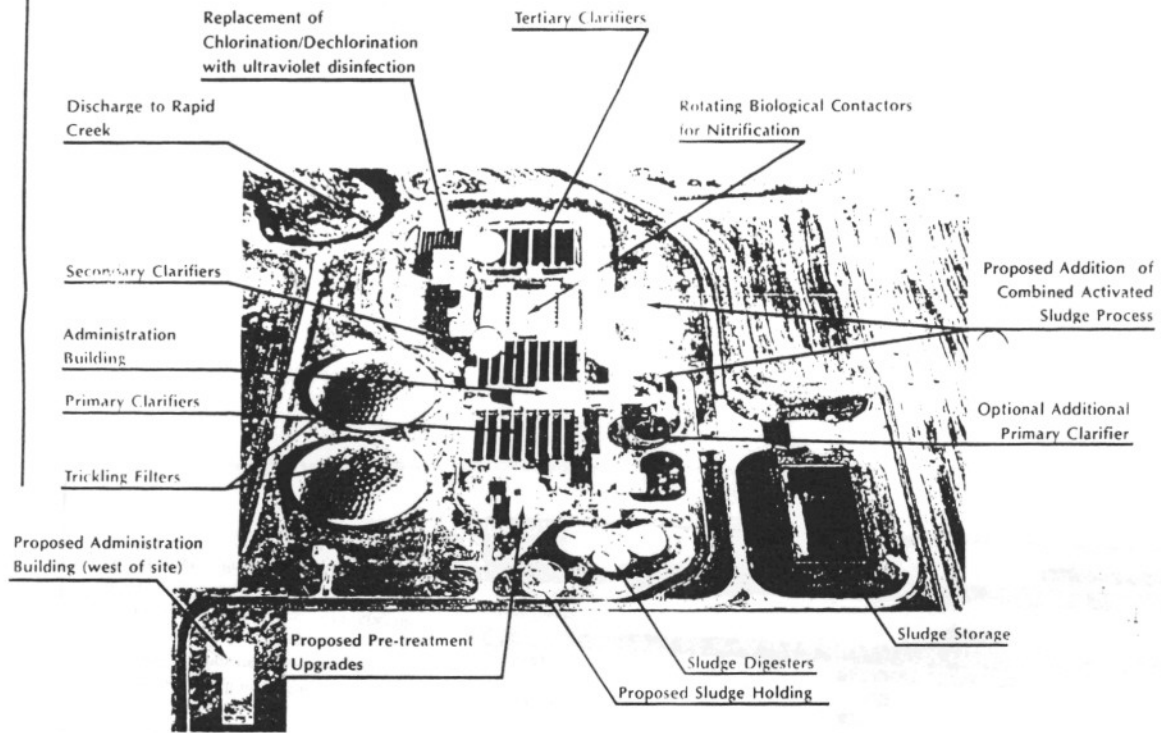


Proposed Improvements



Introduction

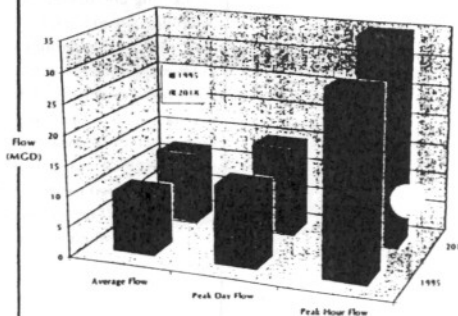
This overview is for people interested in the proposed expansion of the Rapid City Water Reclamation Facility. A complete report entitled *Facilities Plan for Rapid City Water Reclamation Facility, Volumes I, II and III* can be reviewed at City Hall.

History

The Rapid City Water Reclamation Facility (WRF) was initially constructed in 1967 and modified in 1986 and again in 1992. Analysis of past wastewater flow and quality data shows that Rapid City's WRF has consistently met its regulatory goals with very few isolated exceptions. It is however, operating near capacity. As required by the State of South Dakota Department of Environment and Natural Resources (DENR), Rapid City has initiated the planning processes for expansion to meet future demand. The following summarizes the key issues:

- Population in the service area is expected to grow from 76,000 to 94,000 by the year 2018 (a 24 percent increase).
- The current facility is operating at its design capacity of approximately 10 million gallons per day (mgd) and needs to be expanded to meet peak day flows of 15 mgd. (Fig. 1)

Figure 1 - Rapid City Wastewater Flow



- Future environmental regulations and discharge criteria are expected to be somewhat more stringent than current criteria, requiring changes in treatment technology.
- Mechanical components of various unit operations are corroded and/or worn out and need to be replaced.
- Some existing treatment units need to be upgraded to improve treatment efficiency, operability, and safety.
- Current sludge treatment and disposal facilities are operating at capacity and need to be expanded or augmented with other treatment and disposal options.
- Support facilities including decontamination, training, and supervisory facilities need to be upgraded and expanded.

Planning Process

The planning process for the expansion of the Rapid City WRF was initiated in 1997 as the City recognized that the facility was consistently operating at capacity and was beginning to experience difficulties in meeting its discharge limits. The planning process is focused around the Facilities Plan, which documents the planning process and lays the foundation for project implementation. Various factors directly affect the planning process. These include a clear understanding of the needs, guidance from community leaders, environmental regulatory review and approval, availability of funding, and public participation and acceptance. The "feedback loops", which directly influence the development of the Facilities Plan are illustrated in Figure 2 - The Planning Process.

Figure 2 - The Planning Process



Facilities Plan Development

The Facilities Plan documents the planning process. It establishes the basic criteria, identifies and evaluates alternatives, and provides a recommended plan. The development of the Facilities Plan is illustrated in Figure 3 - Facility Plan Development. Definition of the basic criteria began with the definition of the service area and population projections. Based on historical data, and projected implementation of controls on inflow and infiltration, design criteria for projected wastewater flow and wastewater quality were developed. The capacity, condition and performance of each of the existing unit operations were evaluated to determine adequacy for future operations. Existing and anticipated environmental regulations were examined to determine future treated wastewater discharge criteria. The following parameters are of particular concern: organic contamination as measured by biochemical oxygen demand (BOD), suspended solids (TSS), ammonia (NH3), dissolved oxygen (DO), and residual chlorine (Cl). Options for treated wastewater reuse and residuals (sludge) management were examined.

Once the basic criteria were established, multiple alternatives were developed in each of the following areas: pre-treatment, biological treatment, disinfection, sludge treatment, general site features and effluent discharge. A set of weighted criteria were developed to evaluate the effectiveness, reliability efficiency, operability, environmental impacts, and social impacts of various alternatives. Capital and operation and maintenance cost estimates were developed to evaluate life cycle costs for the most favorable alternatives.

Based on the analysis of alternatives, one was selected as the recommended plan. The proposed improvements are illustrated on the back of this brochure in the aerial photograph.

Figure 3 - Facilities Plan Development

