



## Drinking Water Program - Engineering Plan Review Checklist – Instructions

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### Purpose

These checklists apply to public water systems (PWS) requesting construction or operational approval (if approval to construct was not requested prior to construction) for the following:

- New construction
- System modifications and/or change of use
- Separation distance waivers

The checklists are based on the plan review requirements as referenced in the State of Alaska Drinking Water Regulations, 18 AAC 80 (amended as of August 20, 2012). These checklists supersede all previous versions and will be updated as necessary. Please visit the Drinking Water Program website for the latest version.

The checklists are intended to be used as guidance documents only. Completion of the checklists may not constitute a complete submittal. Additional project information not identified in the checklists may be requested by the Department as a part of the plan review process to determine the basis of design.

### Plan Review Process and Checklist Instructions

The plan review and approval process consists of **two major steps** including certifications for **approval to construct and approval to operate**.

Approval to Construct requires a submittal of engineering construction plans, specifications, and calculations to the Department for review. After the Department's review is complete, a letter issuing the approval and a Construction and Operation Certificate with the Approval to Construct section signed will be sent to the owner and submitting engineer. The steps below outline the forms used for construction approval review:

1. *Facility Information Form*: This form compiles owner/responsible party, operator, and facility contact information and includes an owner's statement. The owner's statement must be signed by the property owner or responsible party before a plan review can be conducted.
2. *Project Information Form*: This form has information about the submitting Alaska registered engineer and the PWS and identifies which checklist(s) will be used for the review. Section III of the form is used to determine the checklists needed for the review using the following steps:
  - i. Identify the column matching the project type (i.e. New PWS, Modify Existing PWS, Distribution Extension or Replacement, Waiver, or Water Haul).
  - ii. Identify the checklist in this column that may be required based on the water system and project. Mark all boxes for the checklists that apply to the project.
3. *Checklist*: Complete all Checklists identified in Section III of the Project Information Form. If an item on the checklist does not apply to the project or the project design does not meet the drinking water regulations, indicate on the checklist why the item does not apply or meet the regulations.

Interim Approval to Operate is a temporary certificate allowing a system to begin operation without submitting all plan review items required for final approval to operate. Submittal requirements will be stated in the letter granting approval to construct. After the Department's review of the interim approval request is complete, a letter granting the approval and a Construction and Operation Certificate, with the Interim Approval to Operate section signed, will be sent to the owner. Typically, the following must be provided:

- Letter requesting interim approval to operate
- Verification that construction has been completed as approved
- Documentation that conditions of approval to construct were met
- Results of any required tests (e.g. pressure or bacteriological tests)

Final Approval to Operate will be issued after satisfactory documentation is received by the Department that all requirements and conditions specified in the approval to construct letter have been met. A third party sanitary survey or System Inventory Form completed by the registered design engineer and an Emergency Preparedness Compliance Certification will be required as part of the approval to operate for all new public water systems. After the Department's review is complete, a letter granting the approval and a Construction and Operation Certificate, with the Final Approval to Operate section signed, will be sent to the owner. Typically, the following must be provided:

- Letter requesting final approval to operate
- Verification that construction has been completed as approved
- Documentation that conditions of approval to construct were met
- Results of any required tests (e.g. pressure or bacteriological tests)
- As-built or record drawings

General Information: In accordance with the Drinking Water Regulations, the Department will issue its approval or denial within 30 days after the Department receives all of the required plans and information. If a submittal is deficient, the Department will notify the submitting engineer and owner that additional information is needed. Failure of the Department to issue an approval or denial within 30 days does not constitute automatic approval.

Contacts: The Department encourages applicants, engineers, and system owners and operators to contact local DEC engineering staff with plan review questions. The checklists are used to evaluate the completeness of submitted plans. If a submittal is not complete, it may be returned to the applicant or held until contact is made with the applicant. Formal review may not begin until the Department determines the plan submittal is complete. Fee payment must be made for the submittal to be complete.



## Drinking Water Program - Engineering Plan Review Facility Information Form

### I. Owner/Responsible Party

**First Name:** \_\_\_\_\_ **Last Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_  
**Company Name:** \_\_\_\_\_ **Fax:** \_\_\_\_\_  
**Mailing Address:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip** \_\_\_\_\_  
**Email Address:** \_\_\_\_\_

### II. System Operator

**First Name:** \_\_\_\_\_ **Last Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_  
**Certification:** \_\_\_\_\_ **Fax:** \_\_\_\_\_  
**Mailing Address:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip Code:** \_\_\_\_\_

### III. Facility Information

**Facility Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_  
**AKA:** \_\_\_\_\_ **Fax:** \_\_\_\_\_  
**Mailing Address:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip Code:** \_\_\_\_\_  
**Physical Address:** \_\_\_\_\_

**Legal Description:** Lot: \_\_\_\_\_ Block: \_\_\_\_\_ Subdivision: \_\_\_\_\_ Addition: \_\_\_\_\_  
or  
**Location:** Meridian: \_\_\_\_\_ Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Tax Lot: \_\_\_\_\_

### IV. Owner's Statement

**Project Name:** \_\_\_\_\_

I have authorized submittal of the enclosed items for the above referenced project. By my signature (18 AAC 15.030), I certify that the above information is correct and my authority to sign this statement acknowledging the above listed project is based on (check one):

- Privately owned and I am the owner
- Owned by a sole proprietorship and I am the proprietor
- Owned by a partnership of which I am a general partner
- Owned by a corporation of which I am a principal executive officer of at least the level of vice-president or a duly authorized representative responsible for overall project management
- Owned by a municipal, state, federal, or other public agency of which I am a principal executive officer, ranking elected official, or other duly authorized employee

\_\_\_\_\_  
**Signature** **Date** **Printed Name** **Title**



## Drinking Water Program - Engineering Plan Review Project Information Form

This form must be attached to a completed and signed Facility Information Form. The accompanying hard copy plans must be sealed, signed, and dated by an Alaska registered professional engineer (P.E.) and submitted on 11-inch by 17-inch or 8.5-inch by 11-inch paper whichever is most legible. If additional electronic copies are allowed by the reviewing engineer, they should be in Adobe PDF format.

### I. Project Engineer

**First Name:** \_\_\_\_\_ **Last Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_  
**Company Name:** \_\_\_\_\_ **Fax:** \_\_\_\_\_  
**Mailing Address:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip Code:** \_\_\_\_\_  
**Email Address:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

### II. Facility Information

**PWSID:** \_\_\_\_\_ **System**  **Community Water System** (CWS – formerly called Class A)  
 (for existing water systems) **Classification:**  **Non-Transient Non-Community** (NTNC – formerly called Class A)  
 (18 AAC 80.1990)  **Transient Non-Community** (TNC – formerly called Class B)

**Number of Service Connections in PWS:** \_\_\_\_\_ (including proposed)  
**Days per Year of Operation:** \_\_\_\_\_  
**Dates of Operation:** \_\_\_\_\_ (if seasonal)

**Resident Population Served** (daily average): \_\_\_\_\_ (PWS serves primary place of abode via pipes, delivery, or self haul)  
**Non-Transient Population Served** (daily average): \_\_\_\_\_ (> 6 months/year of PWS use such as students and workers)  
**Transient Population Served** (daily average): \_\_\_\_\_ (<6 months/year of PWS use such as customers)  
**Length of Extension or Replacement (ft):** \_\_\_\_\_ (for distribution projects)

### III. Plan Review Checklist: Identify the checklists required for submittal.

Checklist Number	Checklist Title	New PWS	Modify Existing PWS	Distribution (Extend or Replace Main)	Waiver	Water Haul
1.0	General	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2.0	Capacity Development (CWS/NTNC)	<input type="checkbox"/>	<input type="checkbox"/>			
3.0	Source - Groundwater	<input type="checkbox"/>	<input type="checkbox"/>			
3.1a	Source - GWUDISW Determination	<input type="checkbox"/>	<input type="checkbox"/>			
3.1b	Source - SW/GWUDISW	<input type="checkbox"/>	<input type="checkbox"/>			
4.0	Storage	<input type="checkbox"/>	<input type="checkbox"/>			
5.0	Distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.0	Treatment - SW/GWUDISW	<input type="checkbox"/>	<input type="checkbox"/>			
6.1	Treatment - Corrosion Control	<input type="checkbox"/>	<input type="checkbox"/>			
6.2	Treatment - POU-POE	<input type="checkbox"/>	<input type="checkbox"/>			
6.3	Treatment - Membrane Filtration	<input type="checkbox"/>	<input type="checkbox"/>			
6.4	Treatment - Ozone	<input type="checkbox"/>	<input type="checkbox"/>			
6.5	Treatment - Media Filtration	<input type="checkbox"/>	<input type="checkbox"/>			
6.6a	Treatment - UV Disinfection Validation Report	<input type="checkbox"/>	<input type="checkbox"/>			
6.6b	Treatment - UV Disinfection System	<input type="checkbox"/>	<input type="checkbox"/>			
6.7	Treatment - Other Treatment	<input type="checkbox"/>	<input type="checkbox"/>			
7.0	Waiver - Source	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
7.1	Waiver - Distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8.0	Water Haul					<input type="checkbox"/>



## Drinking Water Program - Engineering Plan Review General Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

Use of this guide is required for construction of new and modifications to existing public water systems. Plans must be submitted in hardcopy and be sealed, signed, and dated by an Alaska registered P.E. and preferably on 11-inch by 17-inch or 8.5-inch by 11-inch paper. If additional electronic copies are allowed by the reviewing engineer, they should be in Adobe PDF format. Incomplete submittals will not be forwarded to engineering staff for review.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
<b>1. Cover Letter and Project Report:</b> Is a cover letter included that specifies the approval requested from DEC? Does the submittal include an engineer's report sealed, signed, and dated by an Alaska registered P.E.? Where in the report (specify page, etc.) is a summary of the project (where, what, why, when, and how) and a description of the basis for design?	<i>18 AAC 80.200(b)</i> <i>18 AAC 80.205(a)(4)</i>
<b>2. Plan Review Fee:</b> Is the plan review fee included in the submittal? For submittals requesting fee calculation assistance, a submittal may be accepted without the fee payment if there is prior approval from the reviewing engineer and all contact information for the person, agency, or company responsible for the fee payment is provided. A plan review will not be completed until the fee payment is received.	<i>18 AAC 80.1910 (c)</i>
<b>3. Project Drawings:</b> Are construction drawings and specifications included in the submittal? The construction drawings must be sealed, signed, and dated by an Alaska registered P.E. and in hardcopy format unless previous arrangements have been made.	<i>18 AAC 80.205(a)(2)</i> <i>12 AAC 36</i>
<b>4. Master Meter:</b> Where in the submittal (specify document name, page number, etc.) is verification the project complies with the need for a master meter?	<i>18 AAC 80.235</i>
<b>5. Asbestos Pipe:</b> If the system has no asbestos cement pipe, where in the submittal (specify document name, page number, etc.) is a copy or application for a one time asbestos sampling waiver?	<i>18 AAC 80.315</i>

