

June 5, 2024 Stakeholder Meeting

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DRAFT STRAWMAN FOR STAKEHOLDER MEETINGS

10 CSR 20-8.140 Wastewater Treatment Facilities

PURPOSE: This rule contains the minimum standards for the design of systems that are part of wastewater collection and treatment systems. This rule is to be used with rules 10 CSR 20-8.110 through 10 CSR 20-8.210. It does not address all possible aspects of design, and the design engineer may refer to other appropriate reference materials so long as these minimum standards set forth in this rule are met.

(1) Applicability. Wastewater systems shall be designed based on criteria contained in this rule, published standards, applicable federal and state requirements, standard textbooks, current technical literature, and applicable safety standards. In the event of any conflict between the above criteria, the requirement in this rule shall prevail.

(A) This rule shall not apply to treatment units covered in 10 CSR 20-8.300.

(B) This rule shall not apply to treatment units covered in 10 CSR 20-8.500.

(2) Alternative Requirements.

(A) When the owner of a proposed reviewable project believes that compliance with a design requirement of this chapter is impracticable, the owner may provide engineering justification to the department in writing prior to the submission of final plans.

1. Engineering justification for the alternative requirement must be provided and include all pertinent facts, data, reports, and studies supporting that the alternative requirement will result in equivalent or improved effectiveness as the minimum design criteria of this chapter.

2. The department may approve an alternative requirement when it determines that compliance with the design requirements of this chapter would be impracticable when the alternative, in its best professional judgement, is in substantial compliance with the requirements of this chapter.

Commented [ML1]: Proposed new language. Same language that is in the draft 10 CSR 20-8.200 to allow for alternative justification on minimum standards.

Commented [ML2]: June comment- suggestion to add "outcome of" so the statement would read **is in substantial compliance with the outcome of requirements of this chapter**

Commented [ML3]: Added this clause to document that facilities need to discuss this.

June comment on planned future use?

For a number of facilities, there is a knowledge about what is expected to go in around the plant and it should be considered when selecting a site.

Commented [ML4]: June stakeholder meeting
Comment on what critical means.
It was existing language, however the sentence was reworded to remove "critical" and to provide what we are looking for- an evaluation of a site based on what is know and how to minimize impacts.
Very similar language in TR-16.

~~##~~ (3) General.

(A) Location. Criteria to be considered when selecting a site are listed in 10 CSR 20-8.110(5)(E)6. **Where The facility plan or the summary of design shall include information and design considerations incorporated into the selected site to minimize adverse impacts.** ~~f site must be used which is critical with respect to following items; appropriate measures shall be taken to minimize adverse impacts.~~ **The following items shall be considered when selecting a plant site:**

- 1. Proximity to residential areas;**
- 2. Direction of prevailing winds;**
- 3. Accessibility by all-weather roads;**

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4. Area available for expansion;
5. Local zoning requirements;
6. Local soil characteristics, geology, hydrology and topography available to minimize pumping;
7. Access to receiving stream;
8. Downstream uses of the receiving stream; and
9. Compatibility of the treatment process with the present and planned future land use, including noise, potential odors, air quality, and anticipated sludge processing and disposal techniques.

(B) Flood Protection. Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation.

1. The one hundred- (100-) year flood plain elevation is based on the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) in effect at the time the construction permit application is submitted.
2. The hydraulic profile in the technical plans shall include the one hundred- (100-) year water surface elevation.

(C) Minimum Separation Distances.

1. Measuring distance. The minimum separation distances are measured to the closest point of the occupied residence, building, road, and property line,
 - A. From the top, center of the berm for open storage basins, earthen storage basins, concrete basins, and lagoons;
 - B. From the edge of the open storage vessel or holding tank;
 - C. From the edge of the treatment unit or building for mechanical treatment components;
 - D. From the edge of the lid or building for underground treatment units;
 - E. From the edge of the end of spray zone for solid set sprinklers, center pivots, and traveling guns utilized for surface land application; and
 - F. From the edge of the dispersal field for subsurface dispersal.

2. Potable water sources. ~~*Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300').*~~
Unless another distance is determined through the Section (2) Alternative Requirements, no wastewater treatment facilities shall be located closer than the minimum distance to all potable water sources, as provided in Table 140-1 below. The department may continue to consult with Public Drinking Water Branch and Missouri Geological Survey as necessary.

Commented [ML5]: Moved from the bottom of the section to the top, since both were dealing with site location.

Commented [ML6]: Comment- definition of major modification.

June stakeholder meeting- major modification in the past has meant addition of new treatment components such as disinfection, changing elevation of berms, modifying berm structures.

Commented [ML7]: Comment to add clarification on 100 year flood

1. A 100 year flood plain based on the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) in effect at the time the construction permit application is submitted.
2. On the hydraulic profile in the plan, mark the 100 year water surface elevation.

Commented [ML8]: June comment on how distances are calculated.
Added to provide clarity and consistency on how distances are to be measured

Commented [ML9]: April 2024 Stakeholder meeting discussion topic per the CWC. Documents for discussion will be posted prior to stakeholder meeting.

Commented [ML10]: Adapted from 10 CSR 23-3.010 Table 3.1.1 Specific Setback Distances for wells from pollution or contaminant sources.

10 CSR 23-3.010 Table 3.1.1 applies to new wells constructed.

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Table 140-1: Minimum Separation Distance from Potable Water Source

Treatment System	Minimum Horizontal Distance
Earthen, concrete, treatment lagoon or open to the atmosphere storage structure containing liquids, solids, or semi-solids	300 ft
Surface land application fields for wastewater	300 ft
Subsurface dispersal field	100 ft
Septic tank or other storage tank	50 ft
Wastewater treatment facility serving mainly domestic sources	300 ft
Wastewater treatment facility serving process or industrial facilities	300 ft
Storage areas for commercial fertilizer and/or chemicals	300 ft
Leachate treatment system	1,000 ft

2. ~~Residences~~ **Domestic Facilities.** No **domestic** treatment ~~unit~~ facility with a design average capacity of ~~twenty-two thousand five hundred gallons per day (22,500 gpd)~~ fifty thousand gallons per day (50,000 gpd) or less shall be located closer than the minimum distance provided in Table 140-~~1~~2 below. See 10 CSR 20-2.010(68) for the definition of a residence.

