**Section 370.860 Sludge Dewatering**

a) General

 On-site sludge dewatering facilities shall be provided for all plants, although the following requirements may be reduced or omitted, if justified, with on-site liquid sludge storage facilities or approved off-site sludge disposal.

1) Anaerobic Digestion Sludge Production

 For purposes of calculating sludge handling and disposal needs, sludge production values from a two-stage anaerobic digestion process shall be based on a maximum solids concentration of 5% without additional thickening. The solids production values, calculated on a dry weight basis, shall be based on the following values for the listed processes:

A) Primary plus waste activated sludge – at least 0.12 lbs/P.E./day;

B) Primary plus fixed film reactor sludge – at least 0.09 lbs/P.E./day.

2) Aerobic Digestion Sludge Production

 For purposes of calculating sludge handling and disposal needs, sludge production values from an aerobic digester shall be based on a maximum solids concentration of 2% without additional thickening. The solids production values, calculated on a dry weight basis, shall be based on the following values for the listed processes:

A) Primary plus waste activated sludge – at least 0.16 lbs/P.E./day;

B) Primary plus fixed film reactor sludge--at least 0.12 lbs/P.E./day.

3) Production from Other Sludge Treatment Processes

 For purposes of calculating sludge handling and disposal needs, sludge production values from other sludge treatment processes shall be determined by rational calculations in the basis of design. Refer to Section 370.520(b) for any new process determinations.

b) Sludge Drying Beds

1) Applicability

 Sludge drying beds may be used for dewatering well digested sludge from either the anaerobic or aerobic process. Due to the large volume of sludge produced by the aerobic digestion process, consideration should be given to using a combination of dewatering systems or other means of ultimate sludge disposal.

2) Unit Sizing

 Sludge drying bed area shall be calculated on a rational basis with the following items taken into account:

A) The volume of wet sludge produced by existing and proposed processes.

B) Depth of wet sludge drawn to the drying beds. For design calculations purposes a maximum depth of 8 inches shall be utilized. For operational purposes, the depth of sludge placed on the drying bed may vary from the design depth based on the solids content and the type of digestion used.

C) Total digester volume and other wet sludge storage facilities.

D) Degree of sludge thickening provided after digestion.

E) The maximum drawing depth of sludge which can be removed from the digester or other sludge storage facilities without causing process or structural problems.

F) The time required on the bed to produce a removable cake. Adequate provision shall be made for sludge dewatering and/or sludge disposal facilities for those periods of time during which outside drying of sludge on beds is hindered by weather. For Illinois that season is considered to extend from early November through at least April.

G) Capacities of auxiliary dewatering facilities.

3) Percolation Type Bed Components

A) Gravel

 The lower course of gravel around the underdrains should be properly graded and should be 12 inches in depth, extending at least 6 inches above the top of the underdrains. It is desirable to place this in 2 or more layers. The top layer of at least 3 inches should consist of gravel ⅛ inch to ¼ inch in size.

B) Sand

 The top course should consist of at least 6 to 9 inches of clean, washed, coarse sand. The effective size of the sand should be in the range of 0.8 to 1.5 millimeters. The finished sand surface should be level.

C) Underdrains

 Underdrains should be at least 4 inches in diameter laid with open joints. Perforated pipe may also be used. Underdrains should be spaced not more than 20 feet apart. Various pipe materials may be used, so long as they are sufficiently strong and are corrosion resistant.

D) Additional Dewatering Provisions

 Consideration shall be given to providing a means of decanting the supernatant of sludge placed on the sludge drying beds. More effective decanting of supernatant may be accomplished with polymer treatment of the sludge.

4) Walls

 Walls should be water-tight and extend 18 inches above and at least 6 inches below the surface of the bed. Outer walls should be curbed or extended at least 4 inches above the outside grade elevation to prevent soil from washing on to the beds.

5) Sludge Removal

 Each bed shall be constructed so as to be readily and completely accessible to mechanical cleaning equipment. Concrete runways spaced to accommodate mechanical equipment shall be provided. Special attention should be given to assure adequate access to the areas adjacent to the sidewalls. Entrance ramps down to the level of the sand bed shall be provided. These ramps shall be high enough to eliminate the need for an entrance end wall for the sludge bed.

c) Sludge Lagoons for Dewatering

1) General

 Lagoons as a means of dewatering digested sludge will be permitted only upon proof that the character of the digested sludge and the design mode of operation are such that offensive odors will not result. Where sludge lagoons are permitted, adequate provisions shall be made for other sludge dewatering facilities or sludge disposal in the event of upset or failure of the sludge digestion process.

2) Location

 Sludge lagoons shall be located as far as practicable from inhabited areas or areas likely to be inhabited during the lifetime of the structures.

3) Seal

 Adequate provisions shall be made to seal the lagoon bottoms and embankments to prevent leaching into adjacent soils or groundwater. Refer to Section 370.930(d)(1)(A), (d)(2)(C) and (d)(2)(D).

4) Access

 Provisions shall be made for sludge pumping or heavy equipment access for sludge removal from the lagoon.

d) Mechanical Dewatering Facilities

1) General

 Provision shall be made to maintain sufficient continuity of service so that sludge may be dewatered without accumulation beyond storage capacity. The number of vacuum filters, centrifuges, filter presses, belt filters, or other mechanical dewatering facilities should be sufficient to dewater the sludge produced with the largest unit out of service. Unless other standby wet sludge facilities are available, adequate storage facilities of at least 4 days production volume shall be provided. Documentation must be submitted justifying the basis of design of mechanical dewatering facilities.

2) Water Supply Protection

 The water supply for mechanical dewatering facilities shall meet the requirements of Section 370.550(b).

3) Auxiliary Facilities for Vacuum Filters

 Back-up vacuum and filtrate pumps shall be provided. It is permissible to have uninstalled back-up vacuum and filtrate pumps for every three or less vacuum filters, provided that the installed units can easily be removed and replaced. At least one filter media replacement unit shall be provided.

4) Ventilation

 Adequate facilities shall be provided for ventilation of the dewatering area. The exhaust air should be properly conditioned to avoid odor nuisance. Ventilation shall be provided in accordance with Section 370.410(g)(6).

5) Chemical Handling Enclosures

 Lime-mixing facilities should be completely enclosed to prevent the escape of lime dust. Chemical handling equipment should be automated to eliminate the manual lifting requirement. Refer to Section 370.560.

e) Drainage and Filtrate Disposal

 Drainage from beds or filtrate dewatering units shall be returned to the sewage treatment process at appropriate points and rates.

f) Other Dewatering Facilities

 If it is proposed to dewater sludge by other methods, a detailed description of the process and design data shall accompany the plans. Refer to Section 370.520(b) for any new process determinations.

(Source: Amended at 21 Ill. Reg. 12444, effective August 28, 1997)