## General Checklist (continued)

Submittal Requirements	Regulatory Reference
<b>6. Contact Information for Engineer Submitting Record Drawings:</b> Where in the submittal (specify document name, page number, etc.) is the name and contact information of the Alaska registered P.E. that will sign, date, and seal the record drawings for operational approval?	<i>18 AAC 80.210(j)(1)</i>
<b>7. Design Criteria and Calculations:</b> Where in the submittal (specify document, page number, etc.) are design criteria, calculations, flow analysis, and other computations?	<i>18 AAC 80.205(a)(4)</i>
<b>8. Manufacturers' Specifications:</b> Where in the submittal (specify document name, page number, etc.) are the manufacturer's specifications for major components and performance curves for the pumps?	<i>18 AAC 80.205(a)(4)</i>
<b>9. Backflow and Cross-Connection:</b> Where in the submittal (specify document name, page number, etc.) are the backflow and cross-connection evaluations?	<i>18 AAC 80.025</i>
<b>10. Lead Free:</b> Where in the submittal (specify document name, page number, etc.) are the lead-free pipe, flux, and solder specifications?	<i>18 AAC 80.500</i> <i>18 AAC 80.205(b)(7)</i>
<b>11. Chemical Additives NSF 60:</b> Where in the submittal (specify document name, page number, etc.) is documentation that additives proposed for water treatment (e.g. disinfectants, coagulants, oxidizing agents, anti-scalants) are certified by an ANSI accredited organization to conform with ANSI/NSF Standard 60 for use in potable water systems?	<i>18 AAC 80.010(b)(9)</i>
<b>12. Materials in Contact NSF:</b> Where in the submittal (specify document name, page number, etc.) is documentation that all materials proposed for direct contact with the water are certified by an ANSI accredited organization to conform with ANSI/NSF Standard 61 or an ANSI/NSF standard with equivalent health requirements? If there are any materials which are not certified in this manner, where in the is the engineering justification for its use?	<i>18 AAC</i> <i>80.010(b)(10)</i> <i>18 AAC 80.030(b)(3)</i>

## General Checklist (continued)

Submittal Requirements	Regulatory Reference
<p><b>13. Operational Control Points:</b> Which drawing sheets show the location of pressure gages, flow meters, rate of flow controllers, sample points, valves, etc. to allow the operator to operate the system in compliance with the monitoring requirements of 18 AAC 80?</p>	<i>18 AAC 80.205(a)(2)</i>
<p><b>14. Disinfectant Discharge:</b> Where in the submittal (specify document name, page number, etc.) is documentation that discharge of chlorinated water used for disinfection is authorized by the State or that the water, independent of volume, will meet State water quality standards in 18 AAC 70 and the effluent limitations in Section 1.2.2 of permit 2009DB0004? Information can be obtained by calling DEC Division of Water in Anchorage at 269-4597.</p>	<i>APDES 18 AAC 70</i>
<p><b>15. Operator Training and Certification:</b> Where in the submittal (specify document name, page number, etc.) is documentation demonstrating the Operator Training and Certification Program has been provided a project schematic and list of proposed additives in order to determine the anticipated system class? Where in the submittal is documentation included demonstrating that the system is working with them to ensure compliance with 18 AAC 74 after construction according the proposed design?</p>	<i>18 AAC 80.007 18 AAC 74</i>
<p><b>16. Emergency Preparedness:</b> If the submittal involves a community or a non-transient non-community PWS or if it involves a transient non-community PWS serving 1,000 or more people/day, where in the submittal (specify document name, page number, etc.) is the name and contact information of the person that will provide the documentation to satisfy the regulatory emergency preparedness requirements? Documentation will be required for final approval to operate the system.</p>	<i>18 AAC 80.055</i>



## Drinking Water Program - Engineering Plan Review Capacity Development Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for all new community and non-transient non-community public water systems. When approvals to construct are sought, the department will determine whether it will have the technical, financial, and managerial capacity to consistently produce and deliver water that meets Alaska's drinking water regulations. The available water resources and the characteristics of the population served are considered. Technical capacity means the physical infrastructure of the water system, including but not limited to the adequacy of the source water, infrastructure (source, treatment, storage, and distribution), and the system personnel's ability to adequately operate and maintain the system and to implement technical knowledge. Financial capacity means the capability of the financial resources of the water system including but not limited to revenue sufficiency, credit worthiness, and fiscal controls. Managerial capacity refers to the management of the water system, including but not limited to ownership, accountability, staffing, and organization, and effective linkages to customers and regulatory agencies.

Submittal Requirements	Regulatory Reference
<p>1. If this community or non-transient non-community public water system has 15 service connections or more, provide a copy of the Certificate of Public Convenience and Necessity (CPCN) application that is date stamped by the Regulatory Commission of Alaska (RCA). Checklist items below do not have to be completed if a CPCN application to RCA is required. <b>*OR*</b></p>	<p><i>18 AAC 80.207(c)(1)(A&amp;B)</i></p>
<p>If the system does not fall under the jurisdiction of the Regulatory Commission of Alaska (RCA), but has worked with the Rural Utility Business Advisor (RUBA) Program, submit the utility business plan completed in conjunction with RUBA. <b>*OR*</b></p>	<p><i>18 AAC 80.207(c&amp;d)</i></p>
<p>If the system does not fall under the jurisdiction of the Regulatory Commission of Alaska (RCA), and has not worked with RUBA, submit a completed managerial and financial capacity form. This form is available on the Department's website in the Drinking Water Program section.</p>	<p><i>18 AAC 80.207(c&amp;d)</i></p>
<p>2. Other information that the owner considers necessary to demonstrate financial and managerial capacity.</p>	<p><i>18 AAC 80.207(c&amp;d)</i></p>

## Capacity Development Checklist (continued)

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<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
3. Provide documentation an operator certified under 18 AAC 74 will operate the system.	<i>18 AAC 80.007 18 AAC 74</i>
4. For a proposed system that is not a public utility, provide documentation showing ownership and plans, if any, for transfer of that ownership on completion of construction or after a period of operation.	<i>18 AAC 80.207(d)(3)(A)</i>
5. A written contingency plan showing that the owner is able to provide water in compliance with Alaska's drinking water regulations to each customer within 24 hours after an event that has the potential to cause contamination of the water system above applicable MCLs as described in 18 AAC 80.300 or a lack of water pressure or supply.	<i>18 AAC 80.207(d)(5) 18 AAC 80.300</i>



## Drinking Water Program - Engineering Plan Review Source - Groundwater Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of a new or modification of an existing groundwater source for a public water system.

Submittal Requirements	Regulatory Reference
<p><b>1. Source Well Location:</b> Where in the submittal (specify document name, page number, etc.) is a site plan locating the source well, its protective radius regardless of property boundaries, and all potential sources of contamination including penetrations into the aquifer within 500 feet of the well? Where in the submittal has the submitting engineer identified situations needing a waiver?</p>	<p><i>18 AAC 80.205(a)(2)</i> <i>18 AAC 80.205(b)(3)</i> <i>18 AAC 80.020</i> <i>(Table A)</i></p>
<p><b>2. Source Water Protection and Flow Capacity:</b> Where in the submittal (specify sheet number, page number, division, section, etc.) are detail drawings and specifications showing the source meets the source water protection and capacity requirements? Details should include well casing size and type, grouting type and depths, screen type and level, surface grading, sanitary seal, casing termination above ground or well house floor level, and the proposed well capacity test method.</p>	<p><i>18 AAC 80.205(a)(2)</i> <i>18 AAC 80.015</i></p>
<p><b>3. Disinfection:</b> Which specification (specify page number, division, section, etc.) requires the well to be disinfected and flushed in accordance with AWWA Standard C654? Where in the submittal is documentation that discharge of chlorinated water used for disinfection is authorized by the State or that the water, independent of volume, meets State water quality standards in 18 AAC 70 and the effluent limitations in Section 1.2.2 of permit 2009DB0004? Information can be obtained by calling DEC Division of Water in Anchorage at 269-4597.</p>	<p><i>18 AAC 80.010(d)(2)</i> <i>APDES</i> <i>18 AAC 70</i></p>
<p><b>4. Contaminated Sites:</b> Where in the submittal (specify document name, page number, etc.) is information noting the DEC Contaminated Sites webmap has been consulted to check for contaminated sites with potential to affect the well?</p>	<p><i>18 AAC 80.020(a)</i></p>

## Source - Groundwater Checklist (continued)

Submittal Requirements	Regulatory Reference
<b>5. Raw Water Analyses:</b> For a new source which has been constructed, where in the submittal (specify document name, page number, etc.) are results of raw water analyses? For a proposed source, where in the submittal (specify document name, page number, etc.) is the proposed raw water quality sampling?	<i>18 AAC 80.205(c)(2) Table B</i>
<b>6. Well Log:</b> Where in the submittal (specify document name, page number, etc.) is a well log for the new source describing the elements listed in 18 AAC 80.210(h) and the location of any impermeable layer?	<i>18 AAC 80.210(h) 18 AAC 80.015(c)(1)(A)</i>
<b>7. Groundwater Under Direct Influence of Surface Water (GWUDISW):</b> If the well draws from less than 50 feet below ground surface and/or is within 500 feet of a surface water body, is the information requested in the GWUDISW Determination Checklist (Checklist No. 3.1a) included in the submittal?	<i>18 AAC 80.605</i>
<b>8. Pump Information:</b> Where in the submittal (specify document name, page number, etc.) are the source pump specifications including its make, model, and pump curve?	<i>18 AAC 80.205(b)(9)</i>
<b>9. Service Pressure:</b> If the source pump will be used to meet distribution pressure and flow, where in the submittal (specify document name, page number, etc.) are engineering calculations showing the pump is capable of maintaining at least 20 psi of service pressure at the highest service elevation or pressure zone of the distribution under peak demand flow conditions?	<i>18 AAC 80.205(a)(5)</i>
<b>10. Longitude/Latitude Location:</b> Where in the submittal (specify document name, page number, etc.) is a completed Alaska Public Water System Locational Data Collection Form (Longitude/Latitude Form) for each well? The form can be found on our <a href="#">website</a> .	<i>18 AAC 80.205(b)(4) 18 AAC 80.015(c)(1)(B)</i>
<b>11. Water Rights:</b> Where in the submittal (specify document name, page number, etc.) is a copy of the Alaska Department of Natural Resources water rights application receipt for each well?	<i>AS 46.15 Inter-agency agreement</i>