Table 140-2: Minimum Separation Distance for 50,000 gpd or less domestic facilities

Treatment System	Minimum Horizontal Distance
Earthen, concrete, treatment lagoon or open to the atmosphere storage structure containing liquids, solids, or semi-solids	200 ft from any public building or occupied residence, not owned or operated by the facility and 50 ft to property line
Septic tank or treatment system used in conjunction as part of a surface land application system or subsurface dispersal system	50 ft from any public building or occupied residence, not owned or operated by the facility
Surface land application fields for wastewater	50 ft to property line
Subsurface dispersal field	10 ft to property line
Discharging facilities, including by not limited to recirculating media filters, activated sludge treatment processes,	100 ft from any public building or occupied residence, not owned or operated by the facility

Commented [ML11]: Discussion at the June 2024 stakeholder meeting
Increased the flow breakpoint to the 50,000 gpd for consistency with other sections of the rule and for consistency with the different general permits

Commented [ML12]: June 2024 discussion:
Comment received to increase distances
Comment received to remove residence and just use property line
Comment received to remove property line and just use residence
Comment received to define open recirculating media filters

Potentially update Table 140-1 reference

Commented [ML13]: To be defined in 10 CSR 20-2.010 rulemaking

Commented [ML14]: Proposed increase from 50 ft, but the rule allows for alternative determinations and it removes the 200 ft from open sand filters that was not clear in the existing rule.

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extended aeration systems, package treatment plants, and membrane bioreactors	
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3. Industrial facilities. No industrial wastewater treatment facility shall be located closer than the minimum distance provided in Table 140-3, unless the industrial facility submits a copy of a written agreement signed by all affected property owners within the relevant buffer distance.

Table 140-3: Minimum Separation Distance for Industrial Wastewater Facilities

Facility Description	Minimum Horizontal Distance
Industrial Wastewater Mechanical Treatment plant	50 feet from property line and/or public road
Industrial wastewater in open storage basin, earthen, concrete, treatment lagoon or open to the atmosphere storage structure containing liquids, solids, or semi-solids all generated onsite	50 feet from property line and/or public road 200 feet from any public building or occupied residence, not owned or operated by the facility
Industrial wastewater in open storage vessel containing liquids, solids, or semi-solids all generated onsite	50 feet from property line and/or public road 200 feet from any public building or occupied residence, not owned or operated by the facility
Surface land application field for industrial wastewater	50 feet from property line and/or public road 200 feet from any public building or occupied residence, not owned or operated by the facility
Subsurface dispersal field of industrial wastewater liquids	10 feet from property line and/or public road 200 feet from any public building or occupied residence, not owned or operated by the facility
Comingled offsite industrial wastewater or wastewater residuals open storage basin or open storage vessel, less than 500,000 gallon storage capacity (≤ 0.5 MG)	300 feet from any public building or occupied residence, not owned or operated by the facility 50 feet from property line and/or public road
Comingled industrial wastewater or wastewater residuals open storage basin or open storage vessel, generated offsite, 500,000 gallons to less than 5 million gallon	1,000 feet from any public building or occupied residence, not owned or operated by the facility 50 feet from property line and/or public road

Commented [ML15]: Reminder- this rule does not apply to CAFOs. And only applies to new facilities.

Setback distances for industrial facilities, especially the land application component will be discussed in upcoming rulemakings for 6.015 and for the Land Application Technical Nutrient Management Standard which will be incorporated into rule. These distances will be consistent with those discussions. And will be discussed in more details at those upcoming meetings.

The goal here is to provide consistency and help with planning for the design of systems that may not be land applying, but discharging.

Commented [ML16]: <500,000 gallon comingled systems are not defined in HB 2134

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storage capacity (0.5 MG to 5 MG)	
Comingled industrial wastewater or wastewater residuals open storage basin or open storage vessel, generated offsite, 5 million gallons to less than 10 million gallon storage capacity (5 MG to 10 MG)	2,000 feet from any public building or occupied residence, not owned or operated by the facility 50 feet from property line and/or public road
Comingled industrial wastewater or wastewater residuals open storage basin or open storage vessel, generated offsite, greater than or equal to 10-million-gallon (≥ 10 MG) storage capacity	3,500 feet from any public building or occupied residence, not owned or operated by the facility 50 feet from property line and/or public road

Table 140-1. Minimum Separation Distance for 22,500 gal/d or less.

Type of Facility	Separation Distance
Lagoons	200' to a neighboring residence and 50' to property line
Open recirculating media filters following primary treatment	200' to a neighboring residence
All other discharging facilities	50' to a neighboring residence

~~[3 Plant Location. The following items shall be considered when selecting a plant site: proximity to residential areas; direction of prevailing winds; accessibility by all-weather roads; area available for expansion; local zoning requirements; local soil characteristics, geology, hydrology and topography available to minimize pumping; access to receiving stream; downstream uses of the receiving stream and compatibility of the treatment process with the present and planned future land use, including noise, potential odors, air quality, and anticipated sludge processing and disposal techniques. Where a site must be used which is critical with respect to these items, appropriate measures shall be taken to minimize adverse impacts.]~~

(D) Accessibility. Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times.

(E) **Materials of Construction.** **The treatment plant facility shall be constructed of materials that are compatible with the characteristics of the wastewater, any chemicals used, and any resulting chemical reactions that occur between the wastewater, chemicals used on site, and the materials of construction.**

Commented [ML17]: June comment on rewording--> The treatment plant facility shall be constructed of materials that are generally comparable with the characteristics of the wastewater and shall take into account the proposed chemical to be used, as well as the resulting chemical reactions.

