APPENDIX
HANDLING AND TREATMENT OF SEPTAGE AT A WASTEWATER TREATMENT PLANT

General

One method of septage disposal is the discharge to a municipal wastewater treatment plant. All plants require special design considerations prior to the acceptance of septage.

Definition

Septage is a general term for the contents removed from septic tanks, portable vault toilets, privy vaults, holding tanks, very small wastewater treatment plants, or semi-public facilities (i.e., schools, motels, mobile home parks, campgrounds, small commercial endeavors) receiving wastewater from domestic sources.

Non domestic (industrial) wastes are not included in the definition and are not covered by this appendix.

Contents from grease traps should not be hauled to most municipal wastewater treatment plants for disposal.

Characteristics

Compared to raw domestic wastewater from a conventional municipal sewer collection system, septage usually is quite high in organics, grease, hair, stringy material, scum, grit, solids, and other extraneous debris. Substantial quantities of phosphorus, ammonia nitrogen, bacterial growth inhibitors, and cleaning materials may be present in septage depending on the source. Tables No. 1 and No. 2 (Tables 3-4 and 3-8 from the U.S. EPA Handbook entitled "Septage Treatment and Disposal" 1984, EPA-625/6-84-009 reprinted herein) give a comparison of some of the common parameters for septage and municipal wastewater.

Data for local septage to be received should be collected for design of septage receiving and treatment systems. The characteristics of septage should be expected to vary widely from load to load depending on the source.

Treatment

Septage is normally considered treatable at a plant. However, unless proper engineering planning and design is provided, septage may represent a shock loading or have other adverse impacts on plant processes and effluent quality which will be influenced by many factors including the following:

a. Capacity (mgd) (m^3/d) of the plant relative to the amount and rate of septage directed to the plant;

b. Unused plant capacity available (above current sewer collection system loadings) to treat septage loadings;

c. Sensitivity of the treatment plant process to daily fluctuations in loadings brought about by the addition of septage;

d. Slug septage loadings of BOD, ammonia nitrogen, or phosphorus which may cause process upset, odor nuisance, aeration tank/aerated digester foaming, or pass through to the effluent;

e. The point of introduction of the septage into the plant process. Feasible alternative points of feed to the treatment units shall be evaluated including feed to the sludge processing units provided the unit function will not be adversely affected;

f. The ability to control feed rates of septage to the plant for off peak loading periods; and,

g. The volume and concentrations of bacterial growth inhibitors in septage from some portable vault toilets and recreational dump station holding tanks.

The permitted plant effluent regulatory limits on each of the controlled parameters must be considered when evaluating these factors.

Considerations

It is essential that an adequate engineering evaluation be made of the existing plant and the anticipated septage loading prior to receiving septage at the plant. The regulatory agency shall be contacted to obtain the appropriate approvals prior to the acceptance of septage. For proposed plant expansion and upgrading, the engineering report or facility plan (refer to Chapter 10) shall include anticipated septage loading in addressing treatment plant sizing and process selection. The following items should be included as appropriate in the engineering evaluation and facility planning:

a. The uninterrupted and satisfactory treatment (within the plant regulatory limits) of wasteloads from the sewer system must not be adversely affected by the addition of septage to the plant;

b. In general, the smaller the plant design capacity relative to the septage loading, the more subject the plant will be to upset and potential violation of permitted discharge effluent limits;

c. Allocation of organic plant capacity originally planned for future growth;

d. For plants to be expanded and upgraded, the engineering evaluation and facility planning should jointly consider the sensitivity of the treatment process to receiving septage and the impact on discharge parameter limits;

e. An evaluation of available plant operator staff and the staffing requirements necessary when septage is to be received. Plant staff should be present when septage is received and unloaded. Added laboratory work associated with receiving septage for treatment should be included in the staffing and laboratory facilities evaluation;

f. The space for constructing septage receiving facilities that are to be off-line from the raw wastewater incoming from the sewer system. The location of the septage receiving facility and the septage hauler unloading area should consider other plant activity and traffic flow; and,

g. The impact of the septage handling and treatment on the plant sludge handling and processing units and ultimate sludge disposal procedures.