## Drinking Water Program - Engineering Plan Review Source - GWUDISW Determination Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for a new groundwater source that obtains water from a vertical depth of 50 feet or less and/or that is located a horizontal distance of 500 feet or less to a surface water body. Information provided in this checklist will be used to evaluate whether the source is Groundwater or Groundwater Under the Direct Influence of Surface Water (GWUDISW). A public water system that uses a GWUDISW source is required to meet surface water treatment regulations.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. A site plan showing the horizontal and vertical location of all surface water sources within 1,000 feet of the proposed water source, regardless of property lines or ownership.	18 AAC 80.605(c)(1)(A)
2. Evaluation of the sources of potential biological contamination.	18 AAC 80.605 (c)(1)
3. The topography of the area surrounding the proposed source including whether drainage of surface water, rainfall, and snowmelt is directed away from the source. What is the risk of flooding?	18 AAC 80.605(c)(2)(B)
4. Geological and hydro-geological information on the proposed source.	18 AAC 80.605(c)(3)(D)
5. Results of well flow or pump test, including drawdown and any effects on nearby surface waters.	18 AAC 80.605(c)(2)
6. A field assessment by the department including, a thorough inspection of the source construction. Contact the reviewing Drinking Water program office to determine if this item is required.	18 AAC 80.605(c)(3)

## Source - GWUDISW Determination Checklist (continued)

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### Submittal Requirements

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### Regulatory Reference

7. A water quality assessment plan to evaluate the physical, chemical, and biological characteristics of the source and any nearby surface water sources, scope of water sources and bodies to be evaluated, water quality parameters to be measured, list of equipment, sample locations, sample times and duration, qualifications of the person conducting on site sampling, and data reporting frequency and format. Contact the reviewing Drinking Water program office to determine if this item is required. *18 AAC 80.605(c)(4)*
8. Plans for advanced water quality testing and analysis such as Microscopic Particulate Analysis (MPA), particle count analysis, specific ion ratio analysis, or chemical tracers, dyes. Contact the reviewing Drinking Water program office to determine if this item is required. *18 AAC 80.605(c)(5)*



## Drinking Water Program - Engineering Plan Review Source - Surface Water/GWUDISW Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for all new or modification of existing surface water or groundwater under the direct influence of surface water (GWUDISW) sources.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Drawings and specifications that cover construction of the water source, including casing and/or piping materials, screen sizing requirements, location, floating intake details, anchoring, well grouting or source protection details and the proposed test (drawdown) pumping methods. It may also be appropriate to include the water line from the source to the treatment plant with this submittal.	<i>18 AAC 80.205(a)(2)</i>
2. Issues of erosion, icing, and/or siltation have been addressed.	<i>18 AAC 80.205(b)(9)</i>
3. Intake screens can be back flushed or provisions for routine cleaning have been provided.	<i>18 AAC 80.205(b)(9)</i>
4. Has the need for flexibility to use different intake levels been addressed?	<i>18 AAC 80.205(b)(9)</i>
5. A site plan showing the horizontal and vertical location of all proposed or existing wastewater treatment and disposal system component(s), sewage pump station(s), sewer line manhole(s) and cleanout(s), petroleum storage tank(s) and lines, and potential or actual sources of pollution or contamination, including the sources listed in Table A in 18 AAC 80.020(a), within 200 feet of a proposed water source, regardless of property lines or ownership.	<i>18 AAC 80.205(b)(3)</i>
6. The latitude and longitude to the closest second or 0.0003 degree, of each well or intake on a form provided by the Department.	<i>18 AAC 80.205(b)(4)</i>

## Source - Surface Water/GWUDISW Checklist (continued)

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<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
7. Operator's certification for systems serving between 25 and 500 people and using a surface water or GWUDISW source.	<i>18 AAC 80.007 18 AAC 74</i>
8. <b>Water Rights:</b> Where in the submittal (specify document name, page number, etc.) is a copy of the Alaska Department of Natural Resources water rights application receipt for each well?	<i>AS 46.15 Inter-agency agreement</i>



## Drinking Water Program - Engineering Plan Review Storage Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

Use of the guide is required for the construction of new or the modification of existing storage systems. Storage includes water holding tanks and hydropneumatic pressure tanks used for storage capacity.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
<b>1. Storage Drawings and Specifications:</b> Which drawings and specifications (specify sheet, page number, division, section, etc.) cover construction of the storage system including details of baffling and inlet and outlet piping?	<i>18 AAC 80.205(a)(2)</i>
<b>2. Interior Coating NSF:</b> If the project proposes an interior coating where in the submittal (specify document name, page number, division, section, etc.) is documentation the product will be certified by an ANSI accredited organization to conform with ANSI/NSF Standard 61 or an ANSI/NSF standard with equivalent health requirements? If the proposed product is not certified in this manner, where in the submittal is the engineering justification for its use?	<i>18 AAC 80.030(b)</i>
<b>3. Interior Coating Curing:</b> Where in the submittal are measures discussed to prevent potential taste and odor problems associated with elevated VOCs resulting from inadequate curing? This issue can be more pronounced when tanks hold water for long detention times.	<i>18 AAC 80.030(b)</i>
<b>4. Compressed Air:</b> If compressed air is proposed to pressurize hydropneumatic tanks, where in the submittal (specify document name, page number, etc.) is information proving source air quality will not add contaminants to the water?	<i>18 AAC 80.205(b)(8)</i>
<b>5. Safe Access:</b> Where in the submittal (specify document name, page number, etc.) is a discussion of how the design provides safe access for operation, maintenance, and inspection such as ladder cages and railings around hatches?	<i>18 AAC 80.205(b)(9)</i>

## Storage Checklist (continued)

Submittal Requirements	Regulatory Reference
<b>6. Vent and Overflow Screens:</b> Which drawing sheet shows that vents and overflow lines are screened?	<i>18 AAC 80.025</i>
<b>7. Overflow Air Gap:</b> Which drawing sheet shows that the tank overflow discharge has an air gap of at least two overflow discharge pipe diameters above the surrounding area or discharge point?	<i>18 AAC 80.025</i>
<b>8. Tank Safety:</b> Which drawing sheet shows mitigation of the potential for erosion that may put the tank foundation at risk for failure?	<i>18 AAC 80.025</i>
<b>9. Storage Disinfection:</b> Where in the submittal (specify document name, page number, etc.) is it specified that storage tanks will be disinfected in accordance with AWWA Standard C652 before use?	<i>18 AAC 80.010(d)(2)</i>
<b>10. Storage Capacity:</b> Where in the submittal (specify document name, page number, etc.) is a calculation demonstrating source capacity is more than instantaneous peak demand or proposed storage capacity is adequate?	<i>18 AAC 80.205(a)(4)</i>
<b>11. Raw Water Tank Maintenance:</b> If a raw water tank(s) is proposed, where in the submittal (specify document name, page number, etc.) is it shown that the engineer has considered the costs and staff time for cleaning the tanks? Raw water storage tanks may require frequent cleaning. The O&M manual will need to contain information on frequency and method of storage tank cleaning needed to control biological growth.	<i>18 AAC 80.205(b)(9)</i>



## Drinking Water Program - Engineering Plan Review Distribution Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

Use of the guide is required for the construction of new, the modification of existing, and/or the extension of existing water mains and raw-water transmission lines.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
<b>1. Drawings and Specifications:</b> Which drawings and specifications (specify sheet number, page number, division, section, etc.) cover construction of the distribution system and raw water transmission lines including piping materials, jointing, thrust blocking, bedding, and the plan and profile of the water mains?	<i>18 AAC 80.205(a)(2)</i>
<b>2. Flow:</b> Where in the submittal (specify document, page number, etc.) are calculations used as basis of design for the main sizing, peak demand flow rates, and velocities?	<i>18 AAC 80.205(a)(4)</i> <i>18 AAC 80.205(b)(2)</i>
<b>3. Dead End Lines:</b> If the proposed distribution configuration creates dead end lines, where in the submittal (specify document, page number, etc.) has the engineer addressed how they will be operated and maintained to avoid adverse water quality affects?	<i>18 AAC 80.205(b)(9)</i>
<b>4. Freeze Protection:</b> Where in the submittal (specify document name, page number, etc.) is freeze-protection design information?	<i>18 AAC 80.205(a)(4)</i>
<b>5. Thrust Blocking:</b> Where in the submittal (specify document name, page number, etc.) is thrust blocking design information?	<i>18 AAC 80.205(a)(4)</i>
<b>6. Flushing:</b> Where in the submittal (specify document name, page number, etc.) is flushing information including which areas can be isolated during flushing?	<i>18 AAC 80.205(b)(9)</i>

## Distribution – Checklist (continued)

Submittal Requirements	Regulatory Reference
7. <b>Seasonal System Startup:</b> If this is a seasonal system, where in the submittal (specify document name, page number, etc.) is information on startup procedures?	<i>18 AAC 80.205(b)(9)</i> <i>18 AAC 80.025</i>
8. <b>Seasonal System Shutdown:</b> If this is a seasonal system, where in the submittal (specify document name, page number, etc.) is information on how it is drained or prepared for the time it is not in operation? Issues may include the use of antifreeze, draining to sumps, and potential cross-connection or contamination.	<i>18 AAC 80.205(b)(9)</i> <i>18 AAC 80.025</i>
9. <b>Service Pressure:</b> Where in the submittal (specify document name, page number, etc.) are calculations showing the design is capable of maintaining at least 20 psi of service pressure at the highest elevation or pressure zone of the proposed distribution main under peak demand flow conditions?	<i>18 AAC 80.205(a)(5)</i>
10. <b>Temporary Distribution:</b> If the project proposes to replace a water main to a community or non-transient non-community water system, where in the submittal (specify document name, page number, etc.) is information on how distribution will be provided during construction?	<i>18 AAC 80.207(d)(4)</i>
11. <b>Water Line Disinfection:</b> Which specifications (specify page number, division, section, etc.) address disinfection of the water mains and transmission lines?	<i>18 AAC 80.205(b)(9)</i> <i>18 AAC 80.010(d)(2)</i>
12. <b>Contaminated Sites:</b> Where in the submittal (specify document name, page number, etc.) is documentation that the Contaminated Sites Program’s web map has been consulted to determine the proximity of the project to contaminated sites? If the project is going to be near or go through an active contaminated site, where in the submittal is documentation that the DEC Contaminated Sites Program staff was contacted regarding proper site controls for dealing with contaminated soils and/or groundwater? Where in the submittal are design considerations for protecting the water in the lines from contamination when the lines are located in contaminated soils?	<i>18 AAC 80.205(b)(9)</i>