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~~(3)~~(4) Quality of Effluent. The degree of wastewater treatment shall be based on 10 CSR 20-7.015, Effluent Regulations, 10 CSR 20-7.031, Water Quality Standards, and/or appropriate federal regulations including the provisions of the operating permit.

~~(4)~~(5) Pump and Haul **Facilities**.

(A) General.

1. Accessibility. Conform to subsection ~~(2)~~(3)(D) of this rule.
2. Security. Follow the provisions in subsection ~~(8)~~(9)(A) of this rule for ~~fencing~~ **restricting access to the tanks or earthen basins where wastewater is stored prior to pumping.**
3. Protection of water supplies. Separation and crossing of water supplies shall be in accordance with subsection ~~(2)~~(3)(C) of this rule and 10 CSR 20-8.120(5).

(B) Septic Tank Design. Conform to 10 CSR 20-8.180(2) for septic tank design; **a minimum one thousand (1,000) gallon tank with baffles.**

(C) Earthen Basin Design. Follow the provisions in 10 CSR 20-8.200 for earthen basin design, **including but not limited to geohydrologic evaluation, emergency spillway, and compaction requirements.**

(D) Alarm system. The alarm shall be activated in cases of high water levels. Follow the provisions in subsection ~~(7)~~(8)(C) of this rule for alarm systems.

Commented [ML18]: Pump and haul tanks with alarms-only allow in specific situations, minimum of 1,000 gallons. Still have to meet setback distances listed above. Holding tanks are not allowed for individual residences.

~~(5)~~(6) Design.

(A) Type of Treatment. Items to be considered in selection of the appropriate type of treatment are presented in 10 CSR 20-8.110(5).

(B) New and Innovative Technology. Follow the provisions in 10 CSR 20-8.110(6).

(C) Design Period. Identify the design period in the facility plan per 10 CSR 20-8.110(5)(B).

(D) Design Loads.

1. Hydraulic design.
 - A. Identify flow conditions critical to the design of the wastewater treatment facility as described in 10 CSR 20-8.110(3).
 - B. The design peak hourly flows shall be used to evaluate the effect of hydraulic peaks on unit processes, pumping, piping, etc.
 - C. **The design of treatment units that are not subject to peak hourly flow requirements shall be based on the design maximum daily flow.** ~~average flow~~.
2. Organic design. Base organic loadings for wastewater treatment facility design on the information given in 10 CSR 20-8.110(3). When septage is accepted at a wastewater treatment facility, the effects of septage flow shall be evaluated in the design.

Commented [ML19]: June comment to change to The design of treatment units that are not subject to peak hourly flow requirements shall be based on **the design peak day or similar anticipated peak throughput of the treatment facility.**

TR-16 uses maximum daily flow

10 State Standards uses

The design of treatment units that are not subject to peak hourly flow requirements shall be based on the design average flow. For plants subject to high wet weather flows or overflow detention pumpback flows, the design maximum day flows that the plant is to treat on a sustained basis should be specified.

Recommendation- make the change to say design maximum day flow.

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3. Industrial process wastewater. When appreciable amounts of process wastewater are involved, the quantity and character of the wastewater shall be determined on an industry-by-industry basis using chemical analyses from pretreatment programs. In the absence of existing pretreatment programs, waste characterization programs should be undertaken.

~~6.6~~ (7) Outfalls.

- (A) Protection and Maintenance. The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability, **capacity to handle the maximum design daily flow**, and freedom from stoppage.
- (B) Sampling Provisions. All sampling points shall be designed so that a representative and discrete twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters.
- (C) All outfalls **and permitted features** shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001).

~~7.7~~ (8) Essential Facilities.

- (A) Emergency Power Facilities.
 - 1. General. ~~All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures.~~ **For continuity of operation during power failures, all wastewater treatment facilities shall be provided with an alternate source of electric power, back-up generators, pumping capability, or the ability to safely store water, without the risk of damaging infrastructure, bypassing, or violating operating permit effluent limits.**
 - 2. Power for disinfection. Disinfection and dechlorination, when used, shall be provided during all power outages.
- (B) Electrical Controls. Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the ~~NFPA 70 National Electric Code (NEC) (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. This standard shall hereby be incorporated by reference in this rule, as published by National Fire Protection Association® (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471. This rule does not incorporate any subsequent amendments or additions.~~ **NFPA 820 National Electrical Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA) (2024 Edition), as approved and published May 13, 2023. This rule does not incorporate any subsequent amendments or additions.**

Commented [ML20]: Proposed new language to allow for the different options available to a facility for continuity of operations without bypassing.

June discussion- comment on breaking up by size of facility.

Commented [ML21]: Comment that adoption of NFPA 820 vs. NEC requirements will increase the cost of projects. Especially the requirements on gas monitoring.

June stakeholder meeting- additional discussion because we were told NEC requirements were adding cost to the project and were more restrictive than the NFPA 820 requirements. Additional discussion and research necessary.

Commented [ML22]: Discussion point for revision, as comments have been received that Class I, Division I Group D locations may not be appropriate or maybe add requirements to ensure durability of the materials in standard operating conditions:
-corrosion resistance requirement to cover components in areas not classified as Class I Division I Group D areas
-weatherproof equipment and NEMA rating requirement for outdoor components (like 8.130(3)(B)2. covers for pump stations)

Commented [ML23R22]: From February stakeholder meeting, add reference to NFPA 820 and remove discussion of specific controls.

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- (C) Alarm Systems. An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities.
- (D) Water Supply.
1. General. No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply.
 2. Direct hot water connections. Hot water for any direct connections shall not be taken directly from a boiler used for supplying hot water to a digester heating unit or heat exchanger.
 3. Indirect connections.
 - A. Where a potable water supply is to be used for any purpose in a wastewater treatment facility other than direct connections, a break tank, pressure pump, and pressure tank, or a reduced pressure backflow preventer consistent with the department's Public Drinking Water Branch shall be provided.
 - B. A sign shall be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking.
 4. Separate non-potable water supply. Where a separate non-potable water supply is to be provided, a break tank will not be necessary, but all system outlets shall be posted with a permanent sign indicating the water is not safe for drinking.
- (E) Flow Measurement. A means of flow measurement shall be provided at all wastewater treatment facilities. **Flow measurement equipment must be sized to function effectively over the full range of flows expected at the facility and be protected from freezing.**
- (F) Sampling Equipment. Effluent twenty-four (24) hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. **See 10 CSR 20-7.015.**
- (G) Housed Facilities. Where wastewater treatment units are in a housed facility, follow the provisions in subsection ~~8.140(9)~~(J) of this rule for ventilation.

