

VI. 研修計画の考察

1. 研修ニーズ

安全な水の供給は人間生活にとって最も基本的で不可欠なものである。1990年12月の国連総会においても「今世紀中に全ての人々に供給する必要がある」ことが唱われ、その実現に向けた国際協力の重要性が益々高まっている。

開発途上国においては、とりわけ都市部における急速な人口増加と著しい生活水準の向上から水需要が増大し、これに応えるための給水施設の拡張が最優先の課題となっている。先進国からの援助によって、浄水施設、給配水施設の拡張が進められているが、その一方で、多くの水道事業体では、これらの施設の適切な維持管理が実施されていないのが現状である。その結果として、漏水に代表される無収水の割合が極めて高く、延いては水道事業体の財政基盤を揺るがし、新たな維持管理ができないという悪循環を引き起こしている。

今回調査を実施した3ヵ国についても事情は全く同じで、各国政府機関及び水道事業体は無収水量の低減（漏水対策）を水道事業経営の根幹をなす重要な課題として位置付けていることが確認された。

本研修コースのカリキュラムは、「漏水探査と修理」、及び「計画・設計・施工・維持管理の各段階における漏水の予防的対策」を網羅している。本調査を通じて、これらの研修科目は概ね途上国の研修ニーズに即したものであることが確認できたが、コース実施に際しての幾つかの留意点の中から、最も重要な3点について以下にまとめる。

- 1) カリキュラムは講義をできるだけ減らし、実技科目に重点を置いた内容となっている。今回の調査を通じ、その中でも特に「漏水探査機器の操作技術」、及び研修員が自ら「漏水防止計画」を作成する「ケーススタディー」に対し、高い関心が示された。しかしながら、現地調査を実施した3ヵ国の中においても漏水対策の進展の度合に差異が見られたことから、研修の実施に際してはケニアのように漏水探査機器がほとんどない国もあることを認識しておく必要がある。
- 2) 途上国では、漏水防止対策の基本データである配管網の図面管理が著しく遅れている。新たな配管敷設はもちろん、漏水探査と修繕工事に並行して配管網の情報を図面に整備・蓄積していくことが、無収水量低減へ

の第一歩である。したがって、「図面管理」の研修において、基礎的な図面管理についての技術指導を行い、研修員が帰国後に自国の配管網の図面整備に必要となる基礎的技術を習得することは非常に重要と思われる。

- 3) 技術的な漏水防止対策の一方で、無収水管理・漏水防止に対する水道事業体職員の意識を高めることや経営管理面からの問題解決へのアプローチが重要である。したがって、「料金徴収」、「盗水（不正使用）対策」といった研修のなかで、無収水の問題が事業体の財政的基盤・経営に及ぼす影響を明らかにすることで、無収水に対する問題意識をさらに高めることが必要と思われる。

2. 到達目標

本コースの到達目標は、

- ①無収水を取り巻く諸問題について包括的な理解ができる
- ②漏水探査機器の操作技術が理解できる
- ③漏水防止作業の分類及び配水管の分析方法が理解できる
- ④漏水防止計画の作成方法が理解できる
- ⑤漏水の予防的対策として計画・設計・施行段階の専門知識及び技術が理解できる

の5項目である。

これらの到達目標は訪問した関係水道公社等から概ね高い評価を得た。特に、エジプトでは上記の④の「漏水防止計画作成」について、シリアでは②の「漏水探査機器の操作技術」について高い評価を得た。一方、ケニアでは漏水防止機器がほとんど普及していないため、「漏水探査機器の操作技術」について、日本で学んだせっかくの技術が活かさない、というコメントがあり、何らかの対応が必要である。

3. 応募資格要件

本コースの応募資格要件は

- ①水道施設に携わる技術系行政官で5年以上の実務経験を有する
- ②大学卒以上又は同等の学歴を有する
- ③年齢が27才以上40才未満である

ことである。

これらの資格要件について、訪問した関係公社から特に新たな要望はなかった。

4. カリキュラム

無収水量管理対策コースのカリキュラム（案）は別紙のとおりである。

日本の水道における漏水防止対策を技術的な側面で見ると、基礎的対策（組織、図面、配水・漏水量分析、材料、漏水探査機器等）と漏水防止作業及び予防的対策（管網整備、計画・設計・施行、給水装置改善等）に分類できる。これらの必要科目は、全てカリキュラムに組み込まれている。そのほかに、地震対策、湯水対策（水源管理）、給配水管接合の実技の科目並びにダクタイル鋳鉄管及び水道メータ製造工場、小規模水道事業体の施設見学が含まれる。

3か国の現地調査を通してカリキュラム全般に関しては、内容の充実度が概ね好評とのコメントが得られており、初年度のカリキュラムを改善する必要はないものとするが、次の点に留意したコース運営が必要と思われる。

- ①ケニア水道技術専門学校での討議の中でGTZの専門家が指摘していたように、開発途上国においては技術的な側面だけでなく、特に上級職員の無収水管理・漏水防止に対する問題意識の深度化及び経営能力の向上等といった水道事業体の運営管理的な側面からのアプローチが問題解決に欠かせない。したがって、「料金徴収」「盗水対策」「漏水防止計画の作成」の科目の中で、職員の問題意識を高めると同時に、管理運営能力の向上に留意した講義を行う必要があると思われる。
- ②エジプトの大カイロ圏上水道庁の研修センター所長より、カリキュラムの実技科目の一つである「給水穿孔」について高い評価を得た。さらに、研修効果を高めるため、研修員自身が「漏水防止作業計画」を作成することができるような「ケーススタディー」を取り入れて欲しいとの要望があった。
- ③エジプトでは4年前、マグニチュード7程度の地震があったので、「地震対策」の科目について高い評価を得た。一方、シリア及びケニアでは過去に大きな地震を持った経験がなく、関心が低い。
- ④ケニアでは漏水探査機器がほとんど普及していない現状であり、たとえ操作技術を学んでも、実際の職務に活用できないという声が多かった。

一方、シリアには日本から多くの漏水探査機器が導入されているものの、納入時の操作研修が十分でないとの声もあり、操作技術の研修の必要性を強調していた。

- ⑤シリアでは不明バルブが多いため、「不断水の凍結工法」について学びたいという要望があった。
- ⑥開発途上国では経済的な理由から維持管理が十分に行えないのが現状である。それゆえ、研修の対象となる給配水施設の材料、構造又は機器等については、この点を十分に配慮した上で選択することが重要である。

5. 研修方法

研修方法は、講義、実技、演習、工場見学、工事現場視察並びに他都市水道施設見学等から成っている。できるだけ、講義の時間数を減らしている。この点についても、評価を得たものとする。

