


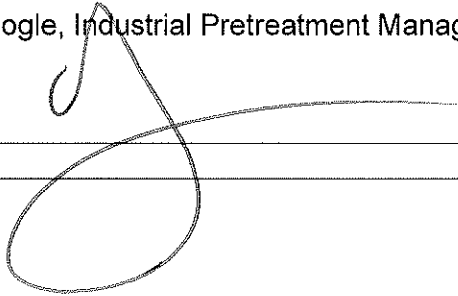


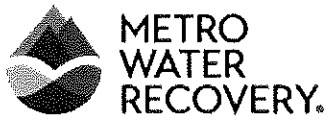
**METRO WATER RECOVERY**

**INDUSTRIAL PRETREATMENT PROGRAM IMPLEMENTATION POLICY**

**PURPOSE/SCOPE:**

This document defines the Industrial Pretreatment Program's approach to characterizing and regulating the acceptance of Naturally Occurring Radioactive Material or Technologically Enhanced Radioactive Material into Metro Water Recovery's collection, transmission, or wastewater treatment facility from industrial users.

Version Number	Approved By	Effective Date
1	Jennifer Robinett, Director of Environmental Services  Bret Icenogle, Industrial Pretreatment Manager 	May 13, 2025



## INTRODUCTION

Metro Water Recovery (Metro) operates a US Environmental Protection Agency (US EPA) approved industrial pretreatment program (IPP) to prevent the introduction of unconventional pollutant loadings to its domestic wastewater treatment plant that have the potential to pass through or interfere with operations and treatment processes; cause worker and public health safety concerns; and harm infrastructure. Metro's legal authority associated with its IPP implementation resides within Sections 2, 5, 6 and 10 of the Metro Water Recovery *Rules and Regulations Governing the Operation, Use, and Services of the System* (Rules and Regulations).

As a wholesale wastewater provider, Metro has the potential to receive both Naturally Occurring Radioactive Material (NORM) and Technologically Enhanced Radioactive Material (TENORM) from domestic and industrial sources. Due to the potentially harmful characteristics of radioactive wastewater to workers and beneficial reuse, Metro uses its industrial pretreatment authorities and the Rules and Regulations to review, permit, and regulate industrial users that have the potential to discharge TENORM to the collection, transmission, and wastewater treatment system. This implementation policy describes how Metro interprets the information and requirements associated with both NORM and TENORM to ensure that Metro meets the requirements of its US EPA pretreatment program and maintains an exempt status specifically related to 6 Code of Colorado 1007-1 Part 20.

## APPLICABILITY

This implementation policy applies to all existing and new Industrial Users (IUs) within Metro's service area. The requirements of this implementation policy may supersede any past written correspondence issued by Metro to an industrial user regarding NORM and TENORM given that Metro must routinely reevaluate, and course correct, when necessary, to maintain consistent implementation of its IPP. The interpretations outlined in this policy become enforceable on the effective date of the policy.

## REGULATORY FRAMEWORK

Metro used the following excerpts from regulations, policies, guidance, and emails in the development of this policy. Metro copied this information into this policy to aid the reader's understanding of the policy. Metro encourages the reader to review each of the complete references and any supporting documentation in their entirety for a more comprehensive understanding.

### US Environmental Protection Agency

The following excerpts from the US EPA's website, located at <https://www.epa.gov/radiation/tenorm-drinking-water-treatment-residuals> (last accessed March 12, 2025), indicate that radionuclides in the drinking water are Naturally Occurring Radioactive Material (NORM). The following image found on this website appears to indicate that the US EPA only considers the sediment and sludge from filters, tanks, and pipes at treatment plants to be TENORM. In this excerpt, the US EPA does not express that the potable water (finished water) qualifies as TENORM.