~~8.140(9)~~ Safety. Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:

- (A) ~~Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals.~~ **Restrict Access. Enclose the facility site with a fence or other barriers designed to discourage the entrance of unauthorized persons and animals. If the site is not fenced, provide details on how access is restricted.**
- (B) Gratings over appropriate areas of treatment units where access for maintenance is necessary;
- (C) First aid equipment;
- (D) Posted "No Smoking" signs in hazardous areas;

Commented [ML24]: Reference to the backflow regs (?)

Commented [BC(25R24)]: I think referencing their regulations would be good; however, then if they change their regulations our citation could then need changing. I would also recommend in the WWGSD we provide links to the departments backflow preventer webpage, which includes the approved backflow assembly list or just include links to the lists themselves.

Commented [ML26]: Discussion point for Feb. stakeholder meeting- Proposed revision is to account for lockable lids or other ways a site may be restricted besides a fence. Also the question has been raised about treatment plants inside already restricted areas if a 2nd fence is necessary since there should not be unauthorized persons present?

Commented [ML27R26]: Result of February 8.140 stakeholder meeting- add examples to WWGSD, but overall like the language.

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- (E) Appropriate personal protective equipment (PPE);
- (F) Portable blower and hose sufficient to ventilate accessed confined spaces;
- (G) Portable lighting equipment complying with ~~NEC requirements~~ **NFPA 820 National Electrical Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA) (2024 Edition), as approved and published May 13, 2023. This rule does not incorporate any subsequent amendments or additions.** See subsection ~~(7)(8)(B)~~ of this rule;
- (H) Appropriate gas detectors in the correct locations, as listed and labeled for use in ~~NEC Class I, Division I, Group D locations~~ **NFPA 820 National Electrical Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA) (2024 Edition), as approved and published May 13, 2023. This rule does not incorporate any subsequent amendments or additions.** See subsection ~~(7)(8)(B)~~ of this rule;
- (I) Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph ~~(7)(8)(D)3.B.~~ of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.;
- (J) Ventilation. Ventilation shall include the following:
 - 1. Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply;
 - 2. Force fresh air into enclosed screening device areas or open pits more than four feet (4') deep. Also see 10 CSR 20-8.130(3)(F);
 - 3. Dampers. Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging;
 - 4. Continuous ventilation. ~~Where continuous ventilation is needed (e.g., housed facilities), provide at least twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area.~~ **Where continuous ventilation is needed (e.g., housed facilities), provide ventilation that meets the minimum requirements of NFPA 820 National Electric Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA) (2024 Edition), as approved and published May 13, 2023. This rule does not incorporate any subsequent amendments or additions.** Base air change demands on one hundred percent (100%) fresh air;
 - 5. Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building.
 - A. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls.

Commented [ML28]: Comment received on Safety Data Sheets and design features for chemicals, polymers, coagulants that may be used on site and the design features that may be necessary.

Commented [ML29R28]: See revised discussion under Chemical Handling on SDS.

Commented [ML30]: June comment about this needing clarification.
Existing rule language; used in 10 States

Will do additional research, see if rule clarification is necessary or if additional info in WWGSD resource

Commented [ML31]: Regarding dampers—is the concern only with dampers on the outside of the structure that may get obstructed with debris (as it ties in with concerns about fine screens)?
1. Or is there some kind of concern with sparking/explosion hazards? Can we identify the concern to be addressed rather than a set restriction (that may not be applicable in all situations), and leave it to the design engineer?
2. Larger facilities may have more extensive HVAC requirements that need dampers to properly balance air flows.

Commented [BC(32R31)]: Looks like this language came from 10 States. Iowa proposed revisions to their Chapter 13 proposed removing the restriction on dampers. Could clarify dampers shall not reduce air flow, which may allow them to be used to direct flow. If we get the Section 2 Alternative Requirements in then we could just keep the language as is and have them justify the use of dampers.

Commented [BC(33)]: Looking at NFPA 820 as well as Iowa's proposed rule change which also incorporates NFPA 820. There is a disclaimer that practices under NFPA 820 standard are intended to minimize fire and explosion hazards; therefore, the NFPA 820 criteria may not be adequate to protect personnel from exposure to toxic and biological hazards. Maybe we should include this as well?

Commented [ML34]: Regarding air changes, how to address other scenarios for air exchanges? Also for the intermittent ventilation scenario, is there a certain amount of time after it has been running 30 air changes per hour that it can switch to 12 complete air changes per hour?

Commented [ML35R34]: February stakeholder meeting-add reference in to NFPA 820 rather than specific number of air exchanges.

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- B. For a two (2) speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; and
6. Fans, heating, and dehumidification. Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings. Follow the provisions in subsection ~~(7)(8)(B)~~ of this rule for electrical controls;

(K) Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. See subsection ~~(7)(8)(B)~~ of this rule;

(L) Provisions for local lockout/tagout on stop motor controls and other devices;

(M) Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards in accordance with ~~[NFPA 70E Standard for Electrical Safety in the Workplace (2018 Edition), as approved and published August 21, 2017. This standard shall hereby be incorporated by reference in this rule, as published by National Fire Protection Association®, 1 Batterymarch Park, Quincy, MA 02169-7471. This rule does not incorporate any subsequent amendments or additions.]~~ NFPA 820 National Electrical Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA) (2024 Edition), as approved and published May 13, 2023. This rule does not incorporate any subsequent amendments or additions.

~~(9)~~ (10) Chemical Handling.

(A) General.