## Distribution – Checklist (continued)

Submittal Requirements	Regulatory Reference
<b>13a. Construction of Sewer Line Within 10 feet or at a crossing:</b> Where in the submittal (specify document name, page number, etc.) is documentation showing portions of sewer lines within 10 horizontal feet of a water main will be designed and constructed in a manner equivalent to the requirements for a potable water line?	<i>18 AAC 80.020(f)(3)(B)</i>
<b>13b. Testing of Sewer Line Within 10 feet or at a crossing:</b> Where in the submittal (specify document name, page number, etc.) is documentation showing portions of sewer lines within 10 horizontal feet of a water main will be pressure tested to ensure watertightness or be enclosed in a carrier pipe of similar strength or stronger and with similar ratings as the actual pipe? Where in the submittal (specify document name, page number, division, section, etc.) are proposed test pressure, duration, and passing criteria specified?	<i>18 AAC 80.020(f)(3)(B)</i>
<b>13c. Sewer Line in Separate Trench:</b> Where in the submittal (specify document name, page number, etc.) is documentation showing portions of sewer lines within 10 horizontal feet of, or crossing a water main will be constructed in a separate trench or excavation from potable water lines?	<i>18 AAC 80.020(f)(3)(C)</i>
<b>14a. Water Lines Above Sewer at Crossings:</b> If the project involves any crossing of water and sewer lines, where in the submittal (specify document name, page number, etc.) is documentation showing the water lines are installed above the sewer lines to the maximum extent possible and the vertical distance between them?	<i>18 AAC 80.020(f)(3)(D)(i)</i>
<b>14b. Water Lines Below Sewer Lines at Crossings:</b> If any crossing of water and sewer lines have a water line below a sewer line, where in the submittal (specify document name, page number, etc.) is documentation showing the sewer line trench will be constructed of a Type 4 or Type 5 bedding described in AWWA Standard C600-05, Installation of Ductile-Iron Water Mains and Their Appurtenances?	<i>18 AAC 80.020 (f)(3)(D)(ii)</i>
<b>14c. Water Line Joints at Crossings:</b> Where in the submittal (specify document name, page number, etc.) is documentation showing that at crossings of water and sewer lines, water line joints are at least nine feet from all sewer line joints?	<i>18 AAC 80.020 (f)(3)(D)(iii)</i>

## Distribution – Checklist (continued)

Submittal Requirements	Regulatory Reference
<b>14d. Vertical Separation at Crossings:</b> Where in the submittal (specify document name, page number, etc.) is documentation showing that at crossings of water and sewer lines, water lines are at least 18 vertical inches from sewer lines?	<i>18 AAC 80.020 (f)(3)(D)(iv)</i>
<b>Notes:</b> If numbers <b>13a-c</b> cannot be met for any length of water line within 10 feet of a sewer line or if numbers <b>13a-14d</b> cannot be met for a crossing of water and sewer lines, a separation distance waiver may be required; see Waiver Checklist – Distribution System (Checklist No. 7.1).	
For projects with multiple lengths of water line within 10 feet of a sewer line or multiple water/sewer line crossings, please submit a summary table to facilitate review. In the table, list each instance where the horizontal distance or prescriptive conditions at crossings are not met. Include the location (Station, if used) and a description of how each of the conditions in 13a-c (horizontal installations) or 13a-14d (crossings) are met for those locations.	
Storm drain lines and associated catch basins, manholes, and lift stations need to maintain the same separation distance from water mains as sewer lines and their associated, manholes, and lift stations.	
<b>15. HDPE Resin:</b> If the project proposes HDPE water mains, where in the submittal (specify page number, division, section, etc.) is documentation the manufacturer was consulted to ensure the appropriate resin was selected for the climate?	<i>18 AAC 80.205(b)(9)</i>
<b>16. HDPE Weldability:</b> If the project proposes any HDPE water mains, where in the submittal (specify document name, page number, etc.) is documentation the manufacturer’s weldability testing recommendations will be followed?	<i>18 AAC 80.205(b)(9)</i>
<b>17. HDPE Joint Construction:</b> If the project proposes any HDPE water mains, where in the specifications (specify page number, division, section, etc.) is the joint construction specified? If fused joints are specified, where in the specifications are the welder qualifications, fusion QA/QC, and equipment certification, maintenance, and calibration specified?	<i>18 AAC 80.205(b)(9)</i>



## Drinking Water Program - Engineering Plan Review Treatment - Surface Water/GWUDISW Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modification of existing water treatment systems for surface water or groundwater under the direct influence of surface water (GWUDISW) sources. This information is needed to evaluate treatment effectiveness for all systems that use surface water or groundwater under the direct influence of surface water as a raw water source.

Submittal Requirements	Regulatory Reference
1. Drawings and specifications that cover construction of the Surface Water / GWUDISW water treatment system.	18 AAC 80.205(a)(2)
2. The characteristics of watershed, physical condition of water source, hydrogeology, and results of laboratory analyses of untreated water for biological quality & turbidity.	18 AAC 80.605
3. Explain how the proposed treatment system (filtration and disinfection) will achieve at least a 3-log removal/inactivation of <i>Giardia lamblia</i> and 4-log removal/inactivation of viruses. At a minimum, filtration must achieve at least 2-log removal and disinfection must achieve at least 0.5-log inactivation of <i>Giardia lamblia</i> . Also explain how the treatment system will achieve 2-log removal of <i>Cryptosporidium</i> (40 CFR 141.500).	18 AAC 80.615(b)(2) 18 AAC 80.645
4. For conventional or direct filtration include design calculations covering loading rates, back washing rates, volume of back wash water, and other items necessary to determine efficiency of proposed filtration process. Address the selection of filtration media and coagulants or filter aids. Please note that the finished water turbidity performance limit is 0.3 NTU.	18 AAC 80.650
5. For alternative filtration using cartridge or bag filters identify and justify the type(s) of proposed filtration processes that provides finished water turbidity of 1 NTU or lower 95% of the time. Submittal will need to include make model of the filters as well as information on the maximum flow rate and differential pressure for each filter selected. The design will need to address the full range of raw water qualities expected.	18 AAC 80.650

## Treatment - Surface Water/GWUDISW Checklist (continued)

Submittal Requirements	Regulatory Reference
6. Specification that if alternate filtration is proposed, that the filters and filter housings must be ANSI/NSF Standard 53 listed for cyst removal or must be approved by the Department. The Department maintains a list of approved alternative filters on its website at <a href="http://www.dec.state.ak.us/eh/dw/DW_Main_Pages/DW_Engineer.html">http://www.dec.state.ak.us/eh/dw/DW_Main_Pages/DW_Engineer.html</a> .	<i>18 AAC 80.030</i>
7. Identify and justify the disinfection parameters/assumptions such as pH, temperature, disinfectant dosage, disinfectant demand, residual disinfectant concentration, design log inactivation criteria, design flow rate, hydraulic efficiency factor, and contact time used in the proposed design. Design calculation for contact time, justifications for hydraulic efficiency factor, and location of the first user will need to be included in the report.	<i>18 AAC 80.645 18 AAC 80.660, CT Tables</i>
8. For a system using a surface water or GWUDISW source, provide verification of the operator(s) certification.	<i>18 AAC 80.007 18 AAC 74</i>
9. Filtration systems including a backwash process have the appropriate backflow prevention assembly on the backwash water supply line and the backwash waste line has at least two-pipe diameters of an air gap to the waste water line.	<i>18 AAC 80.025</i>
10. Chemical feed systems have appropriate overfeed protection and water supply taps for chemical mixing solutions have appropriate backflow prevention assemblies or devices specified.	<i>18 AAC 80.205(b)(9) 18 AAC 80.025</i>
11. Proper disposal of backwash water must be addressed. Wastewater disposal permit must be requested for backwash water disposed onto or into the land or water bodies.	<i>APDES</i>
12. Documentation, calculations and specifications showing that the PWS will be able to maintain 0.2 mg/L minimum chlorine residual at the entry point to the distribution system.	<i>18 AAC 80.655(c)</i>

## Treatment - Surface Water/GWUDISW Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
<b>13.</b> For systems that use conventional or direct filtration, provide specifications showing that the type, quantity, and placement of turbidimeters are adequate to meet the combined and individual filter turbidity monitoring requirements of LT1ESWTR and IESWTR.	<i>40 CFR 141 40 CFR 174 40 CFR 550 40 CFR 560</i>
<b>14.</b> Where in the submittal is the turbidimeter location shown with respect to the treatment scheme?	<i>18 AAC 80.205 (b)(9)</i>
<b>15.</b> Where in the submittal is it documented that an uninterrupted power supply (UPS) or power conditioning equipment is available to protect critical electronic components of the water treatment plant (e.g. turbidimeter and data logger, streaming current detector, alarm panel PLC, etc.)?	<i>18 AAC 80.205 (b)(9)</i>
<b>16.</b> Specification that all components in direct contact with potable water are disinfected in accordance with AWWA Standard C653.	<i>18 AAC 80.010(d)(2)</i>



## Drinking Water Program - Engineering Plan Review Treatment - Corrosion Control Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modification of existing corrosion control treatment systems.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Plan review fee for determination of optimum corrosion control.	<i>18 AAC 80.1910 (b)(5)</i>
2. For new construction, provide drawings and specifications that cover construction of the corrosion control treatment system	<i>18 AAC 80.205(a)(2)</i>
3. Evaluate the corrosion control methods in at least one of the following: alkalinity and pH adjustment, calcium carbonate precipitation, corrosion inhibitor addition. If using computer software to determine corrosion control methods and parameters, provide the name of the software and pertinent reference information.	
4. Attach test results of samples collected before evaluating the corrosion control method. The following parameters must be tested on water provided for consumption: iron, manganese, lead, calcium, copper, conductivity, pH, orthophosphate or silicate inhibitor (if used), alkalinity, and water temperature.	
5. Identify each chemical or physical constraint that limits or prohibits the use of a particular treatment method. Provide documentation as to why the method does not work for this treatment plant.	
6. What effect does the addition of the chosen process/chemical have on the water served or the treatment at this plant?	