## TENORM: Drinking Water Treatment Residuals

All rocks and soils contain some trace amounts of Naturally Occurring Radioactive Materials (NORM). When a drinking water source, either surface or groundwater, comes in contact with NORM-bearing rocks and soils, radionuclides can accumulate in the source water. The most frequently-occurring radionuclides (and their decay products) found in source water include:

- Radium
- Uranium
- Radon

Radium breaks down to form the radioactive gas, radon. Because uranium, radium and radon can dissolve in water, these radionuclides can be present in source water. The likelihood that source water in a certain area will contain radionuclides depends on soil and rock conditions in that area.

EPA has specific regulations under the Safe Drinking Water Act (SDWA) that limit the amount of radioactivity allowed in community water systems.

As water is treated to remove impurities, radionuclides may collect as sediment and sludge and also build up in filters, tanks and pipes at treatment plants. Because the NORM is concentrated due to human activity, it is classified as Technologically Enhanced Naturally Occurring Radioactive Material (TENORM). Most of this waste is disposed in landfills and storage ponds, or is land-applied.

The following image found on this same website builds on the previous statement. This excerpt indicates that the US EPA considers the radioactive material(s) in potable water (finished water) to be NORM.

## Radionuclides in Drinking Water

Across the United States, there are varying amounts of NORM found in drinking water. Community water systems are required to test for and report levels of radionuclides in drinking water to ensure that consumers do not drink water that exceeds standards set by the Environmental Protection Agency. These standards are called Maximum Contaminant Levels (MCLs) and are based on chronic exposure from drinking two liters of water a day over seventy years. For more information about MCLs and radionuclides in drinking water, visit the [Radionuclide Rule](#) page from the Office of Water on EPA.gov.

While EPA sets standards for large and small entity drinking water treatment plants, we do not set standards for private drinking wells. The limits that EPA sets for community drinking water systems under the SDWA can be used as guidelines for drinking water wells.

### **US EPA: A Regulators' Guide to the Management of Radioactive Residuals from Drinking Water Treatment Technologies, Office of Water (4606M), EPA 816-R-05-004, July 2005**

This report, located at <https://www.epa.gov/sites/default/files/2015-05/documents/816-r-05-004.pdf> (last accessed May 12, 2025), defines TENORM as follows:

Technologically Enhanced Naturally Occurring Radioactive Material - Naturally occurring materials, such as rocks, minerals, soils, and water whose radionuclide concentrations or potential for exposure to humans or the environment is enhanced as a result of human activities (e.g., water treatment).<sup>52</sup>

<sup>52</sup> In accordance with concepts presented in NAS (1999) and IAEA (2004).

### **Regulation 11 – Colorado Primary Drinking Water Regulations**

Colorado's Regulation 11 ("Colorado Primary Drinking Water Regulations") includes the following relevant definitions and provisions:

#### 1.3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

(32) "FINISHED WATER" or "FINISHED DRINKING WATER" means water that is supplied to the distribution system of a public water system and intended for distribution and human consumption without further treatment, including disinfection contact time, except treatment as necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

(42) "LOCATIONAL RUNNING ANNUAL AVERAGE" or "LRAA" means the average of sample results for samples collected at a particular monitoring location during the most recent four



calendar quarters. If the supplier fails to complete four consecutive quarters of sampling, the LRAA is based on the available sample results from the most recent four calendar quarters.

11.22(2) MCL Requirements for Radionuclides

(a) The radionuclide MCLs are as follows:

TABLE 11.22-I RADIONUCLIDE MCLs	
Contaminant	MCL
Gross alpha particle activity (including radium-226, excluding radon <sup>1</sup> and uranium)	15 pCi/L
Combined radium-226 and radium-228 <sup>2</sup>	5 pCi/L
Uranium <sup>3</sup>	30 µg/L
Beta particle and photon radioactivity <sup>4</sup>	4 mrem/yr

<sup>1</sup> Radon is not currently regulated in drinking water.

<sup>2</sup> Radium-228 is an individual alpha particle activity emitter, however it is not included in the gross alpha particle activity and is measured separately. Radium-228 sample results are combined with radium-226 sample results for the purposes of determining compliance.