1. Chemical Identification. The identification and hazard warning data included on shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a chemical substance. Label wastewater and sludge sample containers adequately to identify risks present in samples.
2. Provide a copy of Safety Data Sheets (SDS) for all chemicals used or stored at the facility. At the facility, store the SDS in proximity to the chemical or within the operation and maintenance manuals for the facility. All chemicals used onsite shall have the SDS.
3. Containment materials. The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., shall be specially selected considering the physical and chemical characteristics of each chemical.
 - A. Design chemical material handling equipment to minimize manual lifting.
4. Splash Guards. All pumps or feeders for chemicals, especially hazardous and corrosive chemicals, shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel.
5. Piping, labeling, and coupling guard locations.

Commented [ML36]: Rewording and reorganization of the existing chemical handling language.

Commented [ML37]: Based on comment received. Updated to state the SDS can be stored with the chemical or in the operation and maintenance manual.

Commented [ML38]: New from TR-16

Commented [ML39]: Comment- that this statement is not necessary and should be removed.

Suggestion- remove so it reads all pumps or feeders for chemical shall have guards...

Commented [ML40]: June comment about the splash guard provision would require all chemical feed skids to have splash guards.

This is largely existing language in the current rule, it was just moved up for clarity.
Language in TR-16 and 10 State Standards

June 5, 2024 Stakeholder Meeting

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Purple bold- proposed new language at April 2024 meeting

Blue bold- proposed new language at the June 2024 meeting

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Yellow highlight- external to 8.140 regulatory reference to verify as rulemaking progresses.

Red italic strikethrough- proposed removal

- A. All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every ten feet (10') and with at least two (2) labels in each room, closet, or pipe chase.
- B. All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any leakage away from space occupied by facility personnel.
6. Dust. Dust collection equipment shall be provided to protect facility personnel from dusts injurious to the lungs or skin and to prevent polymer dust from settling on walkways that become slick when wet.
7. Alarms. Facilities shall be provided for automatic shutdown of pumps and sounding of alarms when failure occurs in a chemical discharge line.
8. Personal Protective Equipment.

- A. Provide personal protective equipment for breathing, eyes, face, head, and extremities, as well as all other equipment identified by the Safety Data Sheet, for all individuals that will handle any chemical known to pose a potential health risk.
- B. All personal protective equipment and chemical neutralizers must be accessible
- C. Warning signs requiring use of personal protective equipment shall be posted near chemical stations, pumps, and other points of frequent hazard.
- D. Based on the Safety Data Sheet, facilities that use chemicals that are identified as having an absorption, eye, or skin exposure risk must be designed to minimize risks of exposure and if necessary, provide eye washing and showering systems within each chemical work area for immediate emergency use. The eye washing and showering systems must meet the minimum standards established in the American National Standard For Emergency Eyewash And Shower Equipment (ANSI/ISEA Z358.1-2014)

(B) Chemical Storage Safety.

1. Chemicals shall be stored per the Safety Data Sheet, which at a minimum shall include:
 - A. Locating storage area for chemical containers out of direct sunlight;
 - B. Storing chemical containers in a cool, dry, and well-ventilated area;
 - C. Controlling humidity as necessary, especially when storing dry chemicals;
 - D. Maintain storage temperatures in the appropriate ranges to prevent chemical storage tanks and feed lines from reaching temperatures likely to result in freezing or crystallization.
2. Store incompatible chemicals separately to ensure the safety of facility personnel and the wastewater treatment system. Store any two (2) chemicals that can react to form a toxic gas in separate housing facilities;
3. Minimum days of supply. All facilities shall have a chemical storage space sufficient to continue to provide treatment taking into account natural disasters, such as flooding or tornados, or supply chain disruptions. In the summary of

Commented [ML41]: Expanded provide appropriate ppe to include the different components.
From Texas design criteria 217.324

Commented [ML42]: Replaced goggles with ppe

Commented [ML43]: Texas design criteria 217.324

Commented [ML44]: Modified to reference the Standard because there are different shower/eye wash requirements based on type of chemicals.

Need to incorporate by reference.

Add summary table to WWGSD for ease of access.

Commented [ML45]: New from TR-16; NY Design for Intermediate Sized WWTP

Commented [ML46]: June stakeholder meeting. Multiple comments on days of storage. Broke it down into $\leq 50,000$ gpd is 30 days and $>50,000$ gpd is either 10 days or the volume based on max dosing for the period of time between ordering and receipt plus 3 days.

The addition of days between ordering and receipt is used by TR-16 as one of their recommendations for less than 30 days of storage

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design with the construction permit application, provide a discussion of chemicals used and the days of storage available.

A. For facilities with a design average flow of fifty thousand gallons per day (50,000 gpd) or less, provide a minimum of thirty (30) days' supply of chemicals used in the treatment process/processes, unless local suppliers and conditions indicate that such storage can be reduced without limiting the supply;

B. For facilities with a design average flow greater than fifty thousand gallons per day (50,000 gpd), provide a minimum of ten (10) days' supply at maximum design dosage, or the volume at maximum dosage for the time it takes for standard delivery between ordering and receipt of chemicals plus three days, unless local suppliers and conditions indicate that such storage can be reduced without limiting the supply.

4. Keep concentrated acid solutions or dry powder in closed, acid-resistant shipping containers or storage units;

5. Soda ash shall not be bagged in a damp or humid location.

6. Insulate pipelines carrying soda ash at concentrations greater than twenty percent (20%) solution to prevent crystallization;

(C) Chemical Storage Area Design. The following shall be provided to fulfill the particular needs of each chemical storage area or housing facility:

1. Construct the chemical housing facility or storage area(s) in accordance with the environmental, human health, and storage risks identified in the Safety Data Sheet (SDS).

2. Construct the chemical storage area of fire and corrosion resistant material;

A. Provide storage areas housing flammable chemicals with an automatic sprinkler system designed for four tenths gallons per minute per square foot (0.4 gpm/ft²) and a minimum duration of twenty (20) minutes;

B. Construct an isolated fireproof storage area and explosion proof electrical outlets, lights, and motors for all powdered activated carbon storage and handling areas in accordance with NFPA 820 National Electrical Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA) (2024 Edition), as approved and published May 13, 2023.