6. 研修実施体制

本研修コースは、JICA名古屋国際研修センターが名古屋市水道局の協力を得て実施する。実務的な研修は名古屋市水道局の技能研修センターで行われる。

7. 研修評価手法

本研修コースの評価手法は、

- ①研修員による評価
- ②研修講師による評価
- ③研修終了後のフォローアップ評価

を取り入れている。これらの評価手法について、訪問した関係水道公社等から特に新たな要望はなかった。したがって、第1回目のコースは当初予定の評価手法で行なうものとし、コース終了後に改善の必要性があれば、第2回目のコースの評価手法について再検討することとしたい。

8. その他の要望、新規コース開発

今回の調査結果を受けて、関連分野の新規コース開発の可能性として以下の2つを挙げたい。

1) 中東地域特設「水源管理、無収水管理・漏水対策」

新規開発コースとして、中東地域を対象にした「水源管理、無収水管理・漏水対策」特設コースの開催を強く提言したい。水は生物にとってなくてはならないものであり、また、水道水は人間、産業活動に欠くのことのできないものである。中東地域は、国際的な河川はあるが有効利用できない状況にある上に、漏水率が高く、渇水も深刻になっている。それゆえ、紛争の絶えない中東地域を対象とした地域別特設「水源管理、無収水管理・漏水対策」コースを実施することにより、人間生活に最も基本的で不可欠な水の安定供給を図るための技術支援を行い、中東和平に間接的に貢献できないものかと考える。

2) 「灌漑施設における漏水対策」

上水道分野以外であるが、エジプト水資源省灌漑部門関係者より「灌漑施設における漏水対策」コースの設立要望があった。灌漑分野においても、今後増大が見込まれる需要に対応するには漏水対策を含めたシステム管理の改善が重要であるとの強い認識の現われと思われる。上水道部門はもちろんのこと、灌漑分野においても適切な水管理を実施するために技術支援を必要としていることが確認できた。

最後に、今回の調査を通して感じたことは、

- ① 3か国とも無収水管理・漏水対策について、その重要性を認識し、有収率向上に強い意欲を持っていた。
- ② 従前はヨーロッパの水道技術の支援、影響の強かったエジプト、シリアにも日本の技術協力が着手され始めたことを実感した。日本の近代水道もヨーロッパの技術協力により始まり、自助努力により優れた技術を有するようになった。今後、我が国の水道分野における開発途上国への支援は、かつてのヨーロッパの日本に対する水道技術協力への報恩感謝の気持ちで日本の適正技術を移転していくことが必要であり、そのためにも専門家の技量がますます問われることになると思われる。
- ③ エジプト訪問時に、時期を同じくして北アフリカ、中東地域の経済閣僚会

議が開催されていた。タイ、インドネシアに続いて97年度からカイロ市で協力開始が予定されている水道部門の人材育成のための技術協力プロジェクトがアフリカ、中東地域に大きな影響を与えることを期待したい。

④エジプトのモニブ浄水場を施設見学した際、1系列は日本の無償援助により、フロック形成池、傾斜板付横流式沈澱池、急速ろ過池等が、もう1系列はフランスの無償援助により高速凝集沈澱池（パルセータ）、急速ろ過池等が建設されていた。将来の維持管理、ランニングコスト等において、エジプトの水道技術者が日本方式の浄水施設の利点について学ぶことを期待したい。

⑤開発途上国ではどこも同じ事情であろうが、操作・維持管理費が乏しい。

ケニアのナイロビ市から車で約3時間のメルー水道事務所を訪問したが、「維持管理費がないので、これ以上の工事ができない」、また、「パイプ等の資材がなくなった場合は、資材業者から借りて工事を行う」との説明があった。さらに、助役の話によれば国からの財政援助が乏しいので、庁舎の電気、電話代が支払えないため、電気と電話の供給がストップしており、辛うじて水道だけは使用できるということであった。これらの事情を考慮すると、「操作・維持管理費」に十分配慮した講義、実技等の研修を実施する必要があるものとする。

⑥エジプトでは、これまで無償援助等による多数の浄水場、配水管網整備事業が行われてきたが、水道の専門家はこれまで派遣されていなかった。将来の維持管理等を考えた場合、今後JICA専門家あるいは国際協力専門員によるフォローアップシステムの充実が必要であるとする。

VII. 添付資料

1. 調査団配布資料
2. 平成8年度「上水道無収水量管理対策」関連資料

1. 調査団配布資料

- 1) 団員リスト
- 2) コース概要
- 3) クエスチョネア

Japan International Cooperation Agency (JICA)

Special Survey Mission in Non-Revenue Water Management

The Special Survey Mission in Non-Revenue Water Management is happy to visit Egypt, Syria and Kenya to study the current situation and the training needs of the mentioned field in their countries in relation to the establishment of the group training course in Non-Revenue Water Management (Leakage Control) which is to be conducted from January 1997 for the first time in Japanese fiscal year of 1996.

The outcome of the survey will be utilized to betterment the training program in the future.

Team Leader	Mr. Toshio HIRAI Director, Training Division, Nagoya International Training Centre, Japan International Cooperation Agency (JICA)
Technical Adviser (Water Service Installation)	Mr. Tateo FUJIMOTO Assistant Director, Water Supply Division, Service Management Dept. Nagoya Waterworks Bureau
Technical Adviser (Water Distribution System)	Mr. Akio NAKAMURA Assistant Director, Technical Training Center, Water Distribution Dept. Nagoya Waterworks Bureau
Coordinator	Mr. Minoru HOMMA Training Officer, Training Division, Nagoya International Training Centre, Japan International Cooperation Agency (JICA)

Attached : OUTLINE OF THE TRAINING COURSE

OUTLINE OF THE TRAINING COURSE

1. Name of Course : Non-Revenue Water Management (Leakage Control)
2. Duration : From January 13, 1997 to March 10, 1997
3. Participant Number : 8
4. Training Needs

The rate of water leakage through distribution and service facilities in water supply system in many developing countries is considerably high. It is currently estimated more than 30 to 50%. City water delivered from a purification plant cannot fully reach the end of distribution network and, what is worse, the shortage of water volume and water pressure even lead to stoppage of water supply or to outbreak of diseases due to the contamination of water. Despite of these conditions, both daily maintenance such as leak detection and leakage repair, and preventive measures in planning, designing and construction of distribution facilities are still much behind.

The urgent need for technical training in non-revenue water management has been increasing with the background that the engineers with full of practical knowledge and experience in this field are very limited.

This course will be conducted for the first time in the fiscal year 1996.

5. Objective

Upon successful completion of the course, the participants are expected to be able to acquire the followings;

- (1) Comprehensive knowledge about various problems around non-revenue water
- (2) Basic technical knowledge to detect and repair leakage
- (3) Practical knowledge and techniques for planning, designing and construction management as leakage prevention measures

6. Training Institutions

The training course is organized and coordinated by Nagoya International Training Centre (NITC), JICA in cooperation with the following institutions.