## Treatment - Corrosion Control Checklist (continued)

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### Submittal Requirements

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### *Regulatory Reference*

7. Monitoring equipment that will be used by the operator to maintain any chemical addition at the optimal dose.
  
8. Specification that all components in direct contact with potable water are disinfected in accordance with AWWA Standard C653. *18 AAC 80.010(d)(2)*



## Drinking Water Program - Engineering Plan Review Treatment – Point of Use (POU) and Point of Entry (POE) Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modification of existing treatment system that includes POU and/or POE treatment devices. Application to demonstrate an innovative technology or device should also use this checklist. Note: POU treatment units may not be used to achieve compliance with an MCL or treatment technique for a microbial contaminant or an indicator of a microbial contaminant. POU treatment devices should not be used to treat for certain contaminants, such as radioactive contaminants and most volatile organic contaminants (VOCs), that would require protection against inhalation or contact exposure to these contaminants at untreated taps.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Provide a copy of a POU or POU compliance strategy plan, signed by the public water sytem (PWS), owner, or authorized administrator that indicates that all POU and POE units are controlled, and maintained by the PWS to ensure proper operation and maintenance of the devices and compliance with maximum contaminant levels (MCLs).	<i>CFR 141.100(b)</i>
2. Provide a copy of an Access and Maintenance Agreement that will be provided to all residences, lease holders, renters, and/or relevant non-transient users of the PWS. The Agreement must be signed by 100% of the users connected to the PWS in order to maintain approval of this treatment method.	<i>CFR 141.100(e)</i>
3. Results of laboratory analyses of untreated water for the contaminant(s) that will be treated using POU/POE treatment devices.	<i>18 AAC 80.200(f)</i> <i>18 AAC 80.300(d)</i>
4. Provide objective and verifiable (by a third-party) data to support performance claims of the manufacturer. This may be in the form of verification that the POU/POE device is certified by an ANSI accredited laboratory to conform to ANSI/NSF Standard 53 for removal of the contaminant in question.	<i>18 AAC 80.010(b)(14)</i> <i>18 AAC 80.225(c)(18)</i>

## Treatment – Point of Use (POU) and Point of Entry (POE) Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
5. Provide pilot test results of the proposed POU/POE treatment device. Pilot testing of the proposed device should be conducted for a minimum of three-months using raw water from the PWS source. Provide monthly raw water and treated water sample results and media change-out/regeneration frequency information. Describe any operation and maintenance problems experienced during the pilot phase and how they will be addressed if the device is selected and approved for system-wide use.	<i>18 AAC 80.225(d)</i>
6. Provide design calculations covering loading rates, back washing rates, volume of back wash water, and other items necessary to determine efficiency of proposed treatment process. Include estimated demand flow rate, device maximum flow rate, range of water qualities expected, and the suitability of this technology for this water quality. Address the selection of filtration media, resins, coagulants, oxidizing agents, and chemical additives.	<i>18 AAC 80.225(c)</i>
7. Provide the make, model, manufacturer specifications, and an evaluation of suitability of this POU/POE device with consideration to the ability and experience of the PWS operator(s) and the end users.	<i>18 AAC 80.205(b)(9)</i>
8. Provide information about the breakthrough curve characteristics (time to breakthrough, steepness of breakthrough curve) for the proposed POU/POE device taking into consideration the on-site water quality characteristics. Indicate the measures that will be taken to prevent operation of the units past the point where the Maximum Contaminant Level (MCL) may be exceeded.	<i>18 AAC 80.205(b)(9)</i>
9. Provide verification that the POU and POE units have audible/visual warnings to automatically notify customers of operational problems.	<i>18 AAC 80.205(b)(9)</i>
10. Proper disposal of backwash water must be addressed. If backwash water is disposed in an onsite wastewater disposal system, provide verification that the onsite wastewater disposal system has sufficient capacity to receive the additional wastewater flow. Also include documentation that the appropriate wastewater discharge permits are being obtained (if applicable).	<i>18 AAC 72</i>

## Treatment – Point of Use (POU) and Point of Entry (POE) Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
<b>11.</b> Provide verification that the users of the PWS are informed of the contaminant being treated, directed to obtain drinking water only from taps where POU devices installed, provided instructions and contact information for POU malfunctions and warning device activation occurrences. Placing emergency contact information on the POU/POE devices is also recommended.	<i>18 AAC 80.205(b)(9)</i>
<b>12.</b> Provide property location information (legal description) of each POU/POE device if the units are placed at multiple properties. Identify all water taps that could potentially be used to serve drinking water and all water taps that will have POU devices installed.	<i>18 AAC 80.205(b)(9)</i>
<b>13.</b> Provide verification that the POU/POE devices are installed and will be maintained by manufacturer authorized or certified representative according to manufacturer specifications.	<i>18 AAC 80.205(b)(9)</i>
<b>14.</b> Provide a proposed maintenance plan and schedule. The maintenance plan should include information on the type of maintenance performed; identify the person or contractor that will perform the work, and record keeping method.	<i>18 AAC 80.205(b)(9)</i>
<b>15.</b> Contact compliance specialist serving in the region of the PWS to determine the monitoring plan for a system utilizing POU/POE treatment including sample protocol, water analysis, sample site location, and monitoring frequency required.	<i>18 AAC 80.300</i>



## Drinking Water Program - Engineering Plan Review Treatment - Membrane Filtration Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modification of an existing membrane filtration treatment system. Membrane filtration includes reverse osmosis (RO), nano-, ultra-, and micro-filtration systems.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Drawings and specifications that cover construction of the treatment system.	<i>18 AAC 80.205(a)(2)</i>
2. Indicate the treatment objective. Explain how the proposed treatment was selected and its suitability for treating this water source. The design will need to address the full range of raw water quality expected.	<i>18 AAC 80.225(c)</i>
3. Describe the chemical cleaning process (i.e. clean-in-place). Include information on chemicals used, NSF Standard 60 certification if available, duration, frequency, source of rinse water, disposal of spent chemicals and rinse water, and measures to prevent introduction of cleaning chemicals (or traces thereof) into the drinking water.	<i>18 AAC 80.010(b)(9)</i> <i>18 AAC 80.030</i>
4. Results of laboratory analyses of untreated water for contaminants that the proposed treatment system is being designed to remove. What is the range of values for each contaminant (i.e. seasonal variability)?	<i>18 AAC 80.200(f)</i> <i>18 AAC 80.300(d)</i>
5. Provide design calculations covering loading rates; backwash/backflush/reverse flow rates, duration, frequency, event triggers, and other items necessary to assess the hydraulic efficiency of the proposed treatment process.	<i>18 AAC 80.225(c)</i>
6. Provide make and model of the filters as well as information on the maximum flow rate and maximum differential pressure. For RO and NF, also include the maximum filtrate flux rate at the expected operating temperatures. Also include information on flow direction (i.e. inside-out, outside-in) and flow pattern (i.e. cross-flow, dead-end) for the membrane technology.	<i>18 AAC 80.200</i>

## Treatment - Membrane Filtration Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
7. Specification that all components in direct contact with potable water are disinfected in accordance with AWWA Standard C653. Please note that some manufacturers may specify a maximum oxidant limit to prevent damage to the membranes.	<i>18 AAC 80.225(c)</i>
8. If a skid mounted unit, provide details of how the unit is connected to the rest of the treatment system. Specification that the pressure rating of the piping and appurtenances used to connect the membrane filtration unit is adequate for the operating pressure range of the pressure pump and membrane filtration unit.	<i>18 AAC 80.010(d)(2)</i>
9. Explain how the PWS water demand will be met during scheduled shutdown events such as chemical filter cleaning and direct membrane integrity testing.	
10. If compressed air is used for membrane processes such as backwash and integrity testing, how will air quality be managed to prevent contaminants introduced into the water?	
11. If the membrane will be used to remove a primary contaminant, describe the monitoring scheme that will be used to assess process efficiency and reliability during daily operation.	
12. Proper disposal of backwash/backflow/reverse flow water must be addressed. Identify required wastewater disposal permits and provide a copy of the permit application or permit approval.	<i>APDES, 18 AAC 72</i>

### Questions below pertain to Membranes Filtration used as a Microbial Barrier

- |  |                 |
|--|-----------------|
| 13. If membrane is used as a microbial barrier, describe method used for direct membrane integrity monitoring. Please include frequency of monitoring and resolution of the test (must be able to detected defects $\leq 3 \mu\text{m}$ ). | <i>LT2ESWTR</i> |
| 14. Describe method used for continuous indirect membrane integrity monitoring. Please include sampling frequency, instrument resolution and sensitivity.  | <i>LT2ESWTR</i> |

## Treatment - Membrane Filtration Checklist (continued)

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### Submittal Requirements

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### Regulatory Reference

15. How will turbidity be monitored? If it is to be continuous monitoring, please provide specifications of the turbidimeter and location of the sampling point?

*IESWTR, LT1ESWTR*

16. Provide information on third-party verification or challenge testing that shows the log-removal efficiency for cryptosporidium-sized particles achieved by the proposed membrane make and model.

*LT2ESWTR*



## Drinking Water Program - Engineering Plan Review Treatment - Ozone Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or the modification of existing treatment systems proposing to include the addition of ozone. This includes the use of ozone for all intended purposes including disinfection, oxidation, and taste and odor control. If ozone is being used for disinfection of a surface water (SW) or groundwater under the direct influence of surface water (GWUDISW) source, please also use "Treatment – SW/GWUDISW Checklist."

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Describe each of the intended purposes of the addition of ozone: disinfection, oxidation, taste and odor control, VOC removal, and any other purpose. If ozone is being used for disinfection to meet the Surface Water Treatment Rules, you will also need to submit the Treatment – SW/GWUDISW Checklist.	<i>18 AAC 80.205(b)(5)</i>
2. Submit applicable water sample results for ozone treatment. These are in addition to the sample results required for each source under 18 AAC 80.205(c)(2). These results should include: iron, manganese, color, total organic carbon, hydrogen sulfide, pH, turbidity and bromide. For surface water sources, multiple sets of sample results may be necessary to adequately predict seasonal water quality changes.	<i>18 AAC 80.205(c)(1)(A)</i>
3. Explain how the proposed treatment scheme is suited for the source water quality found on-site. Please include description for any required pre- and post-ozonation treatment needed to achieve the intended treatment goal. Poor source water quality may need pretreatment. Sand, mixed media, or granular activated carbon filters may be required following ozonation (but before chlorination if proposed) for systems ozonating waters with a high organic or iron and manganese content.	<i>18 AAC 80.205(b)(5)</i>
4. Provide theoretical ozone oxidation calculations to show that the ozone generation unit has been adequately sized. Please use the applicable source water quality sample results from the proposed site. Include information on source water variability and a reasonable factor of safety.	<i>18 AAC 80.205(a)(4)</i>

## Treatment - Ozone Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
5. For water systems using ozone for disinfection: Provide calculations showing the required CT (concentration*contact time) for inactivation of the target pathogen can be achieved. Please clearly state all assumptions and the CT calculation method being employed.	<i>18 AAC 80.205(a)(4)</i>
6. Provide results and a description of any pilot or bench-scale ozone testing done with either the source water or water of similar quality.	<i>18 AAC 80.205(b)(9)</i>
7. Provide drawings and specifications of the ozone generator and its feed gas including the availability of the power required to run the ozone generator.	<i>18 AAC 80.205(a)(2)</i>
8. Provide information on the method for ozone dissolution (i.e. bubble diffusers, venturi injectors) and expected ozone transfer efficiency at the injection point(s) into the water system. What will be the expected ozone dose delivered to the water?	<i>18 AAC 80.205(a)(2)</i>
9. Provide drawings and specifications on the ozone destruct unit(s) as well as its proposed location(s).	<i>18 AAC 80.205(a)(2)</i>
10. For systems using ozone for disinfection, provide drawings and specifications for the ozone residual meter(s) as well as its proposed location(s).	<i>18 AAC 80.205(a)(2)</i>
11. For systems that use ozone for disinfection, provide drawings and/or specifications on the measures that will be used to assure that the required CT will be met at all times (e.g. flow monitoring, flow restriction devices, ozone level alarm systems, auto-shutoff mechanisms, etc.).	<i>18 AAC 80.205(a)(2)</i>
12. Provide a description and justification of the location of each of the ozone injection points. Multiple injection points maybe needed to achieve a particular disinfection credit.	<i>18 AAC 80.205(a)(2)</i>
13. Submit drawings and specifications describing the ozone contact chambers and baffle factor ( $T_{10}/T$ ).	<i>18 AAC 80.205(a)(2)</i>

## Treatment - Ozone Checklist (continued)

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### Submittal Requirements

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### Regulatory Reference

14. Descriptions of ozone safety measures including air venting and ozone gas concentration alarms.
  
15. Specification that all components in direct contact with potable water will be disinfected in accordance with AWWA Standard C653.

