

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 99-046

AMENDING CEASE AND DESIST ORDER NO. 95-151 for:

TOSCO CORPORATION
AVON REFINERY
CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board), finds that:

1. On November 15, 1995, the Board adopted Cease and Desist Order No. 95-151, ordering Tosco Corporation, Avon Refinery (hereinafter called the discharger) to cease and desist from discharging waste in violation of requirements contained in Waste Discharge Requirements, NPDES Permit Order No. 93-068, as amended by Order No. 95-138. The specific nature of the action was concerning violations of the effluent limit for dioxins and furans in the discharger's process wastewater treatment plant effluent Waste 001.

Purpose of Amendment

2. The main purpose of this Amendment is to extend the final compliance date of CDO No. 95-151 by one year to July 1, 2000, or sooner if pending actions by the U.S. EPA and State Water Resources Control Board (State Board) are finalized earlier than currently expected. This amendment also deletes requirements for development of treatment alternatives because these requirements are no longer applicable. Should additional treatment technology be required in the future, the CDO will be so amended. The reason for these changes are twofold. First, there is forthcoming Water Quality Standards and policy that will set the direction of dioxins and furans regulation throughout California. This direction may result in a different limit than the one currently specified in the discharger's permit. The U.S. EPA and the State Board are in the process of setting these standards and policy and final action may take place within the next twelve months. It is in the interest of the Board to impose effluent limits for dioxins and furans that are consistent with statewide standard and policy. Second, the Board's understanding of the dioxins and furans problem has increased and changed since adoption of the permit and CDO. The Board understands that the problem is widespread in nature and the sources are multi-media in scope. Therefore, a different approach is needed to address the problem. Additional details of all these factors are in the findings below.

Permit Limit

3. Order No. 93-068 specifies an effluent limit for dioxins and furans of 0.14 picogram/liter (pg/l) TCDD equivalent (TEQ). The TEQ is calculated from a weighted sum of seventeen congeners of 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (TCDD) and dibenzofuran (TCDF) using the 1989 U.S. EPA convention and toxicity equivalence factors. The basis for the limit was the State Board's 1992 Enclosed Bays and Estuaries Plan. This Plan was invalidated in 1994.
4. On June 21, 1995, the Board adopted Order No. 95-138 amending Order No. 93-068 to establish another basis for the effluent limit for dioxins and furans. In summary, the basis included various

U.S. EPA documents showing the highly toxic nature of dioxins and furans and the scientific validity of the TEQ approach in assessing risks from mixtures of dioxins and furans.

Pending Water Quality Standards and Policy

5. The findings below described issues related to upcoming water quality Standards and policy on dioxins and furans:
 - a. Water quality standards for dioxins and furans are a part of the U.S. EPA's ongoing process of establishing water quality standards for California. These standards are referred to as the California Toxics Rule. U.S. EPA published on August 5, 1997, a Proposed Rule for Water Quality Standards, Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (Federal Register , Vol. 62, 42160). This proposed rule specified criteria for only 2,3,7,8-TCDD, but suggests strongly that California prepare implementation measures that include the TEQ approach. The U.S. EPA is considering comments received and a final rule is expected in September 1999.
 - b. Concurrent with this process, the State Board is developing implementation plans for the California Toxics Rule. These are the Inland Surface Waters and Enclosed Bays and Estuaries Plans. A major element of these plans is a section on implementation of the dioxins and furans Standards. The State Board plans to finalize the plans within six months after U.S. EPA finalizes the California Toxics Rule.
 - c. The World Health Organization Working Group on Toxicity Equivalents Factors (TEF) for calculating TCDD equivalents (TEQ) has released revised TEFs for two of the congeners. Specifically, the TEF for penta-CDD increases from 0.5 to 1, and the TEF for Octa-CDD decreases from 0.001 to 0.0001. The U.S. EPA is considering adopting these revisions to replace the TEFs they previously adopted in 1989. The State Board is also considering these revisions in its policy development.

CDO No. 95-151 and Discharger's Compliance Status

6. CDO No. 95-151 required the discharger to investigate the causes of the permit limit violations, develop and study treatment technologies, and comply with the permit limit by July 1, 1999. In the interim, the CDO specified an interim limit of 0.14 pg/l for 2,3,7,8- tetrachlorinated dibenzo-p-dioxin (TCDD). This is the most toxic of the seventeen congeners in the permit limit, and is the one for which the U.S. EPA established Water Quality Criteria.
7. The discharger has been in compliance with the interim CDO limit with all samples showing non-detect for 2,3,7,8-TCDD. Although the discharger is still in violation of the permit limit (which is based on TEQ, not just 2,3,7,8-TCDD), the discharger has reduced the concentrations of dioxins and furans from a range of 2.5 to 13 pg/l TEQ prior to the CDO, down to consistently less than 0.5 pg/l TEQ since 1998. The discharger has accomplished this through control of solids resuspension in their final discharge canal by removing aerators and obstructions.
8. To achieve compliance with the permit limit (which is based on TEQ, not just 2,3,7,8-TCDD), the discharger will need to install filters at the north end of the discharge canal. They verbally report that the cost for this will be on the order of millions of dollars. Other options involving segregating treatment plant effluent and storm water could cost up to \$20 Million.