(1) Nagoya Waterworks Bureau

Main Activities: The Nagoya Waterworks Bureau, taking raw water from the Kiso River through two intakes, has three water purification plants and supplies quality water to the 2.2 million citizens in the city of Nagoya.

Since the establishment, the Nagoya Waterworks Bureau has been keeping a record of stable uninterrupted water supply, and achieving high accounted-for water rate.

(2) Technical Training Center, Nagoya Waterworks Bureau

Main Activities: The Technical Training Center Which was established in 1984 for the purpose of continuous improvement of the aptitude of staff members in order to contribute to the effective management of waterworks, located in the southern district of Nagoya City, comprises of a two-story building. The total floor area is approximately 770 m², including an administration office, training laboratories and lecture rooms. There is also a technical training yard which measures approximately 5,100 m².

Scope of Non-Revenue Water Management Course

7. Curriculum

Scope of the Course	Qualification of Participants
	<ol style="list-style-type: none"> Administrative Officials who have engineering background and presently engaged in waterworks management with more than five (5) years working experience University graduates or those who possess equivalent professional qualification in this field Age between twenty-seven (27) and forty (40) years old

Purpose	The purpose of this course is to provide administrative officials who have engineering background and are presently engaged in this field with comprehensive knowledge and control technology of non-revenue water management (leakage control), to enhance their current possessed knowledge and skills, and to contribute development of leading personnel of this field in their own countries.
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Seminar	Course Guidance	Leakage Detection and Repair	Leakage Prevention Measures			Observation of Facilities
			Planning Stage	Designing Stage	Construction and Maintenance Stage	
<ul style="list-style-type: none"> History of Sanitation and Waterworks in Japan Waterworks in Japan Environmental Change by Global Warming in Asia and Pacific Regions Water Shortage and Water Resource Control (Focused in Tokai Region) Country Report 	<ul style="list-style-type: none"> Orientation Outline of Waterworks in Nagoya Outline of Leakage Control in Nagoya 	<ul style="list-style-type: none"> Type and Characteristics of Leakage Analysis of Distributed Water Volume and Leakage Classification of Leakage Prevention Work Leakage Detection Working Plan Making of Leakage Detection Plan Operation of Detection Instruments Distinction of Leakage 	<ul style="list-style-type: none"> Maintenance Plan of Main Facilities Adjustment of Water Distribution Improvement and Replacement of Pipe Countermeasure for Earthquakes Countermeasure for Water Shortage 	<ul style="list-style-type: none"> Choosing of Water Pipe Type Designing Water Distributing Pipe Type and Performance of Water Meter Performance of Pipe Joints 	<ul style="list-style-type: none"> Prevention Measures for Pipe Corrosion Management of Computerized Design System Maintenance of Water Meter Structure and Performance of Aqueduct Pump Water Charge Collection System Countermeasure for Water Stealing Joining of Water Pipe and Perforating of Water Supply 	<ul style="list-style-type: none"> Manufacturing Plant of Ductile Iron Pipe Manufacturing Plant of Water Meter Small and Medium Size Waterworks Body

Evaluation	<ol style="list-style-type: none"> Program Evaluation by Participants Evaluation by Lecturers and Others Concerned in This Course
Objectives	<ol style="list-style-type: none"> To be able to acquire comprehensive knowledge about various problems around non-revenue water To be able to acquire operational skill of leakage detection instruments To be able to acquire knowledge of classification of leakage prevention work and analysis of distributed water volume To be able to acquire practical knowledge of making leakage prevention plan To be able to acquire practical knowledge and techniques for planning, designing and construction management as leakage prevention measures
Follow-up Evaluation	Results of this course is to be evaluated for participants and their bosses about a half year after finishing this course

Questionnaire

Name of Country		Name of Waterworks Utility	
Organization in Your Utility	TRAINING GENERAL DEPARTMENT		
Total Population	16	Average Water Supply Volume (M ³ / day)	
Population Served		Average Water Pressure (MPa)	
Service Ratio (%)		Ratio of Accounted for Water (%)	
Water Supply Capacity (M ³ / day)		Ratio of Water Loss (%)	
Water Resources			
Type of Water Distribution Pipe	Jointing Type of Water Distribution Pipe	Water Distribution System	
		<ul style="list-style-type: none"> - Gravity Flowing System - Pumping-up System - Others 	
Type of House Connection Pipe	Jointing Type of House Connection Pipe	Water Supply System	
		<ul style="list-style-type: none"> - Direct Pressure System - Water Tank System - Others 	
Type of Water Meter Used in Your Country	Type of Flowmeter Used for Water Distribution Pipe	Type of Pipe Drawings	
Leakage Detection Work System		Name of Leakage Detection Instruments Used in Your Country	
Problems Currently Faced			

Please attach the organization chart for reference.

2. 平成8年度「上水道無収水量管理対策」関連資料

- 1) 研修プログラムの概念図
- 2) テキストリスト
- 3) 研修日程
- 4) G.I. (ジェネラルインフォメーション)

研修プログラム概念図

目的
 上水道維持管理に従事する技術系行政官を対象に漏水防止を中心とする無収水の管理技術を習得させることにより、既得知識及び技術の向上を図り、もって当該国の無収水管理に携わる指導者を養成する。

資格要件の件
 ①水道施設に携わる技術系行政官で、5年以上の実務経験を有する。
 ②大卒以上、又は同等の学歴を有する。
 ③年齢は、27才以上、40才未満。

カリキュラムデザイン

セミナー	コースガイダンス	漏水探査と修理	漏水の予防的対策			施設見学等
			計画段階	設計段階	施工・維持管理段階	
-日本の水道衛生の歴史 -温暖化によるアジア太平洋地域の環境変化について -濁水と水管理(東海地方を中心として) -カンクトリレポート	-オリエンテーション -古屋の水道施設概要 -古屋の漏水防止概要	-漏水の特性 -配水量・漏水量の分析 -漏水防止作業の分類 -漏水防止作業計画 -漏水防止計画の作成 -漏水防止機器操作 -漏水の判定法	-基幹施設整備計画 -配水調整 -配水管の改良・更新 -地震対策 -漏水対策	-給・配水管の管種選定について -配水管の設計 -メータの種類と性能 -給配水管継手性能	-配水管の防食対策 -図面情報管理 -メータの維持管理 -導水装置ポンプの構造と性能 -料金の徴収方法 -盗水対策 -給・配水管接合、給水穿孔	-ダクタイル鑄鉄管製造工場 -メータ製造工場 -中・小規模水道事業体

評価
 ①研修員による研修の評価
 ②研修講師等による評価

到達目標
 ①無収水を取り巻く諸問題について包括的な理解ができる。
 ②漏水探査機器の操作技術が理解できる。
 ③漏水防止作業の分類及び配水量の分析方法を理解できる。
 ④漏水防止計画の作成方法が理解できる。
 ⑤漏水予防的対策として計画・設計・施工段階の専門知識及び技術が理解できる。