<sup>3</sup> Uranium is an individual alpha particle activity emitter, however it is not included in the gross alpha particle activity and is measured separately. If uranium is determined by mass, a 0.67 pCi/µg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U-234 and U-238 that is characteristic of naturally occurring uranium.

<sup>4</sup> The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than (>) 4 mrem/yr.

**Metro’s Rules and Regulations**

Section 6.14 of Metro’s Rules and Regulations (“Prohibited Discharges”) prohibits IUs from discharging the following into Metro’s system or the municipal sewer system:

6.14.1 Any liquids, solids, or gases which by reason of their nature or quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion or be injurious in any other way the Metro System, any Municipal Sewer System, or to the operation of Metro Water Recovery. At no time...

6.14.17 Any radioactive substance, the discharge of which does not comply with Section RH 4.35 of the Colorado Rules and Regulations pertaining to Radiation Control (Volume 6 of the Code of Colorado Regulations, 6 CCR 1007-1, Part 4, et seq.).

6.14.19 Any substance which may cause Metro Water Recovery’s effluent for any other product of metro such as residues, sludges, or scums to be unsuitable for reclamation and reuse or to interfere with the reclamation process. In no case, shall a substance discharged to the Metro System cause metro to be in non-compliance with sludge use or disposal criteria, guidelines, or regulations developed under Section 405 of the Federal Water Pollution Control Act; any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or State criteria applicable to the sludge management method being used.



6.14.24 Any waste or Wastewater containing TENORM Radionuclides – Radium-226, Radium-228, Lead-210, and Polonium-210 in excess of 5 Picocuries/gram (pCi/g). In all cases, discharges of TENORM Radionuclides shall be lower than the EXEMPT levels established by Colorado Code of Regulations (6 CCR 1007-1 Part 20 et seq.)

#### **6 Code of Colorado Regulations 1007-1 Part 4**

6 Code of Colorado Regulations (CCR) 1007-1 Part 4 ("Standards for Protection Against Radiation") includes the following relevant provisions:

##### **4.35 Disposal by Release into Sanitary Sewerage.**

4.35.1 A licensee or registrant may discharge licensed or registered material into sanitary sewerage if each of the following conditions is satisfied:

4.35.1.1 The material is "readily soluble," or is "readily dispersible biological material," in water; and

4.35.1.2 The quantity of licensed or registered radioactive material that the licensee or registrant releases into the sewer in 1 month divided by the average monthly volume of water released into the sewer by the licensee or registrant does not exceed the concentration listed in Table 4B3 of Appendix 4B; and

4.35.1.3 If more than one radionuclide is released, the following conditions must also be satisfied:

- (1) The licensee or registrant shall determine the fraction of the limit in Table 4B3 of Appendix 4B represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee or registrant into the sewer by the concentration of that radionuclide listed in Table 4B3 of Appendix 4B; and
- (2) The sum of the fractions for each radionuclide required by 4.35.1.3.(1) does not exceed unity; and

4.35.1.4 The total quantity of licensed or registered radioactive material that the licensee or registrant releases into the sanitary sewerage in a year does not exceed 185 GBq (5 Ci) of hydrogen-3, 37 GBq (1 Ci) of carbon-14, and 37 GBq (1 Ci) of all other radioactive materials combined.

4.35.2 Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in 4.35.1.

#### **6 Code of Colorado Regulations 1007-1 Part 20**

6 CCR 1007-1 Part 20 ("Registration and Licensing of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)") includes the following relevant definitions and provisions:

##### **20.2 Definitions**

"Dry weight" means the mass of materials excluding the mass of any water or moisture present within the materials.

"Technologically enhanced naturally occurring radioactive material" (TENORM) means naturally occurring radioactive material whose radionuclide concentrations are increased by or as a result of past or present human practices. "TENORM" does not include:

- A. Background radiation or the natural radioactivity of rocks or soils;



- B. "Byproduct material" or "source material", as defined by Colorado statute or rule; or
- C. Enriched or depleted uranium as defined by Colorado or federal statute or rule.