*18 AAC 80.010(d)(2)*



## Drinking Water Program - Engineering Plan Review Treatment - Media Filtration Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modification of existing treatment system utilizing media filtration including ion exchange.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Drawings and specifications that cover construction of the treatment system.	<i>18 AAC 80.205(a)(2)</i>
2. Indicate the treatment objective for the proposed technology. Explain how the proposed treatment has been selected and its suitability for treating this water source. The design will need to address the full range of water qualities expected.	<i>18 AAC 80.225(c)</i> <i>18 AAC 80.205(b)(9)</i>
3. Results of laboratory analyses of untreated water for contaminants that the proposed treatment system is being designed to remove. What is the range of values for each water contaminant?	<i>18 AAC 80.200(f)</i> <i>18 AAC 80.300(d)</i>
4. Design calculations covering loading rates, back washing rates, volume of back wash water, and other items necessary to determine efficiency of proposed treatment proposed treatment process. Address the selection of filtration media, resins, coagulants, oxidizing agents, or filter aids.	<i>18 AAC 80.225(c)</i>
5. Address potential water quality interference constituents using the proposed treatment method. Pre-treatment may be required if interfering constituents are present in high concentrations in raw water.	<i>18 AAC 80.205(b)(9)</i> <i>18 AAC 80.205(c)(6)</i>
6. Address the selections of any chemical feed pump and document its suitability for the chemical being injected and the calculations showing it is properly sized for the water flow rates and chemical dosages necessary.	<i>18 AAC 80.225(c)</i>

## Treatment - Media Filtration Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
7. Proper disposal of backwash water must be addressed. Provide documentation showing the pertinent permit application process has been initiated.	<i>18 AAC 72</i>
8. Provide documentation that the filtration system has the appropriate backflow prevention assembly on the backwash water supply line and the backwash waste line has at least two-pipe diameters of an air gap to the waste water line. If surface wash is part of the design, provide specifications for the RPZ backflow prevention assembly to be used.	<i>18 AAC 80.205(b)(9)</i> <i>18 AAC 80.025</i>
9. Address the need for redundant media filtration unit(s). Redundancy may be required to obtain construction approval, based on an evaluation of the acuteness and concentration of the contaminant, contaminant break-through characteristics, availability of media, media type, and risk factors of the facility served by the public water system.	
10. Specification that all water treatment plant components will be disinfected in accordance with the most recent version of AWWA Standard C653.	<i>18 AAC 80.010(d)(2)</i>



## Drinking Water Program - Engineering Plan Review Treatment – Ultraviolet (UV) Disinfection Validation Report Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is applicable to construction or modification of surface water treatment systems intending to install UV disinfection. In order for a UV disinfection system to receive inactivation credits for regulated microbiological contaminants (e.g. *Giardia*, *Cryptosporidium*, viruses) it must be validated by an independent third party. Full-scale UV reactor validation testing results must document the operating conditions (e.g. flow, UV intensity, UVT, etc.) under which the reactor can deliver the required dose to achieve the desired inactivation credit. This checklist outlines basic elements of UV validation reports the State will evaluate. Since review of validation reports can take time, design engineers are encouraged to submit UV validation reports for DEC review at least 30 days prior to submittal of design plans. If a UV reactor has been previously approved in the State it may not be necessary to review its validation report. Also if a UV reactor is being proposed for 0.5-log inactivation of *Giardia* or *Cryptosporidium*, the level of review of the validation report may be less detailed. Contact DEC for more information if these situations apply. Additional information and guidance on UV system validation can be found in the EPA *UV Disinfection Guidance Manual* (UVDGM), November 2006, (EPA 815-R-06-007), which is available on the EPA website at <http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/compliance.cfm>. Other useful UV system references include: AWWA Standard F110-12 “*Ultraviolet Disinfection Systems for Drinking Water*,” August 2012; “*Ultraviolet Disinfection-Guidelines for Drinking Water and Water Reuse*” National Water Research Institute (NWRI), 3<sup>rd</sup> ed., August, 2012. For UV system design review requirements please refer to DEC checklist 6.6b.

These questions are geared for UV reactor validations based on biosimetry (as defined in UVDGM section 5.2). Other validation approaches such as those based on computational fluid dynamics (CFD) or chemical actinometry are not currently accepted in Alaska.

### Submittal Requirements

### Reference

- |   |   |
|---|---|
| 1. What validation protocol was used to validate the proposed UV unit?  | <i>40 CFR<br/>141.720(d)(2)<br/>UVDGM 5.2.2</i>     |
| 2. Document how the validation testing meets the minimum regulatory requirements for UV reactor validation in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)?                       | <i>40 CFR<br/>141.720(d)(2)<br/>UVDGM Table 5.1</i> |
| 3. Provide qualifications and certifications/accreditations of the independent third-party organization that conducted the validation and the laboratory that performed the microbiological analyses. | <i>UVDGM 5.2.3</i>                                  |

## Treatment - Ultraviolet (UV) Disinfection Validation Report Checklist (continued)

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### Submittal Requirements

### Reference

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4. Provide a copy of the full validation report with your submittal together with an executive summary. If the validation report is in a language other than English, please also include a copy translated in English. *UVDGM 5.11*
  
5. Verify the executive summary contains the following minimum elements: validated dose or range of validated doses; inactivation credit achieved for the target pathogens based on the LT2ESWTR UV dose requirements; validated operating conditions (e.g. flow, UVT); and UV intensity set-points (for UV intensity set-point approach) or dose monitoring equation (for calculated dose approach). *UVDGM 5.11.3*  
*40 CFR*  
*141.720(d)(1)*
  
6. Verify that the full validation report contains the following key elements: full scale reactor testing results with data for each test condition evaluated; collimated beam testing results; QA/QC checks (e.g. microbiological work QA/QC, measurement uncertainties of all sensors & meters); calculations of the validated dose including intensity set points and dose equations, as applicable; log-inactivation calculations and derivation of validation factors; and validated operating conditions. *UVDGM 5.11.3*  
*UVDGM checklist 5.3*
  
7. Does the validation report include detailed technical description of the tested UV reactor including specifications of critical components (e.g. lamps, quartz sleeves & sensor ports, UV intensity & UVT sensors) and wetted dimensions? Please review UVDGM checklist 5.1 for details. Include data on the spectral response of the UV intensity sensor. *UVDGM 5.4.8, 5.5.4,*  
*5.11, and D.3*  
*AWWA F110-12 Sec.*  
*4.6.1.2*  
*NWRI Guidelines*  
*Chapter 3 Sec. 2*
  
8. Describe the hydraulic conditions of the validated reactor setup (e.g. inlet and outlet piping configurations). *UVDGM 3.6 & 5.4.5*  
*AWWA F110-12 Sec.*  
*4.1.6.2(7)*
  
9. Provide a diagram of the full-scale biosimetry test stand showing ports for injection of microorganisms and chemicals, sample locations, means for assuring proper mixing prior to sample taps, online monitoring equipment, and flow meters. *UVDGM 5.4*  
*NWRI Guidelines*  
*Chapter 3 Sec. 2*
  
10. Provide water quality characteristics used at the test facility including UVT at 254 nm, turbidity, and parameters that could affect fouling of reactor quartz sleeves (e.g. calcium, alkalinity, hardness, iron, manganese, pH, temperature); if a medium pressure lamp reactor is validated, also include UVT scans covering the germicidal range from 200 nm to 300 nm, with and without a UV absorbing chemical added. *UVDGM 5.4.1*  
*NWRI Guidelines*  
*Chapter 3 Sec. 2*

## Treatment - Ultraviolet (UV) Disinfection Validation Report Checklist (continued)

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### Submittal Requirements

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### Reference

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- 11.** Provide specifications of the monitoring equipment used during validation testing, including information on equipment accuracy and latest calibration certificates. *UVDGM 5.5  
UVDGM Checklist 5.2*
- 12.** For reactors using the UV intensity set-point dose monitoring approach, were critical alarm systems (e.g. visual alarm, failsafe shutoff) tested during validation? If so, please provide results, including UV intensity sensor readings at the triggered alarm condition.
- 13.** Provide details on the lamp fouling and aging factor used during validation such as: how was the value derived/selected; how was it incorporated/ accounted for during validation (e.g. aged lamps, power turndown, or combination); was non-uniform lamp aging potential evaluated and accounted for? *UVDGM 5.4.6 & 5.6  
NWRI Guidelines  
Chapter 3 Sec. 4*
- 14.** Provide answers to UVDGM checklist 5.4 (Review of Quality Assurance/Quality Control) and checklist 5.5 (Review of Key Validation Report Elements). *UVDGM 5.12 &  
UVDGM Checklists  
5.4 & 5.5*
- 15.** Provide detailed information about the challenge microorganism used in validation, such as: protocols for growth and enumeration; published range for UV dose-response (if other than MS2 bacteriophage or *Bacillus subtilis*); and suitability for use as a surrogate for the target pathogens of interest. *UVDGM 5.3*
- 16.** For medium pressure (MP) reactor validation, the validation report should evaluate bias issues resulting from differences of action spectra between the challenge and target microorganisms (i.e. ratio of germicidal outputs as determined by UVDGM equation D.3). If an action spectra correction factor is specified, indicate how it will be incorporated into the validated dose. Provide peer-reviewed action spectra for the challenge microorganism if it is not MS2. The actual emission spectra of the validated reactor UV lamps should be used in the bias analysis. *UVDGM D.4.1  
AWWA F110-12 Sec.  
4.6.1.3*
- 17.** For MP reactor validation, does the validation report account for bias issues resulting from differences in UV absorbance spectra between the validation water and the water treatment facility water, as well as bias due to non-ideal UV intensity sensor location (polychromatic bias)? *UVDGM D.4.2 &  
D.4.3*



## Drinking Water Program - Engineering Plan Review Treatment – Ultraviolet (UV) Disinfection System Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modifications to existing surface water treatment system utilizing UV disinfection. Additional information and guidance can be obtained in the EPA *UV Disinfection Guidance Manual* (UVDGM), November 2006, (EPA 815-R-06-007). Tables referenced in this checklist refer to the *UVDGM*, which can be downloaded from the EPA website at <http://water.epa.gov/lawsregs/rulesregs/sdwa/t2/compliance.cfm>. Other useful UV system design references include: AWWA Standard F110-12 “*Ultraviolet Disinfection Systems for Drinking Water*,” August 2012; “*Ultraviolet Disinfection-Guidelines for Drinking Water and Water Reuse*” National Water Research Institute (NWRI), 3<sup>rd</sup> ed., August, 2012.

