

DELPHI DEVELOPMENT WHITE PAPER:

ANTIDEGRADATION ISSUES

Prepared on behalf of the TIN/TDS Task Force
Under Supervision of the
Santa Ana Watershed Project Authority

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BACKGROUND

Several years before Congress created the EPA or passed the original Clean Water Act, the State Water Resources Control Board adopted a policy to inhibit degradation of California's waters. Resolution 68-16 (see AD-2) codified the state's concern that existing high water quality be maintained wherever possible.

The purpose of resolution 68-16 was to prevent water pollution from becoming worse before water quality standards and discharge permits could be developed within the state. The "antidegradation" policy sought to limit water pollution to no more than the ambient levels found in late 1968. It says, in part:

"Whereas the California Legislature has declared that it is the policy of the State that the granting of permits and licenses for unappropriated water and the disposal of wastes into the waters of the State shall be so regulated as to achieve highest water quality consistent with maximum benefit to the people of the State...and..."

"Whereas the quality of some waters of the State is higher than that established by the [water quality control policies] and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible..."

"Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with the maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies."

Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Fifteen years later, in 1983, EPA amended federal regulations to require that states adopt a formal antidegradation policy (see AD-7). Resolution 68-16 was deemed to comply with that requirement. In subsequent years, the SWRCB made EPA guidelines part of state policy, by reference, where they applied. Since the Clean Water Act applies only to surface waters, the federal antidegradation policy does not apply directly to groundwater. In addition, the federal antidegradation rules apply only to the "fishable/swimmable" uses (WARM, COLD, REC1 & REC2) not to drinking water uses (MUN) or groundwater recharge uses (GWR) (see AD-14).

Resolution 68-16 makes no distinction between surface waters and groundwaters; historically, California's antidegradation policy has been applied to both. There is no consistency in how other states approach this issue (see Table 1). The policy itself is very short and offers little in the way of definitions or guidelines for implementation. Over time, however, the State Board has issued many rulings and written legal opinions which provide substantially more detail regarding antidegradation.

In 1972, the SWRCB set forth a state policy for water quality control (see AD-3). Citing the Porter-Cologne Water Quality Control Act, they wrote:

"Activities and factors which may affect the quality of the waters shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible..."

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"...the State requires implementation of water resources management programs which will conform to the following general principles: (1)...water quality control decisions must assure protection of available fresh water...resources for maximum beneficial use. (2) Municipal, agricultural, and industrial wastewaters must be considered as a potential part of the total available fresh water resource. (3) Coordinated management of water supplies and wastewaters on a regional basis must be promoted to achieve efficient utilization of water. (4) Efficient wastewater management is dependent upon a balanced program of source control of environmentally hazardous substances, treatment of wastewaters, reuse of reclaimed water, and proper disposal of effluents...(7) [It is desirable for] wastewater collection and treatment facilities to implement sound water quality management programs based upon long-range economic and water quality benefits to an entire basin. (9) Wastewater reclamation and reuse systems which assure maximum benefit from available fresh water resources shall be encouraged. Reclamation systems must be an appropriate integral part of the long-range solution to the water resources needs of an area and incorporate provisions for salinity control...(11) Water quality control must be based upon latest scientific findings. Criteria must be continually refined as additional knowledge becomes available."

Key terms have been underlined to emphasize the special regulatory obligations. These phrases help define what the SWRCB expects when Regional Boards implement the state antidegradation policy.

SANTA ANA REGION - 1968 TO 1975

In 1970, less than two years after 68-16 was adopted and nearly two years before the SWRCB adopted the first statewide policy for water quality control, the Water Quality Control Board for the Santa Ana Region was already acting to preclude groundwater degradation. Noting that TDS concentrations were rising in groundwater basins throughout the watershed, the Regional Board adopted resolution 70-38 strongly encouraging Metropolitan Water District to recharge higher quality state project water rather than lower quality Colorado River water (see AD-3). This resolution, although not binding on MET, is important because it establishes the Regional Board's commitment that water quality be suitable for downstream uses "as it was historically."

By 1972, the Regional Board had adopted the first basin plan for the Santa Ana watershed. That plan contained water quality objectives for several constituents found in the aquifers throughout the region. However, some of the discharge permits approved by the Board did not contain limits consistent with the water quality objectives in the basin plan. Specifically, there was no absolute limit on the concentration of TDS which could be discharged, only on the added increment of TDS in excess of source water quality.