"TENORM Radionuclides" means Radium-226, Radium-228, Lead-210, and Polonium-210.

## 20.1 Purpose and Scope

### 20.1.4 Applicability.

- A. The requirements and provisions of these regulations apply to any person who generates, handles, processes, transfers, receives, transports, disposes of, possesses, distributes, or beneficially uses TENORM unless specifically exempted.

## 20.3 General Provisions

20.3.1 Unless otherwise specified, concentration limits within this Part shall be in dry weight and exclude natural background.

- A. Acceptable Natural Background values are either:

1. Established by the Department and may be found on the Department's website; or
2. For generation, disposal, or beneficial use sites, site specific values may be established and employed. An adequate and acceptable background sample set will provide a mean within +/- 20% of the true average at the 95% confidence level.

- B. Dry weight refers to the mass of a material excluding the mass of any water or moisture present within the material.

1. For the purposes of liquid TENORM sample analysis, unfiltered (total) samples which include both suspended and dissolved solids must be analyzed for activity and shall represent the total dry weight mass of the sample.
2. Dry weight concentration values shall be expressed in units of activity per mass, most commonly picocuries per gram.

20.3.2 Any person who generates a waste, residual product, or other material by way of a process that has the potential to increase the concentration of NORM and as a result may contain concentrated naturally occurring radionuclides must make a TENORM determination to evaluate whether that material is subject to the applicable requirements established in this Part, or if it can be exempted from the requirements according to Section 20.4 of this Part. The TENORM determination shall be made as follows:

- A. The TENORM determination for each material must be made at the point of generation, and at any time in the course of its management that it has, or may have, changed its properties or naturally occurring radionuclide concentration as a result of the processes that generated the materials or other factors that may change the properties of the materials such that the TENORM classification of the material may change.

- B. A person shall use knowledge of the material when making this determination. Acceptable knowledge may include material origin, composition, process knowledge (e.g., radiological, chemical, or physical characterization of feedstocks and other inputs to the production process, including the exclusion of one or more TENORM radionuclides from consideration based on that knowledge); knowledge of products, by-products, and intermediates produced by the process; information on the radiological, chemical, and physical properties of the materials used or produced by the process or otherwise contained in the generated materials; proper characterization of the materials that illustrates the radiological concentrations of TENORM radionuclides within the



generated materials; or other reliable and relevant information about the radiological properties of the generated materials (all of which may be used to develop a waste or material profile).

20.4 Exemptions.

TENORM materials that qualify for exemption in accordance with any one of the following exemption categories are exempt from this rule and do not need to meet the requirements of any other exemption category.

20.4.1 Exempt Concentrations.

A. Persons who generate, handle, process, transfer, receive, transport, dispose of, possess, distribute, or beneficially use TENORM are exempt from the requirements of this part if the materials contain or are contaminated at concentrations in dry weight not in excess of those listed in Table 20 – 1 excluding natural background. The radioactive progeny of the isotopes present in exempt TENORM are also exempt.

Table 20 – 1

Exempt TENORM Concentrations Isotope	Picocuries/gram (pCi/g)
Radium-226	5
Radium-228	5
Lead-210	5
Polonium-210	5

20.4.7 The Department may, upon application or upon its own initiative, grant an exemption or exception from any requirement in this Part as it determines is authorized by law and will not result in undue hazard to public health and safety, workers, or property.

**Colorado Department of Public Health and Environment (CDPHE), Hazardous Materials and Waste Management Division, Radiation Control Program**

Metro Water Recovery and others requested CDPHE's interpretation of NORM and TENORM with respect to finished water (i.e., drinking water). Shiya Wang, the Uranium and TENORM lead for the Radiation Control Program sent the following email to WRT, a local industry served by Metro Water Recovery, and copied Metro staff.