9. As required by the CDO, the discharger conducted an investigation to determine the cause of the violations. They concluded that the primary causes are related to atmospheric deposition from disperse sources that are affecting various wastewater streams. In effect, these wastewater streams are conveyances of dioxins and furans from other sources. These disperse sources include exhaust from diesel and gasoline fuel combustion, and wood burning. Additional findings below contain details about the specific wastewater streams that are impacted by these disperse sources.
10. Given the results of the discharger's investigation outlined in Finding 8, above, the discharger requested that the Board revise the permit limit to include a credit for storm water and intake water. In addition, the discharger advised the Board that efforts to comply with the CDO final compliance date of July 1, 1999, through the development of treatment technologies required by task numbers 6 and 9 of the CDO, were inappropriate. Although the discharger did not pursue completion of these tasks, the discharger did implement measures that substantially reduced the concentrations of dioxins and furans in the discharge as Finding 7 described. Board staff concurred with the discharger's decision to forgo development of a treatment technology in light of pending changes to Standards and policy, and in light of new data on storm water runoff that showed similar widespread impacts throughout the region. These data are discussed further in the findings below.
11. The specific causes of the violations that the discharger identified are storm water runoff and coke pond overflow, and minor amounts from raw water treatment and treated process wastewater. On an annual mass basis, storm water runoff accounts for 50% of the dioxins and furans in the discharge; coke pond overflow, 40%; raw water treatment, 8%; and process wastewater from the Wastewater Treatment Plant (WWTP), 2%. Figure 1 shows the facility and the contribution from these sources to the discharge canal. Considering the characteristics (or congener profiles) of the storm water runoff, coke pond overflow, and raw water reject streams, these three may be attributable to disperse sources from atmospheric deposition. In a sense, these violations result from the conveyance of dioxins and furans to the discharge from other sources that generate the pollutants. Overall, the discharger estimates that 99% of the dioxins and furans in their wastewater system are from disperse sources, and they remove approximately 85% of what is captured. Additional details of each of the waste streams causing the violations are in the following findings:
 - a. **Storm Water Runoff** - The discharger handles storm water runoff from its property in three different ways. The first applies to oily storm water. This includes storm water from process unit areas. This oily storm water combines with process wastewaters and receives treatment at the discharger's treatment plant. The second applies to non-oily storm water. This includes storm water from primarily tank farm areas that may be contaminated if there are leaks or spills from the tanks or other ancillary activities. This non-oily storm water discharges via outfalls E-003 through E-005. The third also applies to non-oily storm water but only from areas less susceptible to oil spills. This runoff discharges to E-001 via the discharge canal. The discharger showed that this runoff contributes about 50 percent of the mass of dioxins and furans to the discharge canal. Some of the dioxins and furans settle out in the sediments along the discharge canal. A small amount may be resuspended during dry weather from scouring action and contributes dioxins and furans to the E-001 discharge. Overall, the discharge canal appears to be a sink for dioxins and furans from runoff; in other words, less goes out with E-001 than comes in to the canal with the runoff. The discharger estimates that there is approximately 60 percent of the 85 percent total net dioxin reduction occurs in the discharge canal.