Receiving Facility

The design of the septage receiving station at the plant should provide for the following elements:

a. A hard surface haul truck unloading ramp sloped to a drain to allow ready cleaning of any spillage and washing of the haul tank, connector hoses, and fittings. The ramp drainage must be tributary to treatment facilities and shall exclude excessive stormwater;

b. A flexible hose fitted with easy connect coupling to provide for direct connection from the haul truck outlet to minimize spillage and help control odors;

c. Washdown water with ample pressure, hose, and spray nozzle for convenient cleaning of the septage receiving station and haul trucks. The use of chlorinated effluent may be considered for this purpose. If a potable water source is used, it must be protected in accordance with Section 56 of these Recommended Standards;

d. An adequate off-line septage receiving tank should be provided. Capability to collect a representative sample of any truck load of waste accepted for discharge at the plant shall be provided. The receiving tank should be designed to provide complete draining and cleaning by means of a sloped bottom equipped with a drain sump. The design should give consideration to adequate mixing, for testing, uniformity of septage strength, and chemical addition, if necessary, for treatability and odor control. The operator shall have authority to prevent and/or stop any disposal that is likely to cause a discharge violation;

e. Screening, grit, and grease removal of the septage as appropriate to protect the treatment units;

f. Pumps provided for handling the septage should be of the nonclogging design and capable of passing 3-inch (75 mm) diameter solids;

g. Valving and piping for operational flexibility to allow the control of the flow rate and point of septage discharge to the plant;

h. Safety features to protect the operational personnel. Refer to Section 57; and

i. Laboratory and staffing capability to determine the septage strength and/or toxicity to the treatment processes. Provision for operation reports to include the plant load attributed to septage.

TABLE NO. 1*

PHYSICAL AND CHEMICAL CHARACTERISTICS OF SEPTAGE, AS FOUND IN THE LITERATURE, WITH SUGGESTED DESIGN VALUES[a,b]

	United States (5) (9-19)				Europe/Canada (4) (20)					
Parameter	Average	Minimum	Maximum	Variance	Average	Minimum	Maximum	Variance	EPA Mean	Suggested Design Value
TS	34,106	1,132	130,475	115	33,800	200	123,860	619	38,800	40,000
TVS	23,100	353	71,402	202	31,600	160	67,570	422	25,260	25,000
TSS	12,862	310	93,378	301	45,000	5,000	70,920	14	13,000	15,000
VSS	9,027	95	51,500	542	29,900	4,000	52,370	13	8,720	10,000
BOD_5	6,480	440	78,600	179	8,343	700	25,000	36	5,000	7,000
COD	31,900	1,500	703,000	469	28,975	1,300	114,870	88	42,850	15,000
TKN	588	66	1,060	16	1,067	150	2,570	17	677	700
NH_3-N	97	3	116	39	—	—	—	—	157	150
Total P	210	20	760	38	155	20	636	32	253	250
Alkalinity	970	522	4,190	8	—	—	—	—	—	1,000
Grease	5,600	208	23,368	112	—	—	—	—	9,090	8,000
pH	—	1.5	12.6	8.0	—	5.2	9.0		6.9	6.0
LAS	—	110	200	2	—	—	—		157	150

a Values expressed as mg/L, except for pH.

b The data presented in this table were compiled from many sources. The inconsistency of individual data sets results in some skewing of the data and discrepancies when individual parameters are compared. This is taken into account in offering suggested design values.

* Appendix - Table No. 1 including footnotes is taken from the USEPA Handbook entitled "Septage Treatment and Disposal", 1984, EPA-625/6-84-009 and is designated in that document as "Table 3-4".

TABLE NO. 2*

COMPARISON OF SEPTAGE AND MUNICIPAL WASTEWATER[a]

Parameter	Septage[b]	Wastewater[c]	Ratio of Septage to Wastewater
TS	40,000	720	55:1
TVS	25,000	360	69:1
TSS	15,000	210	71:1
VSS	10,000	160	62:1
BOD_5	7,000	190	37:1
COD	15,000	430	35:1
TKN	700	40	17:1
NH_3-N	150	25	6:1
Total P	250	7	36:1
Alkalinity	1,000	90	11:1
Grease	8,000	90	89:1
pH	6.0	—	—
Linear Alkyl Sulfonate	150	—	—

a Values expressed as mg/L, except for pH.

b Based on suggested design values in Appendix - Table No. 1 (USEPA Table 3-4).

c From Metcalf and Eddy, 4th Edition, "medium strength sewage".

* Appendix - Table No. 2 including footnotes is taken from the USEPA Handbook entitled "Septage Treatment and Disposal", 1984, EPA-625/6-84-009 and is designated in that document as "Table 3-8".