フォローアップ・エバリュエーション

テキストリスト

- (1) Opening Seminar
オープニングセミナー
 - 1) History of Sanitation and Waterworks in Japan
日本の水道衛生の歴史
 - 2) Waterworks in Japan
日本の上水道
 - 3) Projection of Global Environmental Change
環境の地球規模での変化について
 - 4) Water Shortage and Water Resource Management
渇水と水管理について

- (2) Outline of Nagoya Waterworks
名古屋市水道局の概要
 - 1) Waterworks in Nagoya
名古屋の水道施設概要
 - 2) Leakage Control in Nagoya
名古屋の漏水防止概要

- (3) Leakage Detection and Repair
漏水探査と修繕
 - 1) Type and Characteristics of Leakage
漏水の特性
 - 2) Distributed Water Volume Analysis
配水量・漏水量の分析
 - 3) Classification of Detection Work
漏水防止作業の分類
 - 4) Working Plan of Leakage Detection
漏水防止作業の計画
 - 5) Operation of Detection Instruments
漏水防止機器の操作

- (4) Leakage Prevention in Planning
計画分野での漏水防止
 - 1) Main Facilities Planning
基幹施設整備計画
 - 2) Rehabilitation and Replacement of Pipeline
配水管の改良
 - 3) Adjustment of Water Distribution
配水圧調整

- (5) Leakage Prevention in Design
設計分野での漏水防止
 - 1) Pipe Material and Jointing
給・配水管の管種選定と継手性能
 - 2) Structure and Material of Service Installation
給水装置の構造と材料
 - 3) Corrosion Prevention
配水管の防食対策

- 4) Design and Cost Estimation of Pipeline
配水管の設計・積算

- (6) Leakage Prevention in Construction Management
施工段階での漏水防止
 - 1) Pipe -Laying Work and Its Coordination and Inspection
配水管布設工事と施工管理
 - 2) Pipe-Protection for Other Construction Works
他工事に伴う事故対策
 - 3) Management and Maintenance of Service Installation
給水装置の施工と維持管理
 - 4) Tapping and Jointing Technique of Service Pipes
給水穿孔と給水管の接合
 - 5) Mechanical Jointing Technique
配水管の接合

- (7) Metering System
水道メーター
 - 1) Type and Characteristics of Water Meter
メーターの種類と性能
 - 2) Maintenance and Management of Water Meter
メーターの維持管理

- (8) Mapping Management
図面管理
 - 1) Mapping System
図面管理システム

- (9) Measures for Water-Stealing
盗水対策
 - 1) Countermeasures against Illegal Use
不正行為対策

- (10) Water Charges
水道料金
 - 1) Water Charge and Bill Collection
水道料金と徴収方法

- (11) Countermeasures for Disaster
災害対策
 - 1) Countermeasures for Drought
渇水対策
 - 2) Countermeasures for Earthquakes
地震対策

平成8年度上水道無収水量管理対策コース日程

1 月		2 月		3 月	
午前	午後	午前	午後	午前	午後
1 水		1 土		1 土	
2 木		2 日		2 日	
3 金		3 月	他工事に伴う事故対策と現地調査実習	3 月	漏水対策
4 土		4 火	配水管布設工事と施工管理並びに漏水防止作業	4 火	水道事業体訪問(三島水道企業団、南知多町)
5 日		5 水	配水管布設工事と施工管理並びに漏水防止作業	5 水	研修報告書の作成
6 月		6 木	給水装置の管理	6 木	研修報告書の作成
7 火		7 金	水道施設見学(青少年公園、足助町)	7 金	研修評価
8 水		8 土		8 土	東京へ移動
9 木		9 日		9 日	
10 金		10 月	漏水の特性	10 月	帰国
11 土		11 火	通水記念日	11 火	
12 日		12 水	漏水防止作業の分類	12 水	
13 月	来日(東京)	13 木	ダクタイル鑄鉄管製造工場の施設見学(大阪)	13 木	
14 火	プリーファイング	14 金	京都市内観光	14 金	
15 水	乗入の日	15 土		15 土	
16 木	厚生省表彰	16 日		16 日	
17 金	NITC開講式/リエガーション	17 月	メータの種類と性能	17 月	水道メータの維持管理
18 土	ハスツアー	18 火	料金と徴収方法	18 火	盗水対策
19 日		19 水	配水管の設計概算	19 水	図面情報管理
20 月	日本語研修	20 木	研修生による各団体の漏水防止計画作成	20 木	
21 火	日本語研修	21 金	中間討論会	21 金	水道ナガ工場見学(愛知時計)
22 水	日本語研修	22 土		22 土	
23 木	日本語研修	23 日		23 日	
24 金	日本語研修	24 月	犬山取水場、春日井浄水場、東山管理事務所施設見学	24 月	
25 土		25 火	給水工事と施工管理	25 火	
26 日		26 水	給配水管の継手性能	26 水	給水穿孔と給水管接合
27 月	「日本の水道衛生の歴史/名古屋大学地圏環境工学/名古屋大文学」	27 木	漏水防止機器の操作、配水管の接合(K,F,SII形)	27 木	
28 火	「石橋賢の給排水/名古屋の上水道/カトリック/名古屋上野浄水施設見学」	28 金	漏水の平定手法、漏水装置のポンプ	28 金	研修生の要望による講義又は実習
29 水	名古屋の漏水防止	29 土		29 土	
30 木	配水管の管種選定	30 日		30 日	
31 金	配水管の改良・更新				

**INFORMATION ON GROUP TRAINING COURSE
IN
NON-REVENUE WATER MANAGEMENT (LEAKAGE CONTROL)**

(特設；上水道無収水量管理対策)

(COURSE NO.: J-96-03311)

F. Y. 1996

THE GOVERNMENT OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

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Preface

The importance of human resources development is widely recognized. Convinced of its importance, the Government of Japan established the Japan International Cooperation Agency (JICA) in 1974 as its sole agency for the integration and implementation of Japan's technical cooperation with developing countries, with the aim of expanding Japan's development cooperation in response to increasingly diversified requests from developing countries for technical cooperation, particularly in the area of human resources.

JICA conducts such activities as training, expert dispatch, equipment supply, dispatch of cooperation volunteer, and a development survey with extensive cooperation from governmental and private organizations in Japan.

JICA training programme has been regarded as one of its core activities ever since the agency's establishment. Under the training programme, which comprise both group training and individual training, JICA today accepts around 7,000 overseas participants every year for training in Japan.

The objective of the training programme is to provide opportunities for participants to enhance their current technical and administrative skills, thus enabling participants to continue to contribute significantly to their country's development. In addition to gaining technical knowledge, participants will have many opportunities to experience various aspects of life in Japan while they are here. Participants are expected to take advantage of them. Shared friendships and the mutual exchange of ideas with Japanese citizens are also important goals of the training programme.