Orange County Water District petitioned the State Water Resources Control Board to review the Rancho Caballero permit because it did not comply with the basin plan. The SWRCB agreed with OCWD and remanded the permit back to the Regional Board (see AD-4). Rancho Caballero was a unique situation because the proposed discharge quality (755 mg/L TDS), although worse than the basin plan objective (700mg/L), was better than existing receiving water quality (>900mg/L).

In their decision, the SWRCB acknowledged the Regional Board's reasoning but ruled that there was no "assimilative capacity" for increased TDS loads given that groundwater quality already exceeded basin plan objectives. The Rancho Caballero permit was not approvable under the state's antidegradation rule because it did not comply with applicable policies (the basin plan) and existing groundwater quality was not better than necessary to protect the use.

The Rancho Caballero ruling established two other important concepts regarding antidegradation. First, that assimilative capacity existed only where existing concentrations were lower than the water quality objectives in the same groundwater basin. And, second, that it is possible for water quality to change between the point of discharge and the receiving aquifer and, therefore, to permit lower quality discharges but scientific evidence must demonstrate that the groundwater will not, in fact, be degraded.

For most of the next ten years, California's antidegradation policy was interpreted and implemented consistent with the Rancho Caballero decision. In 1978, and again in 1980, the SWRCB resolved the conflict between encouraging water reclamation and inhibiting groundwater degradation in favor of avoiding deterioration.

In 1984, the California Water Code was amended by the legislature to include section 13523.5 which states:

"A regional board may not deny issuance of water reclamation requirements to a project which violates only a salinity standard in the basin plan."

The amendment was proposed by an assemblyman from the San Diego area who believed that water reuse projects were not proceeding quickly enough. Almost immediately the Buena Sanitation District in San Diego County sought relief from basin plan limitations on TDS discharges based on section 13523.5. Relying on advice of their chief counsel (see AD-5), the SWRCB denied the sanitation district's request. Wastewater discharge requirements were deemed to be distinctly different than water reclamation requirements and the special section of the water code did not apply to the former. Wastewater reuse was to be promoted, but not at the expense of degrading groundwater quality or violating basin plan objectives.

NEW INTERPRETATIONS - 1985 TO 1990

After it became clear that water quality objectives took precedence over other considerations, the SWRCB was asked whether and how those objectives could be changed to encourage more reclamation. The State Board's chief counsel wrote a long memorandum which described the available options (see AD-6).

The first options was for a water reclamation project to meet basin plan objectives. This requirement was proving difficult to meet and was the basis for repeated review of Regional Board decisions. The third option was to remove the beneficial use altogether. This was politically untenable and probably illegal since federal law precludes a state from nullifying any use designation where the use already exists.

The second option was to revise the water quality objectives upward providing that beneficial uses were still demonstrably protected. The SWRCB noted that 68-16 allows a reduction in water quality and cited several sections of the water code which requires only that the highest reasonable water quality be maintained after considering all of the demands and values of the area. The Board read section 13241 to mean that it was possible to change water quality without unreasonably affecting beneficial uses and section 13510 to mean that the people of California has a "primary interest" in maximum reuse of wastewater.

It was the opinion of the Chief Counsel that these relief valves had always been available but, that those proposing water reclamation projects had failed to provide an adequate scientific justification for degrading water quality. In 1980, the SWRCB had indicated that a complete, detailed technical analysis of the entire basin including replenishment rates, volume of groundwater, and movement of groundwater must be submitted. If additional data, not available when the objectives were originally adopted, more accurately reflects groundwater quality than those objectives may be changed if, and only if, beneficial uses remain protected and the proposed degradation was deemed to provide maximum benefit to the people of California. In the absence of new data or better analysis, the regulatory emphasis will continue to focus on mitigation and offsets rather than revising water quality objectives.

Although "maximum benefit" is not defined, one example was provided in the 1985 memorandum. Reuse would be of maximum benefit where the recharged wastewater was of higher quality than existing supplies and the groundwater quality was already degraded to the point where beneficial uses were marginal.

In 1986, the State Board affirmed most of the advice provided by their chief counsel the previous year. In the Santa Clara case (see AD-8), they ruled that 68-16 "does not absolutely require existing high water quality be maintained." In a footnote to the case, the Board specifically said that 68-16 was not a "non-degradation" policy. Limited degradation was allowable especially where receiving water quality would continue to meet basin plan objectives despite recharge of lower quality effluent. This is consistent with their previous definitions of assimilative capacity. The Board also stated that lower water quality was more tolerable where degradation had already occurred. 68-16 was not intended to require clean-up of previous pollution.

