

**DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL
CONTROL**

DIVISION OF WATER RESOURCES

Statutory Authority: 7 Delaware Code, Section 60, (7 Del.C. §60)
7 DE Admin. Code 7404

FINAL

Secretary's Order No. 2009-W-0007

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7404 Total Maximum Daily Load (TMDL) for Zinc in the Red Clay Creek, Delaware

Under the authority vested in the Secretary of the Department of Natural Resources and Environmental Control ("Department" or "DNREC") under *29 Del. C. §§8001 et seq.*, *29 Del. C. §§10111 et seq.* and *7 Del. C. §6010 (a)*, the following findings, reasons and conclusions are entered as an Order of the Secretary in the above-referenced rulemaking proceeding to amend the Department's regulation codified at 7 DE Admin. Code 7404, which established the Total Maximum Daily Load ("TMDL") for zinc in the Red Clay Creek in New Castle County.

Based on the record, including the public hearing record reviewed in the February 9, 2009, Hearing Officer's Report ("Report") attached hereto as an appendix, I find the proposed amendment to the regulation is reasonable and well supported, and is not arbitrary or capricious. The Report reviews the October 28, 2008 public hearing and the administrative record. The Report recommends approval of the proposed regulation as a final regulation without any modification. I agree with the Report and adopt it as part of this Order.

The proposed amendment of Department Regulation 7404 is based upon NVF Company's ("NVF") challenge to Secretary's Order No. 99-W-0062, which approved the final regulation that established the TMDL for zinc in the Red Clay Creek ("1999 TMDL"). NVF appealed the Order and the TMDL regulation because it owns and operates a paper manufacturing plant along the Red Clay Creek in Yorklyn, New Castle County. The Department and NVF exchanged technical information and water quality data from five sampling locations. In addition, the Department changed (unrelated to NVF) its water quality criteria for zinc, including a changing from total zinc to dissolved zinc and this change impacted the TMDL for zinc's calculation.

On February 22, 2007, the Department and NVF entered into a settlement ("Settlement") to resolve the challenge to the 1999 TMDL. The Settlement includes a term that the Department will amend the 1999 TMDL for zinc from 1.81 pounds per day to 55.93 pounds per day, but also requires NVF to implement a Pollution Control Strategy designed to significantly reduce the release of zinc from NVF's property into the Red Clay Creek. NVF challenged the 1999 TMDL because NVF discharges into the Red Clay Creek zinc from its paper manufacturing process and the Department determined that NVF's discharges are the primary source of the zinc pollution in the Red Clay Creek. NVF's appeal sought to increase the TMDL for zinc based upon the use of the more complex dynamic, lognormal modeling to determine the TMDL, as opposed to the Department's use of the steady state, low flow modeling. It is important to note that the Department and United States Environmental Protection Agency both have accepted the lognormal and steady state models for use in calculating TMDLs. The Department's decision to accept the lognormal method in this particular case does not represent the Department's departure from the steady state model, which the Department will continue to be use as its default model. Instead, this TMDL is based upon the availability of additional data not normally available in determining a TMDL and the specific factual circumstances with NVF's source of the zinc released into the Red Clay Creek, particularly the data that showed peak zinc concentrations are not greatest at low stream flow levels. The ironic fact is that the zinc TMDL may be increased because of NVF's successful efforts to lower zinc discharges into the Red Clay Creek and the pollution control strategy changed the timing and magnitude of the zinc levels so that they do not occur at low flow conditions.

The lognormal method produces a TMDL for zinc of 55.93 pounds per day, as opposed to the 1.81 pounds per day previously determined under the challenged steady-state method's calculations. This change is significant at first blush, but the fact remains that the scientific results conclusively show that the Department's water quality criteria for zinc will be met with the TMDL derived from lognormal method.

The Department recognized the appropriateness of the amendment, but also was able to negotiate as part of the Settlement that NVF agreed to implement a pollution control strategy. The pollution control strategy will result in significant reduction to the underlying problem, namely, NVF's release of zinc into the Red Clay Creek from both direct discharge and more importantly from groundwater flows from past releases from the NVF property are effectively being controlled by the Pollution Control Strategy.

Public comments from local environmental groups both opposed and supported the proposed amendment. The support recognized the clean up in the Settlement's pollution control strategy, while the opposition was based upon the increase in the zinc loading. I find that the scientific evidence supports the amendment as consistent under the circumstances. The Department has discretion to use different methodologies when supported by sufficient data. In this case, the water quality data and specific factual and unusual circumstances supported the use of the lognormal method. The Department's use of the lognormal method for other TMDLs will be evaluated on a case-by-case basis because the water quality data may impose an undue burden on the Department not supported by any meaningful differences in results. The TMDL will limit the release of harmful levels of zinc into the Red Clay Creek, but the Department's experts have determined that the TMDL will allow the Red Clay Creek to achieve its applicable surface water standard.