This rule does not incorporate any subsequent amendments or additions.

3. Construct the chemical storage area floors and walls of material that is suitable to the chemicals being stored and that is capable of being cleaned;

A. Install floor surfaces to be smooth, chemical resistant, slip resistant, and well drained with three inches per ten feet (3"/10') minimum slope;

B. Provide chemical storage areas with drains, sumps, finished water plumbing, and the hose bibs and hoses necessary to clean up spills and to wash equipment;

C. Pipe chemical drains to isolated holding tanks or other locations within the plant for proper disposal or treatment.

Commented [ML47]: New language added to help provide a distinction between treatment chemicals and maintenance/cleaning chemicals as requested at the Feb. stakeholder meeting

For discussion at April stakeholder meeting

Commented [ML48]: NFPA 820 Table 5.2.2, defined Section 3.3.1

Commented [ML49]: Comment to state pipe chemical drains to isolated holding tanks rather than to the sanitary sewer due to potential hazardous reactions with other chemicals.

June stakeholder meeting discussion- depending on the size and characteristics of the facility, the type and amount of chemical spilled, for many facilities an isolated holding tank may be appropriate but for others returning it to the treatment train or the headworks may be appropriate.

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4. Design vents from feeders, storage facilities, and equipment exhaust to discharge to the outside atmosphere above grade and remote from air intakes;

A. Vent acid storage tanks to the outside atmosphere, but not through vents in common with day tanks;

5. Based on the chemical stored, provide adequate lighting and electrical equipment complying with the NFPA 820 National Electrical Code Standard for Fire Protection in Wastewater Treatment and Collection Facilities (NFPA)(2024 Edition), as approved and published May 13, 2023. This rule does not incorporate any subsequent amendments or additions.

6. For facilities greater than one million gallons per day (1 MGD) or facilities handling gaseous chemicals, equip doors to the chemical storage area with panic hardware. To prevent unauthorized access, doors lock but do not need a key to exit the locked room using the panic hardware;

7. Design and isolate areas intended for storage and handling of chlorine and sulfur dioxide and other hazardous gases. Follow the provisions in 10 CSR 20-8.190(3) and 10 CSR 20-8.190(4) for chlorine and dechlorination;

8. Design the storage area with designated areas for “full” and “empty” chemical containers;

9. Secondary Containment. Secondary containment storage areas contain the stored volume until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:

A. A minimum volume of one hundred twenty-five percent (125%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when not protected from precipitation;

B. A minimum volume of one hundred ten percent (110%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; and

C. Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored.

(D) Chemical Handling Design. The following shall be provided, where applicable, for the design of chemical handling:

1. Make provisions for measuring quantities of chemicals used for treatment or to prepare feed solutions over the range of design application rates;
2. Select storage tanks, piping, and equipment for liquid chemicals specific to the chemicals;
3. Provide sufficient capacity of solution storage or day tanks feeding directly for twenty-four- (24-) hour operation at design average flow;

Commented [ML50]: Comment about change in 10 States about common vents for the same chemical.

Commented [ML51]: Include table on common chemicals in WWGSD- NFPA 820 references NFPA 497 for specific chemicals. NFPA 820 just says Class 1, Class 2, unclassified, etc..

Commented [ML52]: Reworded to provide a break either based on flow or chemical type on when panic hardware is necessary on chemical storage areas.

For discussion at April stakeholder meeting

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4. **Chemical feeders for continuous operability.**

- A. For facilities with a design average flow less than or equal to fifty thousand gallons per day (50,000 gpd), provide a minimum of one (1) chemical feeder for continuous operability. Provide a standby unit or combination of units of sufficient capacity to replace the out-of-service feeder;
- B. For facilities with a design average flow greater than fifty thousand gallons per day (50,000 gpd), provide a minimum of two (2) chemical feeders for continuous operability. Provide a standby unit or combination of units of sufficient capacity to replace the largest unit out-of-service;

5. **Chemical feeders for chemical dosing on noncontinuous processes.**

- A. For facilities with a design average flow less than or equal to fifty thousand gallons per day (50,000 gpd), provide a minimum of one (1) chemical feeder for non-continuous operability;
- B. For facilities with a design average flow greater than fifty thousand gallons per day (50,000 gpd), provide a minimum of two (2) chemical feeder for non-continuous operability. Both feeders must be able to handle the design dosage for the system, to provide sufficient treatment capacity;

(E) Chemical feeders shall—

- 1. Be designed with chemical feed equipment to meet the maximum dosage requirements for the design average flow conditions;
- 2. Be able to supply, at all times, the necessary amounts of chemicals at an accurate rate throughout the range of feed;
- 3. Provide proportioning of chemical feed to the rate of flow where the flow rate is not constant;
- 4. Provide for uniform strength of solution consistent with the nature of the chemical solution for solution tank dosing;
- 5. Be designed to be readily accessible for servicing, repair, and observation;
- 6. Protect the entire feeder system against freezing;
- 7. Be located in close proximity to application points ~~adjacent to points of application~~ to minimize length of feed lines;
- 8. Provide for both automatic and manual operation for chemical feed control systems;
- 9. Utilize automatic chemical dose or residual analyzers, and where provided, include alarms for critical values and recording charts;
- 10. Provide screens and valves on the chemical feed pump suction lines;
- 11. Provide continuous agitation to maintain slurries in suspension;
- 12. Feed chemical slurries through solution feed pumps that are not diaphragm or piston type positive displacement pump types;
- 13. Provide an air break or anti-siphon device where the chemical solution enters the water stream; and
- 14. Flocculation tanks or channels.

Commented [ML53]: Broke up by flow at the 50,000 gpd point

For discussion at April stakeholder meeting

Commented [ML54]: New added for non-continuous processes. Broken up by 50,000 gpd design flow. Proposed not requiring a backup for noncontinuous operations

For discussion at April stakeholder meeting

June stakeholder comment- redundant tanks and feeder lines may not be a good idea for asset management purposes.