Approval of a UV disinfection system for microbial treatment credit will be contingent on DEC’s approval of the third party validation of the proposed UV reactor make and model. Design engineers are highly encouraged to contact their local DEC engineer early in the UV selection process to verify if the proposed UV reactor has been approved by the State. If not, a validation report needs to be submitted for DEC review (See checklist 6.6a) at least 30 days prior to the construction approval request. Please be advised that sufficient water quality data to support the proposed design (e.g. UV Transmittance) may take up to a year to collect and will be requested as part of the construction approval submittal for the UV system.

Please or indicate specific sections of your submittal providing documentation to address the following questions.

<b>Submittal Requirements</b>	<b>Reference</b>
1. What is the treatment objective for the proposed technology? What are the target pathogens (e.g. <i>Giardia</i> , <i>Cryptosporidium</i> , and/or viruses) and what are the design minimum log-inactivation credits for each of these pathogens?	<i>18 AAC 80.205(a)(4) and (b)(5)&amp;(9) 40 CFR 141.720(d) UVDGM 1.4 and 3.4.2</i>
2. What is the proposed minimum operational dose to achieve the desired level of inactivation? Will this dose include an added safety margin (e.g. 10%-20%) to provide flexibility and reduce occurrence of off-specification events?	<i>UVDGM 3.4.2</i>
3. Explain the selected dose monitoring strategy – Will the system use the calculated dose, set-line, or set-point approach?	<i>UVDGM 3.5.2</i>
4. Has the specific make and model of the proposed UV unit been validated by a third party? Has DEC reviewed and approved this UV system’s validation report or certificate? If not, please include information required in checklist 6.6a.	<i>40 CFR 141.720(d)(2)</i>

## Treatment – Ultraviolet (UV) Disinfection System Checklist (continued)

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### Submittal Requirements

### Reference

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5. Provide drawings and specifications covering construction of the treatment system. Include a schematic profile and scaled plan view drawing depicting the placement and location of the UV unit(s) within the treatment process. Specifications should cover make, model, and description of key UV system components (e.g. reactor vessel, lamps, sleeves, and sensors).  
*18 AAC 80.205(a)(2)*  
*UVDGM 4.6*  
*UVDGM Checklist 5.1*  
*NWRI Guidelines*  
*Chapter 1 Sec. 8*
  
6. Provide design criteria used for selecting and sizing the proposed UV disinfection system. Include relevant calculations such as water demand analysis.  
*UVDGM 3.4.3*
  
7. Provide UV transmittance (UVT) measurements at 254 nm and associated design analysis (e.g. cumulative frequency diagram) for the water to be treated by the UV reactor; UVT samples should be analyzed unfiltered. Weekly measurements collected over 2 to 3 months will be the minimum data expected for stable sources of water. Weekly measurements for 6 to 12 months will be the minimum data expected for sources with varying water quality. More frequent sampling may be needed to capture water quality events (e.g. major rain events, lake turnover, etc.). Data collected should address the range of UVT expected during operation; include the design UVT value in the data analysis. Was correlation of UVT with WTP flow considered in the analysis? If MP lamps will be used, include UVT scans in the germicidal range (200-300 nm) sufficient to cover expected seasonal variations; this will help in estimating a site specific action spectra correction factor. For unfiltered systems, consider capturing UVT data that includes high turbidity events and algal blooms.  
*UVDGM Table 3.2 &*  
*Secs. 3.4.4.1 & 3.4.4.3*  
*AWWA F110-12*  
*Sec. 4.2.4.2*
  
8. Address potential water quality constituents in the raw or filtered water that could interfere with UV disinfection (e.g. algae, iron, manganese, calcium, alkalinity, hardness, ORP, pH, organics, color, turbidity, upstream treatment chemicals). Are these constituents within the manufacturer's acceptable ranges and/or within the ranges accounted for during validation testing? If pretreatment is required, provide design criteria for pre-treatment process.  
*UVDGM 2.5.1, 3.4.4,*  
*& 3.4.4.2*
  
9. Addressed UV interference with other treatment processes or equipment (e.g. reduction of chlorine residual, UV degradation of materials like gaskets, glass, and plastics of nearby inline components such as water meters, and valves).  
*UVDGM 2.5.2 &*  
*3.2.1*
  
10. Justify the fouling and aging factors selected for this design and the source water characteristics.  
*UVDGM 3.4.5*

## Treatment – Ultraviolet (UV) Disinfection System Checklist (continued)

Submittal Requirements	Reference
11. For filtration avoidance (i.e. unfiltered) systems, explain how the proposed design will control debris that could cause sleeves and UV lamps to break?	<i>UVDGM 4.5.1</i>
12. What level of redundancy will be considered in the UV system design? Unfiltered water systems will be expected to have some level of redundancy in their UV system design (e.g. n+1 UV reactors).	<i>UVDGM 3.8.1</i>
13. What secondary disinfectant will be used to maintain a disinfectant residual in the distribution system? Will additional virus inactivation be provided with the secondary disinfectant? Please provide relevant design criteria and calculations. Note: for unfiltered systems, LT2 requires the use of two disinfectants to achieve the combined disinfection requirements for <i>Giardia</i> , <i>Cryptosporidium</i> , and viruses.	<i>UVDGM 3.2.1</i> <i>40 CFR 141.712(d)</i>
14. Should a UV lamp break, what design and O&M measures will be in place to control Mercury contamination?	<i>UVDGM Appendix E</i>
15. For existing unfiltered systems modifying disinfection, has a disinfection benchmark been established?	<i>40 CFR 141.540</i>
16. Has an electric power quality assessment been performed to ensure the power source will meet the manufacturer’s specification and tolerances for the selected UV system? Have potential electrical harmonic distortion issues caused by the UV system on other electrical systems been addressed? Are UV reactors provided with GFI circuitry?	<i>UVDGM 3.4.6 &amp; 4.4</i> <i>IEEE Standard 519</i> <i>NWRI Guidelines</i> <i>Chapter 1 Sec. 4</i>
17. How will the UV system design address power outages? Are backup power and power conditioning equipment specified (e.g. UPS, generators)? If so, how will the power supply transition be managed?	<i>UVDGM 3.4.6 &amp; 4.4</i> <i>NWRI Guidelines</i> <i>Chapter 1 Sec. 4</i>
18. What inventory of critical spare parts will be kept at the water treatment plant?	<i>UVDGM 6.3.3</i>
19. Will there be diversion piping installed after the UV unit to prevent water not treated to specifications from entering the distribution system (i.e. treat-to-waste piping)?	

## Treatment – Ultraviolet (UV) Disinfection System Checklist (continued)

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### Submittal Requirements

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### Reference

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20. Describe the proposed UV facility hydraulic design. How will inlet and outlet piping configuration ensure a UV dose delivery equal to or greater than during validation testing? Will piping configuration ensure the reactor is flooded (i.e. all lamps submerged) during normal operation?
21. Please describe UV system alarms and control system interlocks.
22. How will flow be regulated and monitored to ensure the UV system is operating within its validated flow rate?
23. Provide documentation that wetted components of the reactor have been certified to meet ANSI/NSF Standard 61 or equivalent ANSI/NSF standard that evaluates materials for drinking water contact applications.
24. Describe quartz sleeve and UV sensor window cleaning system. If chemicals are used, provide documentation they have been certified to meet ANSI/NSF Standard 60.
25. Has the UV design addressed potential cross connection issues (e.g. cooling water for MP reactors)?
26. Will the water system operator(s) be trained to operate the UV unit? Who will provide the training? What will be the scheduled date for training relative to the proposed system startup?
27. Provide a description of functional and performance tests required during startup. Please note that copies of these tests will be requested for operational approval.
28. Provide information on the main contents of the O&M manual and the timing for its completion. Please refer to recommended O&M activities in UVDGM tables 6.3 and 6.4.

*40 CFR  
141.720(d)(2)(i)  
UVDGM 3.6.2, 4.1 &  
E.2.1.3, AWWA  
F110-12 Sec.5.2.1.4*

*UVDGM 4.3.3 &  
Table 4.2*

*UVDGM 4.1.2*

*18 AAC 80.030  
AWWA F110-12  
Sec. 4.4.1.1;*

*18 AAC 80.030  
NWRI Guidelines  
Chapter 1 Sec. 3*

*18 AAC 80.025*

*18 AAC 80.007  
UVDGM 6.7.2*

*UVDGM 6.1.3-6.1.5*

*UVDGM 6.1.1, 6.2,  
6.3, & 6.4, AWWA  
F110-12 Sec. 5.3  
NWRI Guidelines  
Chapter 1 Sec. 8*

## Treatment – Ultraviolet (UV) Disinfection System Checklist (continued)

Submittal Requirements	Reference
<p>29. Describe proposed UV system monitoring/recording activities and frequencies (refer to UVDGM tables 6.7 and 6.8 for recommendations). Has the design of the UV monitoring and recording equipment and the O&amp;M manual considered regulatory monitoring and reporting requirements the operator will need to fulfill? (See DEC Monthly Operator Reports.)</p>	<p>40 CFR 141.720(d)(3) 40 CFR 141.721(f) UVDGM 6.4 &amp; 6.5</p>
<p>30. Describe how, and how often, the calibration of key UV system sensors will be verified (UV intensity, UVT, flow meters). Will a designated “reference” UV intensity sensor be available to the operator? If so, how often will the reference sensor be calibrated?</p>	<p>40 CFR 141.720(d)(3) UVDGM 6.4.1.1, 6.4.1.2, &amp; 6.3.2.3</p>
<p>31. How will spent UV lamps be disposed of (they are considered hazardous waste under RCRA)? Does the manufacturer have a recycling program?</p>	<p>UVDGM 6.3.2.6</p>
Additional submittal requirements for systems using the calculated dose monitoring approaches	Reference
<p>1. Provide the validated UV dose range. What will be the minimum operational validated dose and its associated target pathogen inactivation credit?</p>	<p>40 CFR 141.720(d)(1) UVDGM 3.5 &amp; 5.10</p>
<p>2. Will the relative UV intensity term (<math>S/S_0</math>) in the calculated dose equation be based on the lowest measured lamp intensity in the reactor? Provide an example calculation of UV dose at worst-case conditions of UVT, flow, and UV intensity (e.g. design fouling/aging factor). Please include all relevant validation factor parameters.</p>	<p>UVDGM Table B.11</p>
<p>3. What means will be provided for calibration verification of online UVT analyzers?</p>	<p>UVDGM 6.4.1.2 AWWA F110-12 Sec. 4.5.7</p>
<p>4. Provide process and instrumentation diagrams, PLC logic loop descriptions, and a process control narrative. Please include alarm descriptions and triggers.</p>	<p>UVDGM 4.3</p>

## Treatment – Ultraviolet (UV) Disinfection System Checklist (continued)

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### Submittal Requirements

### Reference

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5. Will the O&M manual include UV system operational curves to allow the operator to visually verify the delivered dose given key input parameters (e.g. flow, UV intensity, UVT)?
6. Is there a manual override of dose monitoring equation inputs to temporarily keep the UV system running in case a sensor malfunctions? Are emergency operations addressed in the O&M manual?
7. Will operators or field commissioning staff have access to the programmed dose monitoring equation parameters? DEC may request access during inspection to verify the programmed equation is the same as the validated one.