The training, integral to long term economic and technical development, is conducted in various ways. For example:

- * as a component of a technical training programme for the purpose of providing skilled personnel for a development project, or
- * as part of the general human resources development efforts of a particular country.

Japan has given strong emphasis to the training programme, stressing the importance of high level training to meet more effectively the needs for managers, scientists, technicians, teaching faculties, and institutional leaders in all sectors. JICA training programmes are not, in principle, designed for the pursuit of academic studies leading to degrees or diplomas.

Around 520 group training courses are offered to developing countries to meet their needs in the area of human resources development. Non-Revenue Water Management is one of the group training courses to be conducted in Japanese fiscal year 1996 (April 1, 1996 ~ March 31, 1997).

I. COURSE OUTLINE

1. **Duration:** From January 13, 1997 to March 10, 1997

2. **Participant Number:** 8

3. **Training Needs**

The rate of water leakage through distribution and service facilities in water supply system in many developing countries is considerably high. It is currently predicted more than 30 to 50%. City water delivered from a purification plant cannot fully reach the end of distribution network and, what is worse, the shortage of water volume and water pressure even lead to stoppage of water supply or to outbreak of diseases due to the contamination of water. Despite of these conditions, both daily maintenance such as leak detection and leakage repair, and preventive measures in planning, designing and construction of distribution facilities are still much behind.

The urgent need for technical training in non-revenue water management has been increasing with the background that the engineers with full of practical knowledge and experience in this field are very limited.

This course will be conducted for the first time in the fiscal year 1996.

4. **Purpose**

The purpose of this course is to provide administrative officials who have engineering background and are presently engaged in the field of non-revenue water management with comprehensive knowledge and control technology of non-revenue water (leakage control).

5. **Objective**

Upon successful completion of the course, the participants are expected to be able to acquire the followings;

- (1) Comprehensive knowledge about various problems around non-revenue water
- (2) Basic technical knowledge to detect and repair leakage
- (3) Practical knowledge and techniques for planning, designing and construction management as leakage prevention measures

6. Curriculum

1. Course Orientation
(Refer to II. 4 Course Orientation)
2. Country Report Presentation
(Refer to IV. 3 Country Report)
3. Training Programme
 - (1) Seminar
 - 1) History of Sanitation and Waterworks in Japan
 - 2) Waterworks in Japan
 - 3) Projection of Global Environmental Change
 - 4) Water Shortage and Water Resource Management
 - (2) Outline of Nagoya Waterworks
 - 1) Waterworks in Nagoya
 - 2) Leakage Control in Nagoya
 - (3) Leakage Detection and Repair
 - 1) Type and Characteristics of Leakage
 - 2) Distributed Water Volume Analysis
 - 3) Classification of Detection Work
 - 4) Working Plan of Leakage Detection
 - 5) Operation of Detection Instruments
 - (4) Leakage Prevention in Planning
 - 1) Main Facilities Planning
 - 2) Rehabilitation and Replacement of Pipeline
 - 3) Adjustment of Water Distribution
 - (5) Leakage Prevention in Design
 - 1) Pipe Material and Jointing
 - 2) Structure and Material of Service Installation
 - 3) Corrosion Protection
 - 4) Design and Cost Estimation of Pipeline

(6) Leakage Prevention in Construction Management

- 1) Pipe-Laying Work and Its Coordination and Inspection
- 2) Pipe Protection for Other Construction Works
- 3) Management and Maintenance of Service Installation
- 4) Tapping and Jointing Technique of Service Pipes
- 5) Mechanical Jointing Technique

(7) Metering System

- 1) Type and Performance of Water Meter
- 2) Maintenance and Management of Water Meter

(8) Mapping Management

- 1) Mapping System

(9) Measures for Water-Stealing

- 1) Countermeasures against Illegal Use

(10) Water Charge

- 1) Water Charge and Bill Collection

(11) Countermeasures for Disaster

- 1) Countermeasures for Drought
- 2) Countermeasures for Earthquakes

— Observation —

- Intake Facilities: Inuyama Intake
- Water Purification Plant Facilities: Kasugai Water Purification Plant
- Water Distribution Facilities: Leakage Detection Work Site, Water Distribution Pipe Improvement Work Site, Higashiyama Control Office, Narumi Service Reservoir
- Service Installation: Pipe Improvement Work Site
- Waterworks Material & Equipment Manufacturing Plants
- Other Related Facilities: Seamed Conveyance Pipes, Neighboring Waterworks Utility

4. Field Trip for Osaka, Kyoto

5. Evaluation Meeting

At the end of the training, Evaluation Meeting is to be held for further improvement of the training course.

Note: The curriculum may be subject to minor changes.

Please refer to Annex I (Scope of Non-revenue Water Management) and Annex II (Tentative Training Schedule.)

7. Methodology

(1) Instruction Method

The course will be conducted in the form of lectures, observations, practical study, discussions, etc.

(2) Language

The course will be generally conducted in English or through interpretation of Japanese into English.

8. Training Institutions

The training course is organized and coordinated by Nagoya International Training Center (NITC), JICA in cooperation with the following institutions.

NITC was established in 1962 by the previous organization of JICA and since then it has been responsible for training. In fiscal 1996, NITC organizes 34 group training courses and several individual training courses and is expected to receive around 400 participants.

(1) Nagoya Waterworks Bureau

Address: 1-1, Sannomaru 3-chome, Naka-ku, Nagoya, 460-08, Japan

Establishment: September 1, 1914

Main Activities: The Nagoya Waterworks Bureau, taking raw water from the Kiso River through two intakes, has three water purification plants and supplies quality water to the 2.2 million citizens in the city of Nagoya.

Since the establishment, the Nagoya Waterworks Bureau has been keeping a record of stable uninterrupted water supply, and achieving high accounted-for water rate.

(2) Technical Training Center, Nagoya Waterworks Bureau

Address: 5-14, Iroha-cho, Minato-ku, Nagoya, 455 Japan

Tel: 052-652-2663

Establishment: 1984

Main Activities: The Technical Training Center which was established in 1984 for the purpose of continuous improvement of the aptitude of staff members in order to contribute to the effective management of waterworks, located in the southern district of Nagoya City, comprises of a two-story building. The total floor area is approximately 770 m², including an administration office, training laboratories, and lecture rooms. There is also a technical training yard which measures approximately 5,100 m².

Followings are the major facilities of the training centre:

1. Training Laboratory
Field training on basic water purification and service installation techniques are implemented.
 - ① Facility for Water Purification and Water Quality Control
 - ② Facility for Service Installation
2. Lecture Room
There are two lecture rooms which have a capacity of 30 people. Each room is used for general and technical classes.
3. Technical Training Yard (Outdoor)
 - ① Plumbing Yard for Distribution Pipes
(diameter: 100 mm, 150 mm, 400 mm)
 - ② Jointing and Cutting Yard of Large and Medium Size Pipes
(diameter: 600 mm, and larger)
 - ③ Facility of the Valve Operaton (diameter: 600 mm)
 - ④ Facility of the Model Road

(3) Other related organizations and private enterprises

9. Certificate

Participants who have successfully completed the course will be awarded a certificate by JICA.

