

# DRBC Guidelines for Determining Background Concentrations in Surface Waters under Special Regulations, Part 440 – Hydraulic Fracturing in Shale and Other Formations

## 1. Application

- a. For all proposed discharges under Subchapter B, Special Regulations, Part 440 – Hydraulic Fracturing in Shale and Other Formations, determination of background pollutant concentration by sampling and analysis is required.
- b. However, the Executive Director may determine at his or her discretion that background as defined under regulations (such as TDS background definitions in Water Quality Management Zones – Section 4.20.2) or other existing monitoring programs (such as Scenic Rivers Monitoring Program or DRBC Delaware Estuary Water Quality data) is more protective and therefore supersedes results determined by sampling and analysis.
- c. Applicants under this regulation must submit a Sampling and Analysis plan for review and approval by the Executive Director including specific sampling locations, specific analytical methods with method detection limits, limits of quantitation, quality control samples, and determination of median flow for the receiving water if non-tidal.

## 2. Parameters

- a. Applicable to **TDS** (440.5(g)(1)) and **pollutants of concern** (440.5(g)(4)).
- b. A table of acceptable analytical methods, method detection limits, and limits of quantitation will be developed and included with guidance (under development).

## 3. Sample Location(s)

- a. For discharges into non-tidal receiving waters, samples shall be collected from an appropriate near upstream location outside of the influence of the discharge and upstream discharges.
- b. For discharges into tidal receiving waters, samples shall be collected from an appropriate near upstream location and an appropriate near downstream location outside of the influence of the discharge and nearby discharges.

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### 4. Number of Samples

- a. A minimum of 10 samples at each sample location shall be collected, resulting in a total of 10 samples for non-tidal discharges and 20 samples for tidal discharges.
- b. Each sample shall be collected at least 10 days apart.
- c. DRBC staff will review coefficients of variation for parameters for existing data sets to determine if the collection of additional samples is warranted.

### 5. Sampling Flow and Tide Conditions

- a. For discharges into non-tidal receiving waters, samples shall be collected during low flow, defined as flow below the median flow for the sample location. Median flow shall be determined using gage data or estimation techniques described at [https://pa.water.usgs.gov/projects/surfacewater/flow\\_estimation/](https://pa.water.usgs.gov/projects/surfacewater/flow_estimation/) or similar.
- b. For discharges into tidal receiving waters in Zones 2, 3, 4 or 5 of mainstem Delaware River:
  - i. Samples for all parameters *except TDS, chloride and sodium*, must be collected when the flow at the Delaware River at Trenton is **below** 9,270 cubic feet per second measured at USGS gage 01463500 Delaware River at Trenton NJ (<https://waterdata.usgs.gov/usa/nwis/uv?01463500>).
  - ii. Samples for parameters TDS, *chloride and sodium*, must be collected when the flow at the Delaware River at Trenton is **above** 9,270 cubic feet per second measured at USGS gage 01463500 Delaware River at Trenton NJ (<https://waterdata.usgs.gov/usa/nwis/uv?01463500>).
- c. For discharges into tidal tributaries to Zones 2, 3, 4, or 5, samples shall be collected during low flow, defined as flow below the median flow for the sample location. Median flow shall be determined using gage data or estimation techniques described at [https://pa.water.usgs.gov/projects/surfacewater/flow\\_estimation/](https://pa.water.usgs.gov/projects/surfacewater/flow_estimation/) or similar.

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- d. For discharges into tidal receiving waters, samples shall be collected over the ebbing portion of the tidal cycle at the upstream location and over the flooding portion of the tidal cycle at the downstream location. The intent of sampling different portions of the tidal cycle at upstream and downstream locations is to improve representativeness of ambient water as opposed to sampling the existing plume.

**6. Computing Background**

- a. For discharges into non-tidal receiving waters, background concentration for each parameter shall be computed as the mean of concentrations resulting from the sampling and analysis.
- b. For discharges into tidal receiving waters, background concentration for each parameter shall be computed as the more stringent of the means of concentrations from the upstream and downstream locations.
- c. For non-detect results, a value of one half of the method detection limit shall be substituted in the computation of background. For estimated values below the limit of quantification, the estimated value shall be used in the computation of background.
- d. For discharges into non-tidal receiving waters draining to Special Protection Waters (SPW), the more stringent of the mean concentration resulting from the sampling and analysis, or the median concentration for the parameter as defined as the Existing Water Quality (EWQ) values for the nearest downstream Boundary Control Point (BCP) or Interstate Control Point (ICP) defined in DRBC Water Quality Regulations or in the Atlas of Existing Water Quality at [http://www.nj.gov/drbc/library/documents/SPW\\_EWQ-Atlas/entire-report.pdf](http://www.nj.gov/drbc/library/documents/SPW_EWQ-Atlas/entire-report.pdf) .