

## Study of the Reconstruction of the Chubu Water Treatment Center

Year of Research

2008

### (Purpose)

The Chubu Water Treatment Center has been the first treatment plant in Fukuoka City since it began operation in 1966. But its civil engineering structures have deteriorated and its machinery and equipment etc. have aged during the approximately 40 years of continuous day and night treatment of water and sludge on its narrow site. This survey was carried out to clarify the following items at the Chubu Water Treatment Center.

- (1) Service life extension project until the reconstruction work begins
- (2) Period when work on the Chubu Water Treatment Center Reconstruction Project is scheduled to begin in earnest

### (Results)

- (1) Service life extension project until the reconstruction work begins

The service life extension project (work to repair deterioration) plan was enacted as follows, primarily from the perspectives of physical years of service and economical years of service.

The service life extension order of priority was to first focus on and set the physical service life based on the remaining useful life by facility obtained based on the neutralization rate formula. Facilities which would not reach their physical years of service for some time were prioritized based on the importance of each facility. The degree of importance of a facility was set as management buildings in order to put top priority on the protection of human life, next water pumping facilities and disinfection facilities which ensure treatment necessary until the simplest treatment is restored after an emergency, and finally water treatment facilities and sludge treatment facilities.

Table 1. Results of Calculations of Physical Service Lives and Economical Service Lives

Importance of facility *1	Facility name	Year constructed	Physical service lifetime *2		Economical service life	
			Remaining service life	End of service life	LCC Minimum manifestation years	Years elapsed
1	Grit chamber pump building A, Grit chamberA Control	1962	—	—	2056	94
	" Civil engineering	1962	53	2061	2035	73
2	Grit chamber pump building B, Grit chamberB Control	1971	—	—	2031	60
	" Civil engineering	1971	63	2071	2035	64
3	No.1 and No.2 sludge building	1964	—	—	2036	72
	Civil engineering	1962	59	2067	2035	73
4	Sterilization tanks A, B	1964	63	2071	2030	66
5	Initial sedimentation tank B	1972	0	2009	2034	62
6	Biological reaction tank B (water treatment shed B)	1972	0	2009	2033	61
7	Final sedimentation tank B	1972	0	2009	2032	60
8	Water treatment pipe gallery B	1964	0	2009	2026	62
9	Initial sedimentation tank A	1962	53	2071	2034	72
10	Biological reaction tank A	1961	22	2030	2031	70
11	Final sedimentation Tank A	1965	9	2017	2050	85
12	Water treatment pipe gallery A	1964	58	2066	2026	62
13	Influent culvert A	1962	53	2061	2031	69
14	Bypass A	1972	63	2071	2027	55
15	Cake yard	1972	0	2009	2026	54
16	Washed sludge storage tank	1964	53	2061	2042	78
17	Night soil storage tank	1979	53	2061	2049	70
18	No. 1 and No. 2 sludge washing tanks	1964	—	—	2021	57
19	Raw sludge receiving tanks No. 1 and No. 2	1965	—	—	2032	67
20	Thickening machine building	1969	—	—	2054	85

\*1: The importance of a facility is ranked from the most to least important from 1 to 20.

\*2: Physical years of service are the result of calculations based on the neutralization rate formula.

\*3: Economical years of service are the result of calculations based on LCC.

Next, the life cycle costs of civil engineering structures and building structures were calculated by facility in order to evaluate the economical years of service. Facilities which, based on the results, were found to have shorter economical years of service than physical years of service, will have their lifetime extended until the economical years of service.

(2) Period when work on the Chubu Water Treatment Center Reconstruction Project is scheduled to begin in earnest

The period when the reconstruction work will begin in earnest was set from the perspective of economical years of service based on results of life cycle cost calculations by facility. Because the period when the facilities will reach their economical years of service is concentrated from 2032 until 2036, this period was set as the period when the reconstruction work is scheduled to begin in earnest. Thus the service life extension project period was set as by 2031. And a service life extension project will be executed at each of the facilities in turn by 2031.

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Key words

treatment plant, reconstruction, service life extension