II. ORIENTATION PROGRAMME

Orientations addressing specific concerns of participants are generally scheduled before training begins. Several kinds of orientations, focussing on different issues, are given at different times.

1. Pre-departure Orientation

A pre-departure orientation is held at JICA overseas offices (or Japanese diplomatic missions) to provide the selected candidates with details of travel to Japan, conditions of training and other matters. "INFORMATION" (this booklet), "TRAINING IN JAPAN" and "GUIDE TO TRAINING IN JAPAN" are to be provided.

(Refer to IX. PRE-DEPARTURE INSTRUCTIONS for related information.)

2. Arrival Orientation

A briefing session is organized the day after arrival in Japan at the JICA Training Centers designated by JICA to cover the followings.

- (i) Registration
- (ii) Allowances & Expenses
- (iii) Accommodation
- (iv) Medical Service
- (v) Return Arrangement
- (vi) "A Guide to JICA"

3. General Orientation for Introduction to Japan

General Orientation is organized at Nagoya International Training Centre (NITC) prior to technical training to assist participants in understanding Japan and adjusting themselves to the way of life, and thus to facilitate effective training.

The contents of the programme are:

- (i) Outline of the activities of JICA
- (ii) Japanese Society and People
- (iii) Japanese History and Culture
- (iv) Economy and Industry of Japan
- (v) Administrative organization of Japan
- (vi) Education in Japan
- (vii) Bus tour in Nagoya

4. Course Orientation

A course orientation on technical training program is offered by a staff of Nagoya Waterworks Bureau at the very beginning of the technical training.

III. JAPANESE LANGUAGE

An intensive Japanese language course will be conducted prior to the technical training for one week (about 25 hours).

In addition, a general Japanese language course is organized in the evening for those participants who are interested in the language.

IV. CONDITION OF APPLICATION

1. Qualifications of Applicants

Applicants should:

- (1) be nominated by their government in accordance with the procedures mentioned in IV-2 below,
- (2) be **administrative officials who have engineering background and are presently engaged in waterworks management with more than five (5) years working experience.**
- (3) be university graduates or those who possess equivalent professional qualification in this field.
- (4) be between twenty-seven (27) and around forty (40) years of age.
- (5) be proficient in spoken and written English. Experience has shown that many participants find themselves unable to make progress in their training because of inadequate knowledge of English,
- (6) be in good health both physically and mentally, to undergo the course of training. Pregnancy is regarded as a disqualifying condition for participation in the training, and
- (7) not be serving in the military.

2. Procedures for Application

- (1) A government desiring to nominate applicants for the course should fill and forward five (5) copies of the Nomination Form (Form A2A3) together with COUNTRY REPORT (Annex III) and QUESTIONNAIRE (Annex IV) for each applicant to the JICA Office or the Embassy of Japan by November 13, 1996.

- (2) The JICA Office or the Embassy of Japan will inform the applying government whether or not the nominee's application has been accepted by December 13, 1996.

3. Country Report

Country Report Presentation is scheduled to be held just before the technical training begins. Participants are requested to make a presentation in front of the Japanese lecturers in order to further their understandings on the situation of non-revenue water management in the participants' countries.

The COUNTRY REPORT (Annex III) should be typewritten and submitted together with the Nomination Form (A2A3 Form). The time allocation for each presentation is 10 minutes followed by 5 minutes — question & answer period.

The Participants may use photos, slides or video along with their country reports during the presentations.

Application not accompanied by a completed country report cannot be considered.

4. Questionnaire

Each applicant should fill in the QUESTIONNAIRE (Annex IV) which is used for screening of participants. After filling out the form, submit it together with the Nomination Form (A2A3 Form).

Application not accompanied by a completed questionnaire cannot be considered.

V. ALLOWANCES & EXPENSES

The Government of Japan bears the following allowances and expenses through JICA in accordance with relevant laws and regulations.

- (1) Return air-ticket (normal business class fare, if not available, normal economy class fare) between the international airport designated by JICA and Tokyo. During international travel on the way to Japan, incidental stopover expenses, if any, are reimbursed according to JICA's rules and regulations.
- (2) Allowances as stated below

Table 1.

Allowances	Duration		
	1 – 29 days	30 – 89 days	90 days or more
Outfit Allowance	15,000 Yen	30,000 Yen	40,000 Yen
Book Allowance	5,000 Yen	7,000 Yen	17,000 Yen
Airport Facility Charge (NARITA)	2,000 Yen	2,000 Yen	2,000 Yen

Table 2. Living and Accommodations Allowances

Accommodation	JICA Centres except HIC and IFIC	Hyogo International Center (HIC) Institute for International Cooperation (IFIC)	Non-JICA Centre facilities
Living Allowance	¥3,500/day	¥4,100/day	¥4,841/day
Accommodation Allowance	Free Accommodation with a free breakfast and an evening meal equivalent to ¥600/night	Free Accommodation with a free breakfast	Free Accommodation or rate of room charge

Shipping allowance is provided according to region. (4,000 yen ~ 25,000 yen)

- (3) Free medical care for participants who may become ill after arrival in Japan.
- (4) Expenses for JICA study tours.

VI. ACCOMMODATION

Nagoya International Training Centre (NITC) of JICA will be available for the participants.

Nagoya International Training Centre, JICA
2-73 Kamenoi, Meito-ku, Nagoya,
465 Japan

TEL: 81^(*)-52^(**)-702-1391

FAX: 81 -52 -702-1397

(*: country code for Japan)
(**: area code for Nagoya)

In case no room is available at NITC, JICA will arrange accommodation for participants at other appropriate places.

VII. RECREATION ACTIVITIES

To make one's stay in Japan more enjoyable and also to fill one's leisure time, various recreational and entertainment events and social functions are provided at JICA centres in cooperation with local communities. Joining these functions will enrich participants' experiences in Japan and help deepen the cultural and social perceptions of Japan.

Following events are arranged by JICA for example:

- (1) Friendship gatherings with local community
- (2) Exhibition of various Japanese arts (flower arrangement, tea ceremony etc.)
- (3) Sports facilities (tennis, table tennis, soccer etc.)
- (4) Film show

VIII. REGULATIONS

Participants are required:

- (1) to observe strictly the course schedule and not to change training subjects,
- (2) not to extend the training period,
- (3) not to bring any member of their family,
- (4) to return to their home country at the end of their training according to the international travel schedule designated by JICA,
- (5) to carry out such instructions and abide by such conditions as may be stipulated by both the nominating government and the Japanese government in respect of this course of training,
- (6) to observe the rules and regulations of the training institutions or establishments with which participants undertake study or training,
- (7) to refrain from engaging in political activities, or any form of employment for profit or gain,
- (8) to discontinue the course, should she or he fall seriously ill and be considered unable to continue the training,
- (9) to discontinue the course, should she or he commit illegal or immoral conduct.
- (10) to observe those rules and regulations at the place of your accommodation and not to change accommodation designated by JICA.