Although the cases from the mid-80's were meant to clarify the state antidegradation policy things weren't much clearer. It seemed, to the regulated community, as though the California Water Code contained many inherent conflicts between mutually exclusive goals. To make matters more complicated, the federal guidance on antidegradation became widely available about the same time.

FEDERAL ANTIDegradation REQUIREMENTS

The Code of Federal Regulations (section 131.12) was amended in 1983 to strengthen the emphasis on antidegradation. Each state was required to adopt an anti-degradation policy where water quality was better than necessary to protect beneficial uses.

In 1985, EPA provided national guidance on antidegradation (see AD-7). And, in 1987, EPA-Region IX provided expanded guidance on the subject (see AD-9). Among the most important new developments were the following:

- 1) If, after quantifying the probable impacts in the receiving water, quality was not likely to be lower, then no further antidegradation demonstration was necessary.

- 2) Repeated small changes in receiving water quality were also to be considered a degradation under the law. As such, each state must identify a baseline condition to preclude cumulative degradations which would otherwise be considered insignificant on an individual basis.
- 3) The entire antidegradation review process could be reduced to a decision tree (included in EPA-IX's guidance and attached here as Figure 1). And, where receiving water quality would not be "significantly lower", degradations were automatically assumed to be necessary to accommodate important social and economic development. If the proposed degradation was likely to produce significantly lower water quality than the proponents must make an affirmative demonstration that it was necessary to accommodate important social and economic development. Two different burdens of proof depending on the magnitude and extent of degradation expected. In both cases, the criteria for "significance" and for economic "necessity" were to be defined by the state. And, in all cases, beneficial uses must remain fully protected despite lower water quality.

In 1987, the State Board asked their chief counsel to analyze the implications of the new federal guidance. In another memorandum to the Board he highlighted several important points.

First, the federal and state antidegradation policies were not an absolute bar to reducing water quality. Rather, such degradations must be carefully justified after balancing the competing interests in the region.

Second, it must be determined whether a reclamation project was likely to lower water quality. If not, then no further antidegradation analysis was necessary. Specifically, the determination was to be made on basis of whether receiving water quality was affected not on the level of treatment. Antidegradation reviews are not necessarily triggered by proposed changes in water quality objectives.

Third, state law superceded federal authority where a waste or unreasonable use of water might occur. Of course, federal authority is limited to jurisdiction given under the Clean Water Act so groundwater degradations are controlled by 68-16 not 40 CFR 131.12.

Finally, the antidegradation review is generally considered to be part of the normal CEQA planning process. And, in some cases, it may not be possible to determine whether a degradation is likely to occur because the study area is too large and/or the available data is too limited.

In 1990, the State Board relied heavily on their chief counsel's interpretations to decide the San Jose case (see AD-12). The Board recognized legitimate exceptions to meeting basin plan objectives including inordinate burdens on dischargers, value of reclamation project, net environmental benefit, and unique hydrology. In this specific case, however, the State Board ruled that the burden-of-proof had not been met with respect to any of these exception thereby establishing a rigorous standard for justifying future degradations.

The SWRCB upheld the need to base antidegradation decision on sound science and allowed that such decisions could be based on qualitative rather than quantitative proof but that quantitative evidence was strongly preferred. The Board further recognized that federal antidegradation requirements were limited to maintaining ambient water quality as it was on November 28, 1975 and applied only to the fishable/swimmable uses. State resolution 68-16 would continue to govern groundwater quality and provide greater protection than the federal regulations.

Later in 1990, the State Board codified much of their previous guidance on antidegradation in an Administrative Procedures Update. In it they noted that antidegradation reviews must be conducted when issuing, reissuing, amending or revising an NPDES permit. Such reviews, however, are not necessary when the Regional Board has no reason to believe that existing water quality will be reduced. Less comprehensive reviews are acceptable if a Regional Board determines that the proposed action will produce only minor effects which will not result in significant reduction in water quality. The threshold of significance is not defined. Any antidegradation analysis must be conducted on the basis of representative data which accounts for the spatial and temporal variability of water quality. The specific method for conducting such an analysis is also undefined.