*UVDGM 6.1.1 &  
6.4.1.2*

*AWWA F110-12  
Sec. 4.6.2*

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### Additional submittal requirements for systems using the set-point dose monitoring approach

### Reference

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1. Please summarize the set-point conditions (e.g. flow, UV intensity, lamp status values). What will be the validated dose at set-point and its associated target pathogen inactivation credit?
2. Will UV transmittance be measured (note: not typically required for set-point based systems)? If so, how?
3. How will the lamp status be monitored? Please note lamp status may be monitored with UV intensity sensors if each lamp has a dedicated UV intensity sensor.

*UVDGM 3.5.2.1 &  
5.6.1*



## Drinking Water Program - Engineering Plan Review Treatment - Other Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for the construction of new or modification of existing treatment system that do not fit within any other checklist category. Application to demonstrate an Innovative Technology or Device should also use this checklist.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. Drawings and specifications that cover construction of the treatment system.	<i>18 AAC 80.205(a)(2)</i>
2. Results of laboratory analyses of untreated water for contaminant proposed treatment system is being designed to remove.	<i>18 AAC 80.200(f)</i> <i>18 AAC 80.300(d)</i>
3. Explain how the proposed treatment has been selected and its suitability for treating this water source.	<i>18 AAC 80.225(c)</i>
4. For treatment utilizing filtration using media filtration including ion exchange include design calculations covering loading rates, back washing rates, volume of back wash water, and other items necessary to determine efficiency of proposed treatment proposed treatment process. Address the selection of filtration media, resins, coagulants, oxidizing agents, or filter aids.	<i>18 AAC 80.225(c)</i>
5. For filtration using cartridge or bag filters identify and justify the type(s) of proposed filtration processes. Submittal will need to include make model of the filters as well as information on the maximum flow rate and differential pressure for each filter selected. The design will need to address the full range of water qualities expected. Estimates of intervals between filter changing will be needed to address the suitability of this technology for this water quality as well as how and where the spent filters will be disposed.	<i>18 AAC 80.200</i>

## Treatment - Other Checklist (continued)

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
6. Address the selections of any chemical feed pump and document its suitability for the chemical being injected and the calculations showing it is properly sized for the water flow rates and chemical dosages necessary.	<i>18 AAC 80.225(c)</i>
7. Specification that all components in direct contact with potable water are disinfected in accordance with AWWA Standard C653.	<i>18 AAC 80.010(d)(2)</i>



## Drinking Water Program - Engineering Plan Review Waiver Checklist - Source

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

Use of this guide is required as a part of a separation distance waiver request between a community, non-transient non-community, or transient non-community drinking water source such as a well, infiltration gallery, or intake and a potential source of contamination such as septic systems, sewer lines, fuel tanks, storm drains, etc.. **This request must be accompanied by the facility and project information forms in the Plan Review Application (see Checklist 0.0).**

<b>Submittal Requirements</b>	<i>Regulatory Reference</i>
<p><b>1. Waiver Fee and Contact Information:</b> Is the waiver review fee included in the submittal? For submittals requesting fee calculation assistance, a submittal may be accepted without the fee payment if there is prior approval from the reviewing engineer and all contact information for the person, agency, or company responsible for fee payment is provided. A waiver review will not be completed until the fee payment is received.</p>	<p><i>18 AAC 80.020(c)</i></p>
<p><b>2. Plans and Engineering Drawings:</b> Does the submittal include a set of plans consisting of scaled drawings, an accurate description and the location of potential sources of contamination, surface waters, groundwater, and existing and potential drinking water sources within the protective radius of the well? The drawings must be sealed, signed, and dated on each page by an Alaska registered P.E. and in hardcopy format unless previous arrangements have been made.</p>	<p><i>18 AAC 80.020(c)(4)</i></p>
<p><b>3. Verification of Public Health Protection:</b> Where in the engineer’s report (specify page number, etc.) is justification showing the design is protective of public health including a discussion of the construction methods, environmental factors (e.g. soil classifications, groundwater conditions, surface topography, and geology), and any proposed mitigation techniques? Where in the drawings (specify sheet number, etc.) are details of the system design addressing these environmental factors?</p>	<p><i>18 AAC 80.020(c)(2-3) 18 AAC 80.020(c)(4)(C)(i)</i></p>
<p><b>4. Water Source Protection:</b> Where in the submittal (specify document name, page number, etc.) are details of the system design that will prevent contamination of the source(s) at the lesser separation distance?</p>	<p><i>18 AAC 80.020(c)(4)(C)(ii)</i></p>

## Waiver Checklist - Source (continued)

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### Submittal Requirements

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### *Regulatory Reference*

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**5. Risk Mitigation:** Where in the submittal (specify document name, page number, etc.) are details of the component or object posing a potential risk (wastewater system, sewer etc.) indicating that it is constructed and operated in an approved manner, meets minimum engineering standards, and does not present a substantial risk to the water system?

*18 AAC 80.020 (c)(2)  
18 AAC 80.020  
(c)(4)(C-D)*

**6. Other Site Information:** Where in the submittal (specify document name, page number, etc.) is any other information that may assist the Department in assessing the effect of the proposed lesser separation distance on the public drinking water system?

*18 AAC  
80.020(c)(4)(D)*



## Drinking Water Program - Engineering Plan Review Waiver Checklist – Distribution

Project Name: \_\_\_\_\_

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

AK P.E. License \_\_\_\_\_

No.: \_\_\_\_\_

Use of this guide is required as a part of a separation distance waiver request between a community, non-transient non-community, or transient non-community distribution system and a potential source of contamination such as septic systems, sewer lines, fuel tanks, storm drains, etc. as discussed in 18 AAC 80.020 (water) and 18 AAC 72.020 (wastewater). **This request must be accompanied by the facility and project information forms in the Plan Review Application (see Checklist 0.0).**

### Submittal Requirements

### Regulatory Reference

1. **Length of Water Main Requiring Waiver:** How many feet of main will be subject to the waiver? The waiver review fee required under 18 AAC 80.1910(a)(11) shall be included with all waiver requests. For submittals requesting fee calculation assistance, a submittal may be accepted without the fee payment if there is prior approval from the reviewing engineer and all contact information for the person, agency, or company responsible for fee payment is provided. A waiver review will not be completed until the fee payment is received. *18 AAC 80.20(c)*
  
2. **Justification for Waiver Request:** Where in the submittal (specify document name, page number, etc.) is documentation identifying the reason the separation distance cannot be met? This may include site configuration, system design, or the presence of other obstacles. *18 AAC 80.020(f)(3)(A)*
  
3. **Protective of Public Health:** Where in the submittal (specify document name, page number, etc.) is justification showing the design, management, and operations of the distribution system and the potential risk are protective of public health? This may include a discussion of construction methods, environmental factors, proposed mitigation techniques, weld logs, field verification notes, etc.. *18 AAC 80.020 (g)*
  
4. **Waiver Type:** Where in the submittal is a description of the condition(s) in the Distribution Checklist numbers 13a-14d for which a waiver is being requested? Information should include horizontal or vertical separation distance, location, and the details of each condition in 13a-c or 13a-14d. *18 AAC 80.020 (g)*



## Drinking Water Program - Engineering Plan Review Water Haul Checklist

**Project Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Engineer Name:** \_\_\_\_\_ **AK P.E. License No.:** \_\_\_\_\_

This checklist is required for all water-haul tank systems that provide water to one or more public or private water systems, not including owner hauled water for a single owner occupied dwelling.

<b>Submittal Requirements</b>	<b>Regulatory Reference</b>
1. The source of the water must be identified. Water must be obtained from an approved DEC community or non-transient non-community water system. If permits are needed from the supplier, copies of the required permits must be included with the submittal.	<i>18 AAC 80.205</i>
2. The population served and area of service must be identified.	<i>18 AAC 80.205</i>
3. Schematic drawings and component specifications of the water haul system.	
4. A unique tank identification number, such as tank manufacturer serial number, must be provided. This number should be permanently affixed to the tank. This will be referenced in issuing the DEC PWSID (public water system identification number).	
5. The water tank must be conspicuously marked "Potable Water Only".	<i>18 AAC 80.220(e)</i>
6. The make and type of the components used in the system must be identified. Components used, which will be in contact with the drinking water, must be NSF approved where possible, or composed of NSF approved materials where possible, or constructed in accordance with accepted public drinking water system standards.	<i>18 AAC 80.030</i>
7. Water tank vents are screened and readily accessible. Water tank vents must be designed to minimize icing problems and the associated risk of positive or negative pressure situations.	

## Water Haul Checklist (continued)

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### Submittal Requirements

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*Regulatory  
Reference*

8. Exhaust vents from engines are directed away from any drinking water vents or outlets.
  
9. The fittings used on hoses must consist of anchored, locking fitting ("Cam-Lok" or equivalent) which provide a tight connection and prevent the hose from extending down into the water of the haul tank or delivery tank. End caps should be provided on hoses.
  
10. Hoses are stored in safe, protected manner which prevents contamination when not in use.
  
11. Food grade lubricants must be used in drinking water pumps.
  
12. An operator log is maintained and available which includes: maintenance (periodic cleaning), dates of delivery, delivery locations and delivery amounts.
  
13. A "Standard Operating Procedures" manual is available which includes cleaning/disinfecting protocol, flushing protocol, sampling protocol and routine maintenance schedules.
  
14. Haul tank fill lines must have an appropriate backflow prevention assembly that include either (for top-fill tanks) an air-gap that is at least two-pipe diameters of the fill line or (for bottom-fill tanks) a double check valve.