IX. PRE-DEPARTURE INSTRUCTIONS

- (1) Pre-departure instructions for the participants

Participants are requested to report in person to JICA office and/or diplomatic mission of Japan in their own country in order to complete the necessary procedures and obtain pre-departure instructions.

- (2) Visa

Before leaving their countries, participants should have an entry visa to Japan, indicating the status of JICA participant, which will be issued by the diplomatic missions of Japan in their countries.

- (3) Air-ticket

Participants are requested to arrive in and leave Japan on the date designated by JICA, after confirmation of acceptance as mentioned in IV. 2. above. The date will be finally confirmed by the air-tickets sent to the participants.

(4) Photograph

Participants are requested to bring five (5) copies of a recent photograph (passport size).

(5) Airport

The New Tokyo International Airport at Narita (Narita Airport) has two terminal buildings, i.e. Terminal 1 and Terminal 2.

Before arrival at Narita Airport, participants are first required to confirm with the airline which terminal they are going to use (Terminal 1 or Terminal 2).

The participants who land at <u>Terminal 1</u> are to take arrival procedure steps (i) to (vi) below.	The Participants who land at <u>Terminal 2</u> are to take arrival procedure steps (ii) to (vi) below.
(i) Before proceeding to quarantine, each participants should pick up a "Message" placed on a message board at the corridor.	
(ii) When quarantine, immigration and custom clearance procedures have been completed, participants should proceed to the <u>Meeting Service Counter Terminal 1</u> building.	(ii) When quarantine, immigration and custom clearance procedures have been completed, participants should proceed to the <u>JICA Counter at Terminal 2</u> building.
In case the Meeting Service Counter is closed, participants are requested to dial 34-6036/34-6037/34/1711 for assistance by JICA Airport Office.	In case the JICA Counter is closed or no one is present, participants are requested to dial 34-6036/34-1711 for assistance by JICA Airport Office.
(iii) Bus Tickets to the Tokyo City Air Terminal (TCAT) will be provided at the Meeting Service Counter, and service staff will guide the participants to the bus terminal.	(iii) Bus Tickets to the Tokyo City Air Terminal (TCAT) will be provided at the JICA Counter, and service JICA staff will guide the participants to the bus terminal.

(iv) The bus to TCAT takes approximately 75 minutes.

(v) Upon arrival at TCAT, a JICA-designated travel agent will meet participants and will arrange their transportation to a JICA Training Centre, or to a hotel reserved by JICA.

(vi) Initial information on the training schedule will be provided through the agent.

(6) Incidental Expenses

Participants are advised to carry some cash in US dollars or Yen for incidental expenses during their trip to Japan and upon arrival in Japan.

(7) Climate

The monthly mean temperature, humidity and precipitation in Nagoya are as given below. Participants are advised to prepare appropriate clothing.

Month	T max.	T min.	H.	P.
January	8.5°C	-0.4°C	67%	50.1 mm
February	9.5	0.0	65	61.3
March	13.2	2.7	62	98.2

T: Temperature H: Humidity P: Precipitation

X. CORRESPONDENCE

For inquiries and further information, please contact the JICA office or the Embassy of Japan. Further, address correspondence to:

Japan International Cooperation Agency
Nagoya International Training Centre (NITC)
Training Division
2-73 Kamenoi, Meito-ku, Nagoya, Aichi,
Japan 465
TEL: 81^(*)-52^(**)-702-1391
FAX: 81 -52 -702-1397
(*: country code for Japan)
(**: area code for Nagoya)

Annex I

Scope of Non-Revenue Water Management Course

Scope of the Course	Qualification of Participants
	<ol style="list-style-type: none"> 1. Administrative Officials who have engineering background and presently engaged in waterworks management with more than five (5) years working experience 2. University graduates or those who possess equivalent professional qualification in this field. 3. Age between twenty-seven (27) and forty (40) years old.

Purpose
The purpose of this course is to provide administrative officials who have engineering background and are presently engaged in this field with comprehensive knowledge and control technology of non-revenue water management (leakage control), to enhance their current possessed knowledge and skills, and to contribute development of this field in their own countries.

Seminar	Curriculum				Observation of Facilities
	Course Guidance	Leakage Detection and Repair	Leakage Prevention Measures		
	<ul style="list-style-type: none"> -Orientation -Outline of Waterworks in Nagoya -Outline of Leakage Control in Nagoya 	<ul style="list-style-type: none"> -Type and Characteristics of Leakage -Analysis of Distributed Water Volume and Leakage -Classification of Leakage Prevention Work -Leakage Detection Working Plan -Making of Leakage Detection Plan -Operation of Detection Instruments -Distinction of Leakage 	<ul style="list-style-type: none"> -Maintenance Plan of Main Facilities -Adjustment of Water Distribution -Improvement and Replacement of Pipe -Countermeasure for Earthquakes -Countermeasure for Water Shortage 	<ul style="list-style-type: none"> -Choosing of Water Pipe Type -Designing Water Distributing Pipe -Type and Performance of Water Meter -Performance of Pipe Joints 	
<ul style="list-style-type: none"> -History of Sanitation and Waterworks in Japan -Waterworks in Japan -Environmental Change by Global Warming in Asia and Pacific Regions -Water Shortage and Water Resource Control (Focused in Tokai Region) -Country Report 				<ul style="list-style-type: none"> -Manufacturing Plant of Ductile Iron Pipe -Manufacturing Plant of Water Meter -Small and Medium Size Waterwork Body 	

Evaluation
<ol style="list-style-type: none"> 1. Program Evaluation by Participants 2. Evaluation by Lecturers and Others Concerned in This Course

Objectives
<ol style="list-style-type: none"> 1. To be able to acquire comprehensive knowledge about various problems around non-revenue water 2. To be able to acquire operational skill of leakage detection instruments 3. To be able to acquire knowledge of classification of leakage prevention work and analysis of distributed water volume 4. To be able to acquire practical knowledge of making leakage prevention plan 5. To be able to acquire practical knowledge and techniques for planning, designing and construction management as leakage prevention measures

Follow-up Evaluation	Results of this course is to be evaluated for participants and their bosses about a half year after finishing this course.
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Annex II

Tentative Training Schedule for Non-Revenue Water Management (Leakage Control) Course

