



1. Project Data:		Date Posted : 08/15/2002	
PROJ ID: P035079		Appraisal	Actual
Project Name: Waste Disposal Project	Project Costs (US\$M)	305.1	252.7
Country: South Korea	Loan/Credit (US\$M)	75	53.5
Sector(s): Board: WS - Sewerage (80%), Solid waste management (20%)	Cofinancing (US\$M)	0	0
L/C Number: L3830			
	Board Approval (FY)		95
Partners involved :	Closing Date	06/30/2000	12/31/2001
Prepared by:	Reviewed by:	Group Manager:	Group:
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2. Project Objectives and Components			
a. Objectives			
The objectives of the project were to:			
<ul style="list-style-type: none"> • support the Government of Korea in addressing environmental, institutional and technological concerns regarding wastewater and specified waste disposal in Pusan city and Chunbuk province; • reduce the health hazards of surface and ground water contamination; and • promote the reuse of treatment effluent on a major scale. 			
b. Components			
The project consisted of two components:			
<ul style="list-style-type: none"> • Pusan Component included construction of the second phase of the Janglim Wastewater Treatment Plant (WTP) with construction of: (a) primary and secondary treatment units to increase its capacity from 300,000 m3/d to 615,000 m3/d; (b) tertiary treatment units to treat the effluent for reuse as industrial water; (c) 4.5 km of interceptor sewer; and (d) two pumping stations. • Kunsan component included the supply and installation of a Specified Waste Incineration unit (SWI) with a capacity of 60 t/d to burn waste generated in Chunbuk province. 			
Revised Components:			
The Pusan component was substantially revised due to a necessary change in the technological process. For the Kunsan component, the turnkey contract was amended in December 1997 to include facilities for dioxin removal from effluent gases to comply with MOE's new, stricter regulations.			
c. Comments on Project Cost, Financing and Dates			
At completion, US\$53.5 million was disbursed and US\$15.99 million was canceled. The actual total project cost was US\$252.7 million. The project closed on December 2001, eighteen months after the original closing date.			
3. Achievement of Relevant Objectives:			
1. The objective to support the Government of Korea in addressing environmental, institutional and technological concerns regarding wastewater and specified waste disposal in Pusan city and Chunbuk province was largely achieved.			
<ul style="list-style-type: none"> • All physical works were completed within an accelerated time frame, and the plants are operational. • Environment Management Corporation (EMC), local government and the regional office of MOE's (Ministry of Environment) carried out environmental monitoring of the plants. • Kunsan plant performed satisfactorily and complied with environmental regulations. • Jianglim II complied satisfactorily with environmental regulations and plant performance except for nitrogen reduction. The wastewater quantity reaching Jianglim I and Jianglim II is 400,000 m3/d, much lower than the 500,000 m3/d projected in the sewerage master plan. 			
2. The project has substantially reduced the health hazards of surface and ground water contamination. In addition,			

the incineration of specified waste generated in Chunbuk province is carried out in a strictly controlled way, which eliminates health hazards caused by air contamination.

3. The objective to promote the reuse of treatment effluent on a major scale was not achieved due to changes in wastewater quality during the construction of Janglim II.

4. Significant Outcomes/Impacts:

The project has succeeded in significantly reducing the industrial waste generation, stimulating more demand for treatment of specified waste, and generating private sector interest in operating treatment facilities. This success is demonstrated by the fact that in the late 1990s, the number of secured landfills and incinerators for specified waste increased to 17 and 129 respectively, the majority being operated by private operators.

5. Significant Shortcomings (including non-compliance with safeguard policies):

There are no significant shortcomings, however, the project implementation suffered due to following reasons:

- In 1997, shortly before the completion of the Kunsan plant, the Ministry of Environment (MOE) issued stricter environmental regulations concerning the dioxin levels permitted in incinerator exhaust gas. That necessitated a halt in on-going construction, redesign of respective equipment, modification of the contract, manufacturing and installation of new equipment. The process resulted in increased costs (US\$4.0 million) and a 10-month delay in completion of the plant.
- During the construction of Janglim II, there was an unexpected change in wastewater quality arriving in Janglim II, as additional industries were connected to the expanded interceptor system. The planning studies, the sewerage master plan for Pusan and the feasibility study of Janglim II had projected growth of industrial wastewater, but did not anticipate major change in the quality of wastewater. The new raw wastewater could not be treated with the proposed combination of secondary treatment. This resulted in substantial delays in completion of the plant.
- Tariffs for specified waste disposal are too low. As a result, Kusan has been in a deficit situation from the start of the operations.

6. Ratings:	ICR	OED Review	Reason for Disagreement /Comments
Outcome:	Satisfactory	Satisfactory	
Institutional Dev.:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	
Quality of ICR:		Satisfactory	

NOTE: ICR rating values flagged with '*' don't comply with OP/BP 13.55, but are listed for completeness.

7. Lessons of Broad Applicability:

- Private operators of environmental facilities are less likely to be exposed to pressures from various local civic groups than the Government. Currently, in Korea there are about 130 incinerators for specified waste, but only Kunsan is owned by the Government. Thus far, only Kunsan has been exposed to systematic demands from local civic groups for various payments, with arguments pertaining to the protection of public health. This is likely because the Government is much more sensitive to negative exposure in the press or at staged meetings than are private operators.
- Future feasibility studies of wastewater systems should include a detailed assessment of land use plans and enforcement of respective regulations especially for mixed residential and industrial areas. Also, the feasibility studies should conduct a thorough assessment of the quality of wastewater that will be generated by the new industries that will be connected to the system.
- For efficient and better quality treatment, the legal-commercial aspects of the sewerage service, requiring a contract between the service provider and the beneficiary, including permission for the quantity and the quality of wastewater, should be pursued.

8. Assessment Recommended? ☒ Yes ☐ No

Why? A field assessment, preferably combined with assessments of other sewerage projects in South Korea such as in Seoul And Kwangju Sewerage Project could provide valuable lessons for a more efficient sewerage sector. Also, these projects are good cases for a possible OED large study on the sewerage sector.

9. Comments on Quality of ICR:

The quality of the ICR is satisfactory. It is clearly written and covers all the relevant and important issues. It

Identifies important lessons for the sewerage sector.