Mitsumasa Okada	Prof. Grad. School of Eng., Hiroshima Univ.
	Hisashi Nakai	Director, Operations Dept., Japan Food Service Association
	Makoto Natori	Adviser, Japan Society of Industrial Machinery Manufacturers International Environmental Technology Cooperation Center
	Seiji Hirota	Senior Executive Staff, Research Coordination Division, Environmental Pollution Control Center, in Osaka Prefecture

< Secretariat (Ministry of the Environment) >

Kenichi Ando	Director, Environmental Control Technology Office, Environmental Management Bureau
Seisuke Izawa	Deputy Director, as above
Kazumi Shindo	Deputy Director, as above
Satoshi Inoue	Special Researcher, as above
Kazuya Kumagai	Deputy Director, Policy Planning Division, Water Environment Department
Norihiro Kino	Deputy Director, Office of Environmental Research and Technology, Environmental Policy Bureau

< Secretariat (UFJ Institute Ltd.) >

Eiko Saito	Chief researcher, Environmental Policy Consulting Department
Shintaro Munakata	Researcher, Environmental Policy Consulting Department
Naoki Yoshizawa	Researcher, Environmental Policy Consulting Department

V. Particulars discussed in the working group on the organic wastewater treatment technology

First meeting: 10:00 to 12:00, June 26, 2003

- ○ Pilot project for the environmental technology verification
- ○ Organic wastewater treatment technologies for small-scale establishments
- ○ Protocol for the verification (draft)

Second meeting: 13:00 to 17:00, July 16, 2003

- ○ Opinions on the protocol for the verification (draft)
  - ● Environmental Management and Technology Center in Kansai
  - ● Sanyo Electric Co. Ltd.
  - ● Daitogiken Inc.
  - ● TT TechnoPlace, Inc,
  - ● Nishihara Environmental Technology, Inc.
- ○ Protocol for the verification (draft)

Third meeting: 13:30 to 15:30, July 30, 2003

- ○ Protocol for the verification (second draft)
- ○ Public offering and selection of Verification Organizations