Date 1997	A M (Section in Charge)	P M (Section in Charge)
Jan. 13 (Mon)	Arrival in Tokyo	
Jan. 14 (Tue)	Briefing	
Jan. 15 (Wed)	National Holiday (Briefing)	
Jan. 16 (Thu)	Move to Nagoya	
Jan. 17 (Fri)	Opening Ceremony, Orientation	
Jan. 18 (Sat)	Nagoya City Tour	
Jan. 19 (Sun)		
Jan. 20 (Mon)	Japanese Language Lesson	Japanese Language Lesson
~ Jan. 24 (Fri)	Japanese Language Lesson	Japanese Language Lesson
Jan. 25 (Sat)		
Jan. 26 (Sun)		
Jan. 27 (Mon)	(L) History of Sanitation and Waterworks in Japan / Waterworks in Japan, Hydrospheric Science-Nagoya University, Hydrology -Nagoya Institute of Tech.	
~ Jan. 28 (Tue)	(L) Diagnostics of Asbestos Pipe / Waterworks in Nagoya / Country Report. (O) Nabeya Water Purification Plant	
Jan. 29 (Wed)	(L) Leakage Prevention in Nagoya (Leakage Prevention Section)	(L) Maintenance Plan of Main Facilities (Planning Section)
Jan. 30 (Thu)	(L) Adjustment of Water Distribution (Water Distribution Planning Section)	(L) Choosing of Water Pipe (Water Supply Device Section)
Jan. 31 (Fri)	(L) Improvement and Replacement of Pipe (Water Distribution Planning Section)	(L) Prevention Measures for Pipe Corrosion (Leakage Prevention Section)
Feb. 1 (Sat)		
Feb. 2 (Sun)		
Feb. 3 (Mon)	(L) Pipe Prevention Measure from Accident by Other Constructors. (O) Practice at Site (Leakage Prevention Section)	
Feb. 4 (Tue)	(L/P/O) Pipe Laying Leakage Detection Work and Its Coordination and Inspection. (The Second Section, Technical Training Center)	
Feb. 5 (Wed)		
Feb. 6 (Thu)	(L/O) Designing Estimation of Pipe (Leakage Prevention Section)	(L/O) Management of Computerized Mapping System (Computer Mapping System Section)
Feb. 7 (Fri)	(O) Facilities at Chubu Waterwork Public Corporation (Deep Well etc.)	
Feb. 8 (Sat)		
Feb. 9 (Sun)		
Feb. 10 (Mon)	(L/O) Type and Characteristics of Leakage (Leakage Prevention Section)	(L/O) Analysis of Distributed Water Volume Leakage (Leakage Prevention Section)
Feb. 11 (Tue)	National Holiday	
Feb. 12 (Wed)	(L) Classification of Leakage Detection Work (Leakage Prevention Section)	(L) Planning of Leakage Detection Work (Leakage Prevention Section)
Feb. 13 (Thu)	(L/O) Ductile Iron Pipe Manufacturing Plant in Osaka	
Feb. 14 (Fri)	Sightseeing in Kyoto	
Feb. 15 (Sat)		
Feb. 16 (Sun)		
Feb. 17 (Mon)	(L) Type and Performance of Water Meter (Water Meter Section)	(L) Maintenance & Management of Water Meter (Water Meter Section)
Feb. 18 (Tue)	(L/O) Water Charge and Collection (Sales Section, Nakamura Office)	(L/O) Countermeasure for Water Stealing (Sales Promotion Section)
Feb. 19 (Wed)	(L) Maintenance of Water Supply Device (Water Supply Device Section)	(L) Inspection of Installation of Pipe (Water Supply Devices Section)
Feb. 20 (Thu)	(P) Practice of Making Prevention Plan of Your Own Country (Leakage Prevention Section)	
Feb. 21 (Fri)	(L/P) Midterm Discussion	(O) Water Meter Manufacturing Plant
Feb. 22 (Sat)		
Feb. 23 (Sun)		

Feb. 24 (Mon)	(L/O) Inuyama Intake, Kasugai Water Purification Plant, Higashiyama Control Office	
Feb. 25 (Tue)	(L/P/O) Construction of Water Supply Pipe and Its Coordination and Inspection (Construction Section, Minato Management Office)	
Feb. 26 (Wed)	(L/P) Performance of Pipe Joints (The Second Section, TTC)	(L/P) Perforation of Water Supply & Jointing Pipe (The Second Section, TTC)
Feb. 27 (Thu)	(L/P) Operation of Leakage Detection Instruments, Jointing of Pipes (Type K, F, S II) (The Second Section, Technical Training Center)	
Feb. 28 (Fri)	(L/P) Distinction of Leakage (Water Quality sec., Kasugai Water Purification Plant)	(L/P) Structure and Performance of Aqueduct Pump (Second Section, TCC)
Mar. 1 (Sat)		
Mar. 2 (Sun)		
Mar. 3 (Mon)	(L/O) Countermeasures for Water Shortage (Water Utilization Section)	(L/O) Countermeasures for Earthquake (Chief, Water Distribution Div.)
Mar. 4 (Tue)	(O) Small and Medium Size Waterwork Body (Undersea Pipe Lines in Taketoyochou and Himakajima Island)	
Mar. 5 (Wed)		
Mar. 6 (Thu)	(L/P) Writing Report	Course Review Meeting, Farewell Calling
Mar. 7 (Fri)	(P) Evaluation Meeting	Closing Ceremony
Mar. 8 (Sat)	Move to Tokyo	
Mar. 9 (Sun)		
Mar. 10 (Mon)	Leave Japan	

(L):lecture (P):practice (O):observation (D):discussion
 ※The training schedule may be subject to change.

COUNTRY REPORT

Name of Participant		Name of Country		Age	
Name of Organization		Present Post and Title			
Outline of Waterworks in Your Utility					
Total Population		Recipient Population of Water Service			
Diffusion Rate of Water Service		Capacity of Waterwork Facilities	m ³ /day		
Number of Personnel in Your Organization		Average Water Supply Volume	m ³ /day		
Rate of Accounted for Water		Average Water Pressure	MP a		
Type of Water Distribution Pipe	Joining Type of Water Distribution Pipe	Water Distribution System			
		<ul style="list-style-type: none"> - Gravity Flowing System - Pumping-up System - Others 			
Type of House Connection Pipe	Joining Type of House Connection Pipe	Water Supply System			
		<ul style="list-style-type: none"> - Direct Pressure System - Water Tank System - Others 			
Type of Water Meter Used in Your Country	Type of Flowmeter Used for Water Distribution Pipe	Water Charge Collection System			
Leakage Detection Work System	Name of Leakage Detection Instruments Used in Your Country				
Problems Currently Faced					

Participants are requested to bring (1) the chart of the organization and (2) an example of a map of the system.

Annex IV QUESTIONNAIRE (Supplemental Description on Applicant's Position & Organization)

1. Your occupational background

(1) Your previous and present position with years of experience :

(2) Your functions and duties :

2. Detailed description about the work of your organization