**From:** Wang - CDPHE, Shiya <[shiya.wang@state.co.us](mailto:shiya.wang@state.co.us)>  
**Sent:** Thursday, February 22, 2024 2:33 PM  
**To:** Kevin Smith <[ksmith@wrtnet.com](mailto:ksmith@wrtnet.com)>  
**Cc:** Icenogle, Bret <[BAIcenogle@MetroWaterRecovery.com](mailto:BAIcenogle@MetroWaterRecovery.com)>; Maggie Schnettler - CDPHE <[maggie.schnettler@state.co.us](mailto:maggie.schnettler@state.co.us)>  
**Subject:** Site-specific background determination for use of treated water

Hi Kevin,

This is to respond to your question on establishing a site-specific background value for your TENORM materials generated as a result of the use of treated water. I am including Bret here as I have also been discussing the same topic with him.



So here is our guidance on establishing a site-specific background value. For processes or operations that utilize waters that have been previously treated and distributed by a water system in compliance with CDPHE/State of Colorado water quality drinking water requirements and standards, a generator's site-specific background value may be established and employed for the purposes of determining compliance with Part 20 by acquiring no less than 6 samples of the incoming drinking waters collected from the same point with minimum of 24 hours between each sampling event and using the Department's site specific background determination spreadsheet to calculate the site specific background value. If there will be seasonal variation in the drinking water that you use, we would suggest you consider that in your sampling schedule. Once you establish a site-specific background value, you may use this value for your ongoing operation until there is a change in your incoming drinking water that may result in a different background value.

You do not need to get our further approval if you establish your site-specific background value following our guidance mentioned above. We would however ask you to keep all sampling reports and the spreadsheet in your record. You may propose an alternative method for our approval, however the proposed method will need to demonstrate that the background value can be established meeting the criteria in Part 20, Section 20.3.1.A.2.

Let me or Maggie know if you have any questions.

Shiya

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Shiya Wang, PhD  
Uranium and TENORM Lead  
Radiation Program



P 720.598.2960 or 303.692.3447 | F 303.759.5355  
4300 Cherry Creek Drive South, Denver, Colorado 80246-1530  
[shiya.wang@state.co.us](mailto:shiya.wang@state.co.us) | [www.colorado.gov/pacific/cdphe](http://www.colorado.gov/pacific/cdphe)

## ISSUE IDENTIFICATION

6 CCR 1007-1 Part 20 (Part 20) applies to any person who generates, handles, processes, transfers, receives, transports, disposes of, possesses, distributes, or beneficially uses TENORM unless specifically exempted. Because of the broad applicability, Part 20 could apply to both Metro, as an entity that transfers, receives, and beneficially uses TENORM, and IUs within its service area, as entities that receive, process, and transfer TENORM. Because Metro intends to operate as an exempt person, Metro has adopted Rules and Regulations and industrial permitting practices that prevent industrial users within its service area from discharging concentrations of TENORM over the exempt levels established by Part 20.



While Metro's practices align with Part 20 to maintain an exempt status (i.e., non-registered and non-licensed), Metro and its IUs identified an unintentional misalignment between the Colorado Primary Drinking Water Regulations and Part 20 that has the potential to cause IUs to exceed the exempt levels established by Metro even when the industrial process of creating TENORM would not, by itself, exceed the TENORM exempt concentrations. The following example outlines the potential challenge using radium-226 as the basis.

Most, if not all, IUs within Metro's service area receive and use finished water from a public water system for industrial processes. While Part 20 identifies drinking water treatment residuals as a potential source of TENORM, Part 20 does not specifically identify finished water (i.e., drinking water) as a potential source of TENORM. The US EPA appears to align with this approach by terming potable water as NORM.