Most important, the Administrative Procedures Update recommends that the severity and extent of water quality reduction be weighed against the benefits to be accrued if degradation is allowed. A long list of factors to be considered is included in the Update (see AD-13 @ pg. 5). And, the State Board adopted a decision-tree flow chart, very similar to EPA-Region IX's, to guide the antidegradation review process.

SANTA ANA RIVER TIN/TDS STUDIES

In 1991, after completing a comprehensive scientific study of groundwater quality throughout the Santa Ana River watershed, the Regional Board concluded that there was little or no assimilative capacity for nitrates or salts. In many cases, ambient groundwater quality already exceeded basin plan objectives for these constituents. A wasteload allocation for nitrogen was adopted in 1991 and a wasteload allocation for TDS was adopted in 1994. Together, these WLA's make it difficult or impossible to increase wastewater reclamation in the watershed without comparable mitigation and/or offsets to preclude further degradation of the region's groundwater quality.

The 1991 study was limited to reviewing the ability of water and wastewater agencies to comply with existing groundwater objectives. The objectives themselves were not reviewed or revised. They were assumed to be both accurate and representative.

The Regional Board found that it was not possible to meet all basin plan objectives for TIN or TDS without enormous expense (several billion dollars) to residents of the watershed. The wasteload allocations they adopted were deemed to be the best balance between the competing need to discourage degradation and encourage reclamation.

It is possible to increase the amount of wastewater reclamation by meeting one of several conditions:

- 1) Offset or mitigate the likely degradations at the point of recharge or, if the Regional Board approves, elsewhere in the watershed.

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- 2) Increase the available assimilative capacity by demonstrating that the original objectives did not accurately represent baseline groundwater quality. If existing water quality remains below the revised historical ambient concentration than additional recharge may be allowed to lower water quality providing that the degradation assures maximum benefit to the people of California and beneficial uses remain fully protected.

The purpose of the present, on-going TIN/TDS study is to explore the viability of the second option. The TIN/TDS Task Force is charged with determining what is required to protect beneficial uses, justify degradation, and estimate ambient groundwater quality.

In the first DELPHI development effort, the Task Force identified concentration thresholds of TIN and TDS which protect the MUN-designated use. In the second DELPHI development effort, the Task Force will define what constitutes a "significant" lowering of water quality and what demonstrations are necessary to justify such a degradation on the basis of maximum benefit to the people of California.

To initiate the DELPHI discussion on these topics, a list of questions has been prepared. Task Force participants are asked to submit written responses to each question, review the responses of other participants, and provide written reactions/rebuttals to the comments of others.

ANTIDEGRADATION QUESTIONS (non-economic)

- 1) What does it mean to "degrade" or "lower" water quality? Is any increase in TIN or TDS concentration a degradation or must a demonstrated impairment result?
- 2) What distinguishes a "significant" from an insignificant lowering of water quality? Please attempt to define the threshold quantitatively.
- 3) If a formal antidegradation review is triggered by an action which may allow lower water quality, what probability or percent certainty best describes the "reasonable potential" of incurring degradation?

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- 4) Where is the need to conduct an antidegradation review assessed: in the receiving groundwater, in the receiving surface water, at point of effluent reclamation, all-of-the-above?
- 5) Define "ambient water quality" accounting for spatial and temporal variability. This should be an abstract definition not a site-specific or quantitative analysis.
- 6) Describe the factors and equations which you believe must be used to determine whether assimilative capacity for TIN or TDS exists in groundwater basins. Diagram the relationships if possible.

SOCIOECONOMIC QUESTIONS

- 7) Should any degradation of groundwater quality be allowed? Why or why not? Under what conditions? (For this question, assume that beneficial uses remain fully protected as defined in the earlier DELPHI discussions).
- 8) How is "maximum benefit" different from merely beneficial? What special demonstrations are necessary?
- 9) How should benefits and costs be valued for analysis, especially the intangibles? How should unlike effects be weighed against each other?
- 10) List the critical benefits and costs of wastewater reclamation which you believe must be considered as part of a formal antidegradation review. Specific effect categories are an essential part of your answer.
- 11) Define "people of California" as it should be used to evaluate the benefits or reclamation during an antidegradation review. Does it include only the affected interests, all three counties, the entire state? Is there a preferential order?
- 12) What distinguishes "important" from unimportant social and economic growth in the region? Quantitative threshold criteria are the preferred answer to this question.

- 13) What does "necessary to accommodate" mean? How should necessity be demonstrated? Is accommodation different from active support?