Source of the 2 feeders is TR-16

Commented [ML55]: Comment received that a standby shelf unit for redundancy may be a good middle ground with the standby being allowed to cover multiple chemicals if they use the same pump.

Suggestion: Add that clarification into the Wastewater Guidelines and Standards Document as a suggestion and option for consideration.

Commented [ML56]: June comment that adjacent is not always practicable. Reworded to say in close proximity. Will add info to the WWGSD to include the considerations brought up in the comment about access, code requirements, safety, and site specific considerations.

Commented [ML57]: Comment on type of screens and valves- does it mean foot valves? Screens can cause clogging issues with some chemicals.

Leasee- have not located the source from the 2018 version. Suggestion- remove and place as a recommendation in WWGSD.

Commented [ML58]: Comment on tubular diaphragm pumps and hose pumps being positive displacement. Is this appropriate restriction?

Leasee- can not find the source of this from the 2018 rulemaking. In research, Veolia has a number of chemical feed systems using positive displacement. Suggestion- add to Wastewater Guidelines and Standards document as a recommendation, rather than a requirement. <https://www.watertechnologies.com/handbook/chapter-35-chemical-feed-systems>

Commented [ML59]: Broke by flow, used the 50,000 gpd flow break
For discussion at April stakeholder meeting

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- A. For facilities with a design average flow less than or equal to fifty thousand gallons per day (50,000 gpd), the flocculation tank or channel shall have at least one (1) flocculation tank or channel capable of providing the maximum dosing feed with a detention time **or hydraulic residence time based on the results of jar testing, pilot scale testing, or a minimum of twenty (20) minutes based on the expected wastewater characteristics and treatment intent.**
- B. For facilities with a design average flow greater than fifty thousand gallons per day (50,000 gpd), provide a minimum of two (2) flocculation tanks or channels having a combined detention time **or hydraulic residence time based on the results of jar testing, pilot scale testing, or a minimum of twenty (20) minutes based on the expected wastewater characteristics and treatment intent.** ~~forty to thirty (20–30) minutes.~~ Provide independent controls for each tank or channel.
- C. In the summary of design, provide copies of any testing completed to determine and any assumptions on the dosing rate, detention time, and wastewater characteristics.

(F) Liquid Chemical Handling Feeder Design.

1. Install all liquid chemical mixing and feed installations on corrosion resistant pedestals;
2. Pump concentrated liquid acids in undiluted form from the original container to the point of treatment or to a covered storage tank. Do not handle in open vessels.

(G) Powdered or Dry Chemical Handling Feeder Design.

1. Be equipped with a dissolver capable of providing a minimum retention period of five (5) minutes at the maximum feed rate;
2. Have an eductor funnel or other appropriate arrangement for wetting the **chemical during the preparation of the stock feed solution on the makeup tanks;**
3. Provide adequate mixing by means of a large diameter, low-speed mixer;
4. Make provisions to measure the dry chemical volumetrically or gravimetrically;
5. Completely enclose chemicals and prevent emission of dust; and
6. **Polyelectrolyte feed installations**

- A. For facilities with a design average flow less than or equal to fifty thousand gallons per day (50,000 gpd), provide one (1) solution vessel and transfer piping for polyelectrolyte feed installations.
- B. For facilities with a design average flow greater than fifty thousand gallons per day (50,000 gpd), provide a minimum of two (2) solution vessel and transfer piping for polyelectrolyte feed installations. Provide a standby unit or combination of units of sufficient capacity to replace the largest unit out-of-service.

~~(A) General.~~

Commented [ML60]: TR-16 is the source of the 20 minutes of detention time. Other sources use residence time, so added both
Comment about jar testing, pilot scale testing of chemicals-added that option in.

Commented [ML61]: Comment received to change polymer to chemical as there are other dry chemicals besides polymers that may be used.

Commented [ML62]: Broke up by 50,000 gpd flow. For discussion at April stakeholder meeting

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1. Containment materials. The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical.

2. Secondary containment. Secondary containment storage areas contain the stored volume until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:

A. A minimum volume of one hundred twenty-five percent (125%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when not protected from precipitation;

B. A minimum volume of one hundred ten percent (110%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; and

C. Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored.

3. Splash guards. All pumps or feeders for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel.

4. Piping, labeling, and coupling guard locations.

A. All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every ten feet (10') and with at least two (2) labels in each room, closet, or pipe chase.

B. All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any leakage away from space occupied by facility personnel.

5. Alarm system. Facilities shall be provided for automatic shutdown of pumps and sounding of alarms when failure occurs in a pressurized chemical discharge line.

6. Dust. Dust collection equipment shall be provided to protect facility personnel from dusts injurious to the lungs or skin and to prevent polymer dust from settling on walkways that become slick when wet.

(B) Chemical Housing. The following shall be provided to fulfill the particular needs of each chemical housing facility:

1. Provide storage for a minimum of thirty (30) days' supply, unless local suppliers and conditions indicate that such storage can be reduced without limiting the supply;

2. Construct the chemical storage room of fire and corrosion resistant material;

3. Equip doors with panic hardware. To prevent unauthorized access, doors lock but do not need a key to exit the locked room using the panic hardware;

4. Provide chemical storage areas with drains, sumps, finished water plumbing, and the hose bibs and hoses necessary to clean up spills and to wash equipment;