To be served to the public, finished water must meet the Colorado Primary Drinking Water Regulations. Per this regulation, finished water must meet the Maximum Contaminant Levels (MCLs) for radionuclides shown in Table 11.22-1 included above. Focusing on radium-226 alone, the concentration of radium-226 in the drinking water must be below 5 pCi/L using the Locational Running Annual Average (LRAA). This MCL limits the radionuclide's impact on each person that consumes an average of 2 liters of potable water per day. This MCL is volumetric based and protects the public independent of the solids concentration in the drinking water. For the Denver area, drinking water generally has total solids ranging from 50 to 1000 mg/L.

Now consider an IU that purchases potable water with a radium-226 concentration of 5 pCi/L (LRAA) for industrial processes. The industrial process then concentrates the radium-226 to 5.4 pCi/L prior to discharge to the sanitary sewer. While the industrial wastewater, with a concentration of 5.4 pCi/L, may still meet the Colorado Primary Drinking Water Regulations, the potable water has been transformed into TENORM and now must meet the exempt levels in Part 20 and the Rules and Regulations for radium-226 prior to being discharged to Metro's sanitary sewer. Per Part 20 and the Rules and Regulations, radium-266 must have a concentration of less than 5 pCi/g based on the dry weight (see definition of dry weight above) of the solids to meet exempt levels. Noting the regulatory unit change from pCi/L to pCi/g, the dry weight of pCi/g depends significantly on the total solids content of the finished water, considered to be NORM. Considering the typical total solids found in drinking water throughout the Denver area, a TENORM concentration of 5.4 pCi/L may result in a mass-based concentration of radium-226 between 108 pCi/g and 5.4 pCi/g. Per Part 20, the solids concentrations in most Denver area drinking waters would push industrial users' wastewater into the non-exempt levels of TENORM. Only when the finished water has high total solids does the finished water have the potential to meet the exempt levels for TENORM.

To help correct the unintentional misalignment, CDPHE has identified finished water as NORM and has provided direction that a site-specific background may be developed for finished water when the finished water complies with the Primary Drinking Water Regulations' MCLs for radionuclides. While being considered NORM, the current *Guidance for Implementation of the Final Rule "Registration and Licensing of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)" 6 CCR 1007-1 Part 20, Addendum B: Site Specific Background Determination (TENORM Addendum B)* does not clearly specify how an IU would



develop a site-specific finished water background level for compliance with Metro's Rules and Regulations.

## **APPROACH**

To evaluate TENORM, CDPHE has instructed industrial users to develop a site-specific background for finished water that mirrors the process for soils using the process outlined in TENORM Addendum B. CDPHE would then allow this background concentration to be subtracted from the industrial wastewater to evaluate the TENORM concentration relating to regulatory limitations. Based on this guidance, Metro would calculate industrial discharge radionuclide concentrations for TENORM using the following basis:

*Concentration of industrial discharge (pCi/g) - Concentration of raw influent finished water (NORM, background, pCi/g) = TENORM (pCi/g)*

The TENORM calculated using this formula for the industrial discharge must comply with the prohibited discharge limit of 5 pCi/g stated in the Rules and Regulations.

While Metro supports this general approach, IUs are not initially obligated to develop a site-specific mean background concentration for radionuclides. When an IU does not choose to develop a site-specific mean background concentration, Metro will evaluate the industrial wastewater process sample against the prohibited discharge limit of 5 pCi/g stated in the Rules and Regulations, without subtracting raw water background concentrations. If found to be in violation of the Rules and Regulations, Metro may then require the IU to develop a site-specific mean background concentration for radionuclides.

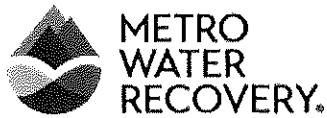
When developing a site-specific mean background concentration for radionuclides, Metro expects IUs to characterize finished water background in a more representative method than the process outlined by the CDPHE guidance. Per TENORM Addendum B, an IU could use 6 discrete finished water samples, each separated by at least 24 hours, to develop a mean background concentration for radionuclides. While this approach may work for onsite soils, this method does not well represent seasonal finished water changes based on customer demands or shifting raw water sources. Because of the unique operational characteristics of finished water, Metro expects more representative sampling to establish the mean background radionuclide concentrations in finished water. The following sections outline Metro's process for 1) the industrial user to develop an initial, long-term, and re-verification of background for radionuclides in the finished water; and 2) Metro's permitting and compliance processes for radionuclides.