The public comment about including the pollution control strategy in the regulation is rejected only because such a change may delay the regulation. This TMDL should be implemented as soon as possible and it will allow the NPDES permit to be issued to reflect this change. I agree that the Settlement provides a sufficient tool to obtain continued compliance with the Settlement's Pollution Control Strategy.

In conclusion, the following findings and conclusions are entered:

The Department, acting through this Order of the Secretary, adopts the proposed regulation 7404 as a final regulation, as set forth in the Appendix A to the Report;

The approval of the proposed regulation as a final regulation will protect and improve the water quality of Red Clay Creek in order that it may meet the Department's water quality standards;

The TMDL approved by this Order was developed consistent with the applicable law and regulatory standards, is adequately supported by expert technical analysis and is based upon use of an approved lognormal method to calculate the TMDL, which is appropriate under the specific circumstances presented here and consistent with changes that have occurred and the Settlement;

The Department provided adequate public notice of the proceeding and the public hearing in a manner required by the law and regulations, held a public hearing in a manner required by the law and regulations, and considered all timely and relevant public comments in making its determination;

The Department's proposed regulation, as published in the October 1, 2008, *Delaware Register of Regulations*, and set forth in Appendix A to the Report, are adequately supported, not arbitrary or capricious, are consistent with the applicable laws and regulations, and should be approved as a final regulation to go into effect ten days after its publication in the next available issue of the *Delaware Register of Regulations*; and that;

The Department shall provide written notice to the persons affected by the Order, as determined by those who participated in this rulemaking at either the public workshop or at the public hearing, including participation through the submission of timely and relevant written comments.

David S. Small, Acting Secretary

7404 TMDLs for Zinc in the Red Clay Creek, Delaware

~~4.0 Introduction and Background~~

~~1.1 Water quality monitoring performed by the Delaware Department of Natural Resources and Environmental Control (DNREC) and others has shown that the Red Clay Creek, adjacent to and~~

downstream of Yorklyn, Delaware, does not meet applicable water quality standards for zinc. Although zinc is an essential element for both aquatic life and humans, excessive concentrations can adversely affect aquatic life and human health. Zinc concentrations in the Red Clay Creek are not high enough to adversely affect people who drink water that is withdrawn from the Red Clay Creek. Zinc concentrations do, however, frequently exceed water quality criteria designed to protect fish and other aquatic life from the toxic effects of the metal.

- 1.2 A reduction in the amount of zinc reaching the Red Clay Creek is necessary to assure that applicable water quality standards are met and beneficial stream uses are protected. Zinc enters the Red Clay Creek from point sources and nonpoint sources. The National Vulcanized Fiber (NVF) Company located in Yorklyn, Delaware, is the only permitted point source discharge of zinc to the Red Clay Creek in Delaware. Nonpoint sources of zinc in the Red Clay Creek include background loading from the area of the Red Clay Creek watershed upstream of Yorklyn, seepage of contaminated groundwater from beneath the NVF facility to the Red Clay Creek, and diffusive flux from Creek sediments to the overlying water column.
- 1.3 Section 303(d) of the Federal Clean Water Act (CWA) requires States to develop a list (303(d) List) of waterbodies for which existing pollution controls are not sufficient to attain applicable water quality standards. Section 303(d) also requires each state to develop Total Maximum Daily Loads (TMDLs) for those waterbodies and pollutants placed on the state's 303(d) List. A TMDL sets a limit on the amount of a substance that can enter a water body while still assuring that applicable water quality standards are met and beneficial stream uses are protected. A TMDL is composed of three components, including a Waste Load Allocation (WLA) for point source discharges, a Load Allocation (LA) for nonpoint sources, and a Margin of Safety (MOS) to account for uncertainties.
- 1.4 DNREC listed the Red Clay Creek on Delaware's 1996 and 1998 303(d) Lists because applicable water quality standards for zinc were, and continue to be, frequently exceeded. Therefore, DNREC is proposing the following Total Maximum Daily Load (TMDL) regulation for zinc in the Red Clay Creek.