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- 5. Construct chemical storage area floors and walls of material that is suitable to the chemicals being stored and that is capable of being cleaned;*
 - 6. Install floor surfaces to be smooth, chemical resistant, slip resistant, and well drained with three inches per ten feet (3"/10') minimum slope;*
 - 7. Provide adequate lighting;*
 - 8. Comply with the NEC recommendation for lighting and electrical equipment based on the chemicals stored. See subsection [(7)](8)(B) of this rule;*
 - 9. Store chemical containers in a cool, dry, and well ventilated area;*
 - 10. Design vents from feeders, storage facilities, and equipment exhaust to discharge to the outside atmosphere above grade and remote from air intakes;*
 - 11. Locate storage area for chemical containers out of direct sunlight;*
 - 12. Maintain storage temperatures in accordance with relevant [Material] Safety Data Sheets [(MSDS)] (SDS);*
 - 13. Control humidity as necessary when storing dry chemicals;*
 - 14. Design the storage area with designated areas for "full" and "empty" chemical containers;*
 - 15. Provide storage rooms housing flammable chemicals with an automatic sprinkler system designed for four tenths gallons per minute per square foot (0.4 gpm/ft²) and a minimum duration of twenty (20) minutes;*
 - 16. Store incompatible chemicals separately to ensure the safety of facility personnel and the wastewater treatment system. Store any two (2) chemicals that can react to form a toxic gas in separate housing facilities;*
 - 17. Design and isolate areas intended for storage and handling of chlorine and sulfur dioxide and other hazardous gases. Follow the provisions in 10 CSR 20.8.190(3) and 10 CSR 20.8.190(4) for chlorine and dechlorination;*
 - 18. Design an isolated fireproof storage area and explosion proof electrical outlets, lights, and motors for all powdered activated carbon storage and handling areas in accordance with federal, state, and local requirements;*
 - 19. Vent acid storage tanks to the outside atmosphere, but not through vents in common with day tanks;*
 - 20. Keep concentrated acid solutions or dry powder in closed, acid-resistant shipping containers or storage units; and*
 - 21. Pump concentrated liquid acids in undiluted form from the original container to the point of treatment or to a covered storage tank. Do not handle in open vessels.*
- (C) Chemical Handling Design. The following shall be provided, where applicable, for the design of chemical handling:*
- 1. Make provisions for measuring quantities of chemicals used for treatment or to prepare feed solutions over the range of design application rates;*
 - 2. Select storage tanks, piping, and equipment for liquid chemicals specific to the chemicals;*
 - 3. Install all liquid chemical mixing and feed installations on corrosion resistant pedestals;*

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- 4. Provide sufficient capacity of solution storage or day tanks feeding directly for twenty-four (24) hour operation at design average flow;*
- 5. Provide a minimum of two (2) chemical feeders for continuous operability. Provide a standby unit or combination of units of sufficient capacity to replace the largest unit out of service;*
- 6. Chemical feeders shall—*
 - A. Be designed with chemical feed equipment to meet the maximum dosage requirements for the design average flow conditions;*
 - B. Be able to supply, at all times, the necessary amounts of chemicals at an accurate rate throughout the range of feed;*
 - C. Provide proportioning of chemical feed to the rate of flow where the flow rate is not constant;*
 - D. Be designed to be readily accessible for servicing, repair, and observation;*
 - E. Protect the entire feeder system against freezing;*
 - F. Be located adjacent to points of application to minimize length of feed lines;*
 - G. Provide for both automatic and manual operation for chemical feed control systems;*
 - H. Utilize automatic chemical dose or residual analyzers, and where provided, include alarms for critical values and recording charts;*
 - I. Provide screens and valves on the chemical feed pump suction lines; and*
 - J. Provide an air break or anti-siphon device where the chemical solution enters the water stream;*
- 7. Dry chemical feed system shall—*
 - A. Be equipped with a dissolver capable of providing a minimum retention period of five (5) minutes at the maximum feed rate;*
 - B. Be equipped with two (2) solution vessels and transfer piping for polyelectrolyte feed installations;*
 - C. Have an eductor funnel or other appropriate arrangement for wetting the polymer during the preparation of the stock feed solution on the makeup tanks;*
 - D. Provide adequate mixing by means of a large diameter, low speed mixer;*
 - E. Make provisions to measure the dry chemical volumetrically or gravimetrically; and*
 - F. Completely enclose chemicals and prevent emission of dust;*
- 8. Provide for uniform strength of solution consistent with the nature of the chemical solution for solution tank dosing;*
- 9. Use solution feed pumps to feed chemical slurries that are not diaphragm or piston type positive displacement types;*
- 10. Provide continuous agitation to maintain slurries in suspension;*
- 11. Provide a minimum of two (2) flocculation tanks or channels having a combined detention period of twenty to thirty (20—30) minutes. Provide independent controls for each tank or channel;*

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12. Insulate pipelines carrying soda ash at concentrations greater than twenty percent (20%) solution to prevent crystallization; and

13. Prohibit bagging soda ash in a damp or humid place.

(D) Chemical Safety. The following shall be provided in addition to the safety provisions in section [(8)](9) of this rule:

1. Appropriate personal protective equipment (PPE).

2. Eye wash fountains and safety showers. Eye wash fountains and safety showers utilizing potable water shall be provided in the laboratory and on each level or work location involving hazardous or corrosive chemical storage, mixing (or slaking), pumping, metering, or transportation unloading. The design of eye wash fountains and safety showers shall include the following:

A. Eye wash fountains with water of moderate temperature, fifty degrees to ninety degrees Fahrenheit (50°–90°F), suitable to provide fifteen to thirty (15–30) minutes of continuous irrigation of the eyes;

B. Emergency showers capable of discharging twenty gallons per minute (20 gpm) of water of moderate temperature, fifty degrees to ninety degrees Fahrenheit (50°–90°F), and at pressures of thirty to fifty pounds per square inch (30–50 psi);

C. Eye wash fountains and emergency showers located no more than twenty-five feet (25') from points of hazardous chemical exposure; and

D. Eye wash fountains and showers that are to be fully operable during all weather conditions; and

3. Warning signs. Warning signs requiring use of goggles shall be located near chemical stations, pumps, and other points of frequent hazard.

(E) Chemical Container Identification. The identification and hazard warning data included on shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a hazardous substance.]

Commented [ML63]: Comment on OSHA Standard 1910.151(e), for general industry: Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.
Min 0.4 gallons (1.5L) of clean water per minute, continuously for at least 15 minutes. Wash fluid should be between 60 and 100 degrees Fahrenheit.