### **Finished Water Background**

TENORM Addendum B provides a clear process for developing site-specific background for soils. Metro has modified this process as follows:

Determination of site-specific background values include the following steps:

- Step 1 – Selection of background reference sampling point(s)
- Step 2 – Collection of background samples
- Step 3 – Laboratory analysis of background samples
- Step 4 – Background data evaluation
- Step 5 – Approval process for site-specific background values



### Step 1 – Selection of background reference sampling point(s)

The IU must work directly with Metro to identify source water sampling locations for finished water or process water. Considering that the IU may have multiple sources of process water, Metro may require samples from each of the raw source waters. When multiple raw water sources exist, Metro will determine how to determine the finished water background. For example, if each raw water source is dedicated to a segregated process, the background development and evaluation would differ from a situation where the various raw water sources blended prior to use in the industrial process. Each raw water sampling location must be prior to modification (e.g., treatment or blending) of the source water and must be approved by Metro prior to sampling.

Metro must provide written approval of sampling points prior to an IU taking samples. This process requires a written application from the industrial user and a site inspection by Metro staff. Metro makes decisions on the sampling locations, sampling requirements, and other conditions in writing. Examples of other conditions might be the addition of sampling taps, flow metering and recording devices, and demonstration that the finished water complies with the Colorado Primary Drinking Water MCL at the time of every sample. Samples taken when the finished water does not comply with the Colorado Primary Drinking Water MCL may not be used to establish the site-specific background concentration for radionuclides.

### Step 2 – Collection of background samples

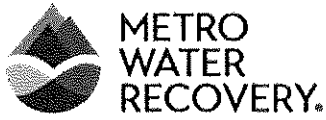
Once the collection sites, methods, and other conditions are approved, the IU may take samples in accordance with Metro's decision. Metro's decision will define the key radionuclide pollutants and the analytical techniques. In most cases Metro will offer a two-phase sampling process for new, existing, and modified IU processes. The first phase establishes the initial, short-term site-specific background. The second phase establishes the permit-term, site-specific background.

The first phase establishes the initial, short-term site-specific background radionuclide concentrations. This set of 6 discrete finished water samples, each separated by at least 24 hours, would represent a short-term mean background concentration for radionuclides. Metro and the IU would use this mean background concentration for radionuclides until the IU develops a permit-term, site-specific background concentration for radionuclides in the second phase.

The second phase requires the IU to collect 6 discrete finished water samples taken over a year, each separated by at least 1.5 months, to represent a permit-term mean background concentration for radionuclides. This sampling regime captures the seasonal and source variations. The permittee must reestablish this permit-term mean background concentration for radionuclides during the first year of each permit renewal. Repeating this process at the permit renewal stage captures source water changes that may occur within the water provider's system. In addition, if Metro learns of notable source water changes, Metro may require the IU to repeat the sampling for the permit-term, site-specific background concentration for radionuclides outside of the permit renewal schedule.

### Step 3 – Laboratory analysis of background samples

The IU must evaluate the raw water samples per 40 CFR 136 and as stated in Metro's decision letter provided during Step 1 of this process.



Step 4 – Background data evaluation

The IU must submit a permit modification application with all raw water analytical results and quality assurance verifications to Metro. The application must provide the basis and analysis used to develop the requested site-specific mean background concentration for radionuclides. Metro will approve, modify, or deny the permit modification application in writing.

Metro and the IU must maintain all analytical results and documentation related to the site-specific mean background concentration for radionuclides.

Step 5 – Approval process for site-specific background values

If approved, Metro will modify the IU's discharge permit to replace the current site-specific mean background concentration for radionuclides with the permit-term, site-specific mean background concentration for radionuclides.