2.0 Total Maximum Daily Load (TMDL) Regulation for Zinc in the Red Clay Creek, Delaware

- Article 1. The TMDL for zinc in the Red Clay Creek shall be 1.81 pounds per day, measured as total zinc.
- Article 2. The combined mass loading of zinc to the Red Clay Creek from NVF's permitted discharge 002 (i.e., WLA_{002}), plus the mass loading of zinc to the Red Clay Creek from contaminated groundwater beneath the NVF property (i.e., $LA_{g.w.}$) shall not exceed 1.2 pounds of zinc per day, measured as total zinc.
- Article 3. The load allocation of zinc from the area upstream of Yorklyn (i.e., LA_{up}) shall be capped at 0.6 pounds per day, measured as total zinc. —
- Article 4. The margin of safety (MOS) for the TMDL listed in Article 1 has been set at 0.01 pounds of zinc per day. This small margin of safety (less than 1% of the TMDL) reflects the robust data set and the conservative approach used to establish the TMDL, while still accounting for the uncertainty associated with possible diffusion of zinc from Red Clay Creek sediments.
- Article 5. DNREC has determined with a reasonable degree of scientific certainty that water quality standards for zinc will be met in the Red Clay Creek once the mass loading requirements of Articles 1 through 3 are met.
- Article 6. Implementation of this TMDL Regulation shall be achieved through the development of a Pollution Control Strategy. The Strategy will be developed by DNREC in concert with affected parties, the interested public, and the Department's ongoing Whole Basin Management Program. The manner in which the 1.2 pounds per day that is noted in Article 2 above is allocated between discharge 002 and the contaminated groundwater discharge shall be one particular area of focus as part of the Pollution Control Strategy. The Pollution Control Strategy will also consider how monitoring will be conducted to verify compliance with the TMDL.

1.0 Introduction and Background

A TMDL specifies the maximum allowable mass loading of a pollutant (e.g., pounds per day) that can be delivered to a waterbody while still assuring that applicable water quality standards are met. A TMDL is composed of three components, including a Waste Load Allocation (WLA) for point source discharges, a Load Allocation (LA) for nonpoint sources, and a Margin of Safety (MOS) to account for uncertainties regarding the relationship between mass loading and resulting water quality. In simple terms, a TMDL attempts to match the strength, location, and timing of pollution sources within a watershed with the inherent ability of the receiving water to assimilate the pollutant without adverse impact.

On December 1, 1999, a Final TMDL Regulation for zinc in the Red Clay Creek was published in the *Delaware Register of Regulations* (3 DE Reg. 806 (12/1/99)). That TMDL Regulation was appealed by the National Vulcanized Fiber (NVF) Company to the State Environmental Appeals Board and the State Superior Court. The NVF Company owns and operates a manufacturing facility in Yorklyn, DE along the banks of the Red Clay Creek. The Department entered into a Settlement Agreement with the NVF Company in February of 2007, thereby resolving the appeal subject to the conditions of the Agreement. One condition of the Settlement Agreement was for the Department to propose an amended TMDL based upon a lognormal probability modeling approach. Such an approach provides an improved match between the strength, location, and timing of zinc mass loading to the Red Clay Creek with the inherent ability of the Red Clay Creek to assimilate the zinc loading without adverse impact. The lognormal probability modeling has been completed and the Department is now proposing to adopt an amended TMDL based upon the approach.

2.0 Amended Total Maximum Daily Load (TMDL) Regulation for Zinc in the Red Clay Creek, Delaware

- Article 1. The TMDL for zinc in the Red Clay Creek shall be 55.93 pounds per day, measured as total zinc.
- Article 2. The combined mass loading of zinc to the Red Clay Creek from NVF Yorklyn's permitted discharge 002 (i.e., WLA_{002}), plus the mass loading of zinc to the Red Clay Creek from contaminated groundwater beneath the NVF Yorklyn property (i.e., $LA_{g.w.}$) shall not exceed 25.17 pounds of zinc per day, measured as total zinc.
- Article 3. The load allocation of zinc originating from upstream of Yorklyn (i.e., LA_{up}) shall not exceed 25.17 pounds of zinc per day, measured as total zinc.
- Article 4. The margin of safety (MOS) for the TMDL listed in Article 1 has been set at 5.59 pounds of zinc per day, measured as total zinc. This MOS represents 10% of the TMDL and accounts for uncertainties in the overall TMDL analysis.
- Article 5. DNREC has determined with a reasonable degree of certainty that water quality standards for zinc will be met in the Red Clay Creek once the mass loading requirements of Articles 1 through 3 are met.

3 DE Reg. 806 (12/1/99)

12 DE Reg. 1230 (03/01/09) (Final)