- b. **Coke Pond Overflow** - Coke pond overflow consists of the discharger's treated process wastewater that is re-used in the coke handling process. Coke is a powdery substance made up mostly of carbon from the coker unit. The coker unit processes the heaviest crude ends and residues from the refinery. "Light ends" and coke are the products. The light ends are returned to other process units at the refinery. The discharger stores and sells the coke to other industries for use in furnaces or iron manufacturing. The discharger uses effluent from the wastewater treatment plant to slurry and transport the coke to large outdoor coke piles. Effluent is also used to keep the coke in the piles wet to suppress dust. This wastewater re-use is a conservation measure to minimize the amount of raw water used at the refinery. The water percolates and settles through the coke and collects in a 72-acre pond adjacent to the coke piles. Overflows from the coke pond enter the discharge canal, combines with other wastewaters there and discharges through E-001. The discharger estimates that the overflows contribute about 40% of the mass of dioxins and furans to the discharge canal. As is the case for the storm water, some of the dioxins and furans settle out in the sediments along the discharge canal and some may be resuspended at other times by scouring action. Because of the large surface area of the coke pond, the discharger contends that atmospheric deposition impacts the quality of the pond water. They estimate that the quantity from ambient deposition onto the pond is roughly the same as that in the overflows from the pond.
- c. **Intake Water** - Raw water treatment streams consist primarily of demineralizer wastewater. This contains most of the solids and minerals removed from Contra Costa Canal water. The treated raw water is used in the refinery processes, and the reject flows to the discharge canal. The discharger estimates that these streams contribute about 8% of the mass of dioxins and furans to the discharge canal. The dioxins and furans in the raw water are most likely from atmospheric deposition onto reservoirs and the Contra Costa Canal.
- d. **Process Wastewater from WWTP** - Effluent from the process wastewater treatment plant contributes approximately 2% of the mass of dioxins and furans to the discharge canal. The discharger operated two catalytic reformer units that are known to generate dioxins and furans. One of these was shut down indefinitely in 1999. As a result of Board requirements in 1992, the discharger installed granular activated carbon treatment at one of the units and a settling tank at the other. These measures are effective at removing as much as 99.99 percent of the dioxins and furans from the wastewater streams from those two sources. However, these reductions have had no measurable impact on the concentration in the combined effluent. The remaining dioxins and furans in the treatment plant effluent may be due to oily storm water, and atmospheric deposition onto the over 100 acres of treatment ponds.

Regional Board Efforts to Understand the General Problem

12. Concurrent with the discharger's investigation, Regional Board staff initiated a survey of dioxins and furans in storm water runoff throughout the Bay Area with sampling during the wet weather season of 1995/1996. The results show widespread presence of dioxins and furans in runoff. The results did not show significant differences between the congener profile nor concentration of dioxins and furans in runoff samples from areas close to oil refineries versus areas far away.
13. On May 7, 1997, the Board organized a public workshop to receive technical testimony from national and local experts in the field of dioxins and furans. The experts presented information on sources, toxicity, and source control measures.

14. On February 18, 1998, the Board held a public hearing and received additional oral and written testimony from Board staff and the public on the health affects of dioxins and furans and recommendations for regulatory action to address dioxins and furans discharges to the San Francisco Bay environment. Board staff prepared and presented an issue paper titled "Dioxin in the Bay Environment - A Review of the Environmental Concerns, Regulatory History, Current Status, and Possible Regulatory Options, February 1998." Board staff made the following conclusions in this issue paper:
 - a. Human body-burden of dioxins and furans is approaching the level where there may be adverse health affects.
 - b. The primary route of human exposure to dioxins and furans is through diet. Decreasing local sources only may not have an impact on the body burden of dioxins and furans for the general population in the Region.
 - c. Concentrations of dioxins and furans in fish tissue from San Francisco Bay are at levels similar to the rest of the nation and may be representative of ambient levels.
 - d. Air emission sources make up greater than 95% of the dioxins and furans discharged to the San Francisco Bay estuary through direct deposition onto the Bay water surface and indirect deposition via storm water runoff.
 - e. Reductions in dioxins and furans air emission have been demonstrated for medical waste incinerators through sorting and elimination of certain types of waste.
15. At the February 1998 hearing, the Board stated that dioxins should be a high priority for immediate action to restore water quality and protect public health. The Board asked staff to work with the California Environmental Protection Agency and the U.S. Environmental Protection Agency to bring attention to dioxins as a cross-media issue.

CDO Amendment is Warranted

16. The Board finds that in light of the factors described above, revising the original requirements of CDO No. 95-151 is warranted. However, because of the changing Standards and policy for California, the appropriate scope of the CDO is unclear at this time. Therefore, the Board should await any revisions until the Standards and policy are finalized. The Board will reconsider this item no later than June 2000.

Compliance with CEQA and California Water Code

17. This amendment of enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15321 of the Resources Agency Guidelines.
18. The Board has notified the discharger and interested agencies and persons of its intent to adopt this order, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
19. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Order No. 95-151 is amended as follows:

Delete Item numbers 6 (Alternatives Report) and 8 (Chosen Alternative).

Item number 10 shall read as follows:

“10. **Final Compliance:** Achieve compliance no later than **July 1, 2000**, with the effluent limitation for TCDD specified in A.3 of Order No. 93-068 as amended, or in Waste Discharge Requirements adopted by the Board for the discharger that supersedes Order No. 93-068.”

Add the following provision:

“13. The Board may amend the requirements and deadlines specified in this Order after consideration of final Water Quality Standards from the U.S. EPA and Statewide Policy from the State Board. This may include shortening or lengthening of the deadlines depending on the scope and requirements of those Standards and Policy.”

I, Loretta K. Barsamian, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on June 16, 1999.


LORETTA K. BARSAMIAN
Executive Officer

Attachment: Figure 1

Figure 1. Contribution of Dioxins and Furans from Various Wastewater Streams to